A Collective Case Study of Online Interaction Patterns in Text Revisions

Yu-Fen Yang and Shan-Pi Wu

ABSTRACT
Learning happens through interaction with others. The purpose of this study is to investigate how online interaction patterns affect students’ text revisions. As a sample, 25 undergraduate students were recruited to play multiple roles as writers, editors, and commentators in online text revisions. In playing different roles, they chose to read peer writers’ texts, edit peer writers’ errors, evaluate peer editors’ suggestions and corrections, and finally rewrite their own texts. Students’ choices of actions in the system to interact with their peers for the common goal of text improvement were identified as interaction patterns in this study. Results of this study revealed significant differences in students’ interaction patterns and their final texts. The interaction pattern of students who made both local (grammatical corrections) and global (the development, organization, and style of texts) revisions was an extensive and reciprocal process. The interaction pattern of students who made only local revisions was almost a one-way process. Based on these interaction patterns, we suggest that teachers encourage low-participating students to engage in interactions with their peers by showing the benefits of peers’ text revisions in the final drafts. Providing necessary assistance and guidance to low-participating students is essential, given their difficulties in writing texts, editing peer writers’ texts, and evaluating peer editors’ suggestions.

Keywords
Interaction pattern, Collaborative learning, Trace result, Text revision, Peer review

Introduction
Learning can be more effective when students are able to discuss with peers their ideas, experiences, and perspectives (Gonzalez-Lloret, 2003; Jonassen, Davison, Collins, Campbell, & Bannan Haag, 1995; Pena-Shaff & Nicholls, 2004). Through interaction, students are provided with opportunities to engage in a process of meaning construction in which they share ideas and try to create meanings from new experiences (Jonassen et al., 1995). That is, individuals may bring divergent ideas, experiences, and perspectives into collaborative learning (Hoadley & Enyedy, 1999; Stahl, 2002). How individuals move from seemingly divergent perspectives to shared understandings and then to a new construction of meaning is considered a significant aspect in collaborative learning (Puntambekar, 2006; Reeves, Herrington, & Oliver, 2004). In collaborative learning, a student entering a discussion with his/her own understanding may take away a more in-depth or broader comprehension of a topic through collaborative interaction.

The process of collaborative interaction is also important in the development of students’ writing skills. Students usually use the writing products of others to assist them in the construction of meanings. They may also collaborate and converse with others to exchange information and rewrite their texts. Results of DiGiovanni and Nagaswami’s (2001) and Heift and Caws’ (2000) studies indicated that students had better writing (or cognitive) development under the assistance from mature peers or experts.

Collaborative revision is considered a scaffold because it helps students improve their writing. Scaffolding is a temporary support for students that aids them in bridging the gap between what they can do and what they need to do (Graves, Graves, & Braaten, 1996). In the process of collaborative revision, novice writers gain assistance from capable peers to improve their texts. Similarly, expert writers’ metacognitive ability grows by editing texts and providing feedback to novice writers. That is, both novice and expert writers benefit from the process of collaborative revision.

According to Pena-Shaff and Nicholls (2004), the meaning-making or meaning-construction process “can become even more powerful when communication among peers is done in written form, because writing, done without the immediate feedback of another person, as in oral communication, requires fuller elaboration in order to successfully convey meaning” (p. 245). Collaborative interaction via the written medium is particularly important for college students who learn English as a foreign language (EFL) in Taiwan because they are required to read English
textbooks and write academic essays. However, in both reading and writing classes, they have less interaction with their peer learners and teachers due to very limited time in language instruction (Chi, 2001).

To foster interaction among students, computer-supported collaborative learning (CSCL) is proposed as an alternative (Martindale, Pearson, Curda, & Pilcher, 2005; Loard & Lomicka, 2004; Kinnunen & Vauras, 1995). CSCL has been claimed to be time and space independent (Huffaker & Calvert, 2003; Warschauer, 1997). The teacher and students can exchange messages from different places at different times. In the process of text revision, students can take peers as scaffolds to read peer writers’ texts and correct peers’ errors in order to help themselves construct meanings. That is, they collaborate with peers or the teacher to negotiate meanings and reconstruct their own texts.

Background of this study

To help EFL students revise their texts, an online system was built in this study that allowed students to play multiple roles. As writers, students posted their texts into the system for their peers to read. As editors, they read and edited their peers’ texts. When playing the role of a commentator, they evaluated peer editors’ suggestions and corrections (Fig. 1). That is, students were free to choose their actions in the system as they assumed each role in a writing cycle (write-edit-evaluate-rewrite). In taking different actions to play multiple roles, students acquired information from and contributed information to peers. Meaning arose as students created interpretations of their peers’ suggestions and corrections to construct and reconstruct their own texts (Leahey & Harris, 1989).

Figure 1. The writing cycle and role-switching in the system

This study is different from the related research in the field of collaborative revision in two main aspects. First, the role-switching of students in the system results in online interaction with peers through reading and writing. Online interaction occurs when writers, editors, and commentators post their texts or comments on peers’ texts. Students are free to change their roles as they take different actions such as reading peers’ texts, editing peers’ texts, and evaluating peer editors’ corrections in the system. They are also reminded to make choices and decisions to accept or reject peer editors’ correct and incorrect revisions. Second, most previous studies (e.g., DiGiovanni & Nagaswami, 2001; Heift & Caws, 2000) considered collaborative revision as an instructional intervention for students without paying attention to individual students’ progress in information acquisition and contribution. In most of the previous studies, the decreasing rate of grammatical errors in the final drafts was considered to indicate the students’ progress in text revisions. However, the quantitative data of the decreasing rate neither disclosed how students made such revisions nor revealed their progress in text reorganization.

This study not only recognizes collaborative revision as an instructional intervention but also emphasizes individual progress in text improvement. Each student’s interactive process was recorded in the trace result of the system to indicate how individuals revise their texts through online interaction to acquire and contribute information in improving their final drafts. In other words, students’ choices of actions in the system to interact with their peers for the common goal of text improvement are defined as interaction patterns in this study (Liu & Tsai, 2008; Reisslein,
Seeling, & Reisslein, 2005). Students’ first and final drafts were further analyzed and compared to illustrate the influence of interaction patterns on text revisions.

The purpose of this study is to investigate how online interaction patterns affect students’ text revisions. Because students are free to choose their actions in the interactive process to improve their texts, their interaction patterns may reveal significant instructional implications for teachers. Two research questions are addressed in this study: (1) What are students’ interaction patterns in online text revisions? and (2) How do the interaction patterns affect students’ text revisions in their final drafts?

Method

Participants

An EFL writing class was randomly selected from a university of science and technology in central Taiwan. In this class, the 25 students were common in two aspects: (1) they all passed the intermediate level of the General English Proficiency Test, a nationwide screening test administered by the university in the selection of students who wish to major in English, and (2) they had taken the same writing class for two years in this university and were in the third year of their studies.

The objective of this writing class was to develop students’ writing skills via online interaction that led to a reconstruction of their original texts based on the feedback received from peer editors. That is, students attempted to achieve their common goal in text improvement and their improvement was examined by comparing the differences between their first and final drafts. In addition to in-class instruction, students were expected to finish each text in a writing cycle (write-edit-evaluate-rewrite) within three weeks and spend three to four hours per week doing so. They were randomly assigned a user identifier in the system in order to be anonymous in the writing cycle when they posted their reaction essays, edited peers’ writing errors, evaluated peer editors’ corrections, and finally reconstructed their texts.

Procedures of data collection

The present study was conducted between October 1, 2007, and January 14th, 2008. A total of 25 undergraduate students were asked to revise their texts by interacting with their peers online both during and after class. Peer editors chose the error types and stated the reasons behind their choices so that each student was able to read the revised essay and the comments by moving the mouse on the icons in the text (Fig. 2). These corrections or comments helped writers reflect on their errors. In addition, revisions were indicated by Diff Engine, which highlighted newly added words and crossed out deleted words.

![Figure 2. Commenting on corrections](image)
Next, the original student writers provided comments to evaluate editors’ suggestions. For example, a commentator (a student writer) might click a “triangle” icon to read peer editors’ corrections or suggestions. He then might or might not write his response to each correction or suggestion. The commentator evaluated the peer editor’s correction by giving two stars on a five-star scale in the “evaluation” column. He then explained his evaluation in the “reasons for evaluation” column. An example is shown in Figure 3.

Students’ interactive processes with peers in text revision were recorded in the trace result. Two kinds of data were included in the trace result: an action log and personal statistics. The action log records students’ every single action in the system, such as reading, posting, editing, and evaluating. When students log in to the system, the recording function is activated. The trace module can record various operating actions that students adopt within the system, for example, read, post, revise, suggest, and evaluate. The action logs are listed in tables (see Fig. 4). By clicking the “view” button, the teacher was able to ascertain which student, which text, and which correction or suggestion the student interacted with.

“Personal statistics” shows the number of texts each student posts, the number and the type of errors that each student makes. “Post records” include (a) the number of new essays posted, (b) comments on peers’ essays, and (c) the topics of essays that the student has revised. For example, the peer editors select the type of errors, and the number of errors in a text is automatically counted as personal statistics in the system.

Figure 3. An example of a student writer’s evaluation of online feedback

Figure 4. Action log
According to the report, students nowadays feel stressful during their school life. To my surprise, the report also mentions that junior high students feel more stressful than senior high students do. It is not difficult to find out the reason, which is related to our social values.

Figure 5. Student A, information acquired from peers
Procedures of data analysis

The main challenge of data analysis in this study involved the integration of cases, methods, and datasets to produce compelling analytic conclusions. In this collective case study, data analysis within each case, between cases, within each method, and between methods took place alongside the data collection and processing (Lim & Barnes, 2005). Data were analyzed in terms of each student’s actions in the trace result and each student’s first and final drafts along with peer editors’ suggestions and corrections collected in this study. First, in order to observe interactions among students and their peers through reading and writing, the action logs in the trace result were examined. Second, students’ interaction patterns were identified based on the actions that students took in the system.

Finally, students’ first and final drafts were analyzed and compared in terms of local and global revisions. “Local revision” refers to student writers’ corrections with respect to grammatical errors such as redundant words, misuse of punctuation, and incorrect subject-verb agreement. “Global revision” refers to student writers’ corrections concerning the organization, development, or style of a text. Both local and global revisions are important for students to improve their texts (Cho & Shunn, 2007; Li, 2006). In other words, an individual student’s text improvement was assessed by the comparison between his first and final drafts in terms of local and global revisions. The inter-rater reliability of the students’ local and global revisions in their first and final drafts ranged from 0.75 to 0.86 among 25 participants. The disagreement between two raters was resolved by discussion. Data analysis using this research method is presented in the following sections.

Results

In this study, revision is defined as the changes that students make to a writing product to improve it. Revisions are indicated in the system by Diff Engine, which highlights newly added words and crosses out deleted words. In order to illustrate the differences in student writers’ final drafts and interaction patterns, we selected two sample students. Whereas student A is an example of a student that made both local and global revisions, student B made only local revisions in the final draft. The statistics concerning the 25 participants’ actions, as recorded in the trace result and corrections on their peers’ texts, is also discussed.

Student A’s and B’s interactive processes with their peers

Student A’s interactive processes are shown in Figure 5. In tracing student A’s actions, we found that he acquired information by reading different peer writers’ texts on November 6, 2007. He then read and reread his own text and further corrected his errors to perfect the text. In interacting with his peers, he received various corrections and suggestions from different peer editors. Based on these corrections and suggestions, student A revised his text. As shown in Figure 5, student A read various suggestions and corrections from peer editors on December 4, 2007. After reading, he rewrote his text based on peer editors’ suggestions and corrections. He then published his final draft on January 5, 2008. From the trace result, it was found that student A read not only the suggestions that peer editors provided to him but also peer editor 1’s suggestions on peer writer 2’s essay (December 4, 2007).

Apart from acquiring information from peers, student A also contributed information to his peers. As shown in Figure 6, he edited a peer writer’s text and made some suggestions on December 29, 2007. In the process of information acquisition and contribution, student A served as a scaffold for others, and vice versa.

![Trace Result](image)

Figure 6. Student A, information contributed to peers
In Figure 6, student A actively participated in collaborative interactions with his peers through, for example, editing and making suggestions with respect to his peers’ essays. While student A interacted with peers, reading and providing suggestions to peers helped him revise his own text.

Similar to Student A, Student B acquired information by reading his peers’ essays (see Fig. 7). However, he sometimes published new essays without reading his peers’ essays. That is, student B used his prior knowledge to compose essays without interacting with peers in the system. When student B revised his essay, he only read few or even none of the corrections and suggestions provided by his peers. For instance, there were 74 comments (action 4) in his text. Student B only read one of the 74 comments in the text (action 5). Actions 6 to 10 indicate that none of the comments in the different versions of the essay were read by him. He read the corrections from peers without evaluating the reasons (comments) why the corrections had been made.

Students A’s and B’s interaction patterns

Based on students’ actions recorded in the trace result, students A’s and B’s interaction patterns were identified (Liu & Tsai, 2008; Reisslein, Seeling, & Reisslein, 2005). These patterns referred to how a student published new essays, read peer writers’ texts, edited peers’ errors, and provided suggestions to peer writers. Based on the actions that student A took and recorded in the trace result, the interaction patterns of student A are shown in Figure 8.
Six types of interactions are shown in Figure 8. In information acquisition, student A read peer editors’ local and global revisions as well as peer writers’ texts. In information contribution, he edited peer writers’ texts, provided suggestions to peer writers, and published texts for peers to read. In the system, almost everyone is someone else’s scaffold in the collaborative interaction of text revisions. As an individual, student A frequently acquired and contributed information to peers in assuming each role.

A closer look at student A’s information acquisition showed that student A had read the suggestions provided by peers 1 and 3 (Fig. 9). He also read the suggestions that were provided by peer 1 to peer 2. Student A was not just passively acquiring information from peer editors. Instead, he actively searched for and read other resources such as peer 1’s suggestions on peer 2’s essay.

With respect to information contribution (see Fig. 10), student A edited peer 1’s essay and stated the reasons why the corrections had been made. In addition to editing peers’ essays, student A also made suggestions on peer 2’s text concerning the organization and development of the text. After acquiring and contributing information in collaborative interactions, student A finally published a new essay for his peers to read.
In contrast to student A, student B had much simpler interaction patterns. In Figure 11, student B’s acquisition of information involved reading peers’ suggestions and peer writers’ essays only. He had acquired little information because he had read only the suggestions provided by peers to himself (see Fig. 12).

**Figure 10. Student A’s contribution of information**

**Figure 11. Student B’s interaction pattern**

**Figure 12. Student B’s acquisition of information**
In information contribution, student B edited peer 1’s essay and published his own essay (see Fig. 13). Different from student A’s interaction patterns, student B’s action in “suggesting global revision to peers’ essay” was missing. Student B could only edit peers’ essays for grammatical errors. He did not provide suggestions regarding the style, organization, and development of his peers’ essays.

**Figure 13. Student B’s contribution of information to peers**

The influence of student A’s and B’s interaction patterns on text revisions

The excerpt of the editor’s suggestions and corrections on student A’s text is shown in Table 2.

| Table 2. Excerpt of the editor’s suggestions and corrections on student A’s text |
|-------------------------------|-----------------------------------------------------------------|
| (1) After seeing seeing, the movie, the most impress on my mind is a phrase” If you focus on the problem, you can not see the solution. Never focus on the problem!” (2) Just As like my general lessons knowledge course’s teacher said” People people often commit an error because in of the habitual inertia train of thought and do not jump out the circle.” (3) Because we always suppose believe that the seeing thing is what believes, we is see truth. Is Such true. as (4) Like the patients in the movie, they do are not lose their mental balance, but most of people think they are mental patients and nobody willing to realize hear them. (5) the Furthermore, voice it in is their useless mind. Cures Doctors that also the doctors just use medication but in compliance with the formulation and ignore the patient’s feeling. It is no futile effort that cures the problem only on the physiology. |

Analyzing student A’s first and final drafts, we found that student A did both local and global revisions (see Table 3). Student A did not accept all the corrections or suggestions that his peers provided; instead, he selectively accepted some suggestions and corrections in his final draft. For example, in sentence 2, 3, and 4 (see Table 3), student A did not revise the sentences exactly as the peer editor suggested. Instead, he rewrote the sentence to express his ideas more clearly and precisely. He further integrated sentences 5 and 6 in his final draft, a global revision. The meaning of sentences 5 and 6 was, thus, changed according to the reorganization of the text.

| Table 3. Analysis of student A’s first and final drafts |
|-----------------------------|-------------------------------------------------|
| First draft | Final draft | Type of revision |
| (1) After seeing, the most impress on my mind is a phrase” If you focus on the problem, you can not see the solution. Never focus on the problem!” | (1) After seeing the movie, the most impressive statement in my mind is “If you focus on the problem, you can not see the solution. Never focus on the problem!” | Local revision |
| (2) As my general knowledge course’s teacher said, people often commit an error in the inertia train of thought and do not jump out the circle. | (2) As one of the teachers of general education said “People often commit an error because of the habitual thought and do not jump out the circle.” | Local revision |
| (3) Because we suppose that seeing is believes, is truth. | (3) Because we always believe the thing what we see is true. | Local revision |
| (4) Such as the patients in the movie, they are not lose their mental balance, but most of people think they are mental patients and nobody willing to hear the voice in their mind. | (4) Such as the patients in the movie, they do not lose their mental balance, but most of people even doctors think they are mentally disordered psychiatric patients and nobody is willing to realize them. | Local revision |
Doctors also just use medication in compliance with the formulation and ignore the patient’s feelings. Furthermore, I think it is useless that the doctors just use medication but ignores the patient’s feeling.

It is no futile effort that cures the problem only on the physiology. Additionally, I think it is useless that the doctors just use medication but ignores the patient’s feeling.

Global revision

It is futile effort that cures the problem only on the physiology. N/A

Global revision

The leading role finally proved his concepts and his ways are correct at the end of this movie. The final result is that Patch proved his concepts and his ways are correct at the end of this movie.

Local revision

N/A

So I think the rules are people to formulate, so the rules are supposed to modify by people in appropriately.

Global revision

Table 4 shows the excerpt of the editor’s corrections and suggestions on student B’s text.

Table 4. Excerpt of the editor’s corrections and suggestions on student B’s text

<table>
<thead>
<tr>
<th>Sentence</th>
<th>First draft</th>
<th>Final draft</th>
<th>Type of revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) “Patch Adams” was wonderful.</td>
<td>(1) “Patch Adams” was wonderful.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(2) I was really moved by the movie.</td>
<td>(2) I was really moved by the movie.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3) All emotions were running high during this whole movie.</td>
<td>(3) All emotions were running high during this whole movie.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(4) The sadness level rises, the happiness level rises, and the overall entertainment through this whole movie.</td>
<td>(4) The sadness level rose, the happiness level rose, and the overall entertainment through this whole movie rose.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(5) “Patch Adams” delivers a powerful message.</td>
<td>(5) “Patch Adams” delivers a powerful message, which is an old saying that goes “laughter is the best medicine.”</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(6) It is about the old saying that goes “laughter is the best medicine.”</td>
<td>(6) It is about the old saying that goes “laughter is the best medicine.”</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(7) He knew in his heart that all patients needed to laugh.</td>
<td>(7) He knew in his heart that all patients needed to laugh.</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(8) Laughter is after all the best medicine anyone could ask for.</td>
<td>(8) Laughter is after all the best medicine anyone could ask for.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(9) Adams discovers that a clown nose can accomplish more than any pill in many cases—and sets to work amusing patients.</td>
<td>(9) Adams discovered that a clown nose could accomplish more than any pill in many cases, and then set to amuse patients.</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(10) By communicating with patients, he discovers that by helping others he helped himself, too.</td>
<td>(10) Through communicating with patients, he discovered that by helping others he helped himself, too.</td>
<td>Local revision</td>
<td></td>
</tr>
</tbody>
</table>

The peer editor provided many corrections and suggestions to student B, but only four out of ten sentences were revised in student B’s final draft (see Table 5). Referring back to student B’s actions in the trace result, we found that student B had few interactions with peers, such as reading very few or none of the suggestions from peers. Passive interaction in the system resulted in student B’s limitations in revising his final draft. The types of text revisions were constrained to local revisions.

Table 5. Analysis of student B’s first and final draft

<table>
<thead>
<tr>
<th>Sentence</th>
<th>First draft</th>
<th>Final draft</th>
<th>Type of revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) “Patch Adams” was wonderful.</td>
<td>(1) “Patch Adams” was wonderful.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(2) I was really moved by the movie.</td>
<td>(2) I was really moved by the movie.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3) All emotions were running high during this whole movie.</td>
<td>(3) All emotions were running high during this whole movie.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(4) The sadness level rises, the happiness level rises, and the overall entertainment through this whole movie.</td>
<td>(4) The sadness level rose, the happiness level rose, and the overall entertainment through this whole movie rose.</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(5) “Patch Adams” delivers a powerful message.</td>
<td>(5) “Patch Adams” delivers a powerful message, which is an old saying that goes “laughter is the best medicine.”</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(6) It is about the old saying that goes “laughter is the best medicine.”</td>
<td>(6) It is about the old saying that goes “laughter is the best medicine.”</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(7) He knew in his heart that all patients needed to laugh.</td>
<td>(7) He knew in his heart that all patients needed to laugh.</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(8) Laughter is after all the best medicine anyone could ask for.</td>
<td>(8) Laughter is after all the best medicine anyone could ask for.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(9) Adams discovers that a clown nose can accomplish more than any pill in many cases—and sets to work amusing patients.</td>
<td>(9) Adams discovered that a clown nose could accomplish more than any pill in many cases, and then set to amuse patients.</td>
<td>Local revision</td>
<td></td>
</tr>
<tr>
<td>(10) By communicating with patients, he discovers that by helping others he helped himself, too.</td>
<td>(10) Through communicating with patients, he discovered that by helping others he helped himself, too.</td>
<td>Local revision</td>
<td></td>
</tr>
</tbody>
</table>
Differences in participants’ text revisions

Of the 25 participants in this study, nineteen conducted only local revisions in their final drafts, while six participants made both local and global revisions (see Table 6). Some differences could be detected in these two groups. First, the number of actions that the members of the two groups took was different (see Table 6).

A t-test was conducted to examine whether there were significant differences between these two groups of students in actions and revisions. The result showed that the differences were significant with p values less than .01. The mean frequency of students’ actions indicated that the students who made global revisions took many more actions of reading, posting, editing, and evaluating than those students who made only local revisions. In other words, the more students interacted online, the more they did both local and global revisions in the texts. The effects of interaction on students’ texts could also be noticed from the rate of sentence revisions. Within a text, students who made both local and global revisions revised 90% of their sentences, whereas students who made only local revisions revised 41% of their sentences.

### Table 6. Mean frequency of students’ actions in text revisions

<table>
<thead>
<tr>
<th>Participants</th>
<th>Number of students</th>
<th>Mean frequency of students’ actions</th>
<th>Mean of sentence revision rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A: Local and global revisions</td>
<td>6</td>
<td>862 **</td>
<td>90%**</td>
</tr>
<tr>
<td>Group B: Local revision</td>
<td>19</td>
<td>198.6 **</td>
<td>41%**</td>
</tr>
</tbody>
</table>

**p < .01

Second, some actions were missing in the interaction pattern of students who made local revisions only. For instance, six types of interaction patterns were found in students who made both local and global revisions, whereas only four of them were found in students who made local revisions. The missing actions were (1) reading suggestions from peers, (2) making suggestions to peers’ essays. Third, it was found that students who made only local revisions focused on the suggestions that peers provided to them and ignored or rarely read the suggestions of their peers. This decreased students’ opportunities to learn from peers. Fourth, students who made only local revisions had difficulties finding and correcting peer writers’ errors. They only focused on grammatical errors without providing suggestions in terms of style, development, and organization of texts.

Fifth, from student A’s interaction patterns, we found that his collaborative interaction with peers was not a one-way process. Instead, it was a reciprocal process of sharing and constructing meaning. In the reciprocal process, he not only acquired information from his peers but also contributed information to them. He was connected with his peers to accomplish their common goal of text revision. He also served as a scaffold to his peers in the process of achieving this goal. The interaction patterns of students who made both local and global revisions are illustrated in Figure 14.

![Figure 14. Interaction patterns of students who made both local and global revisions](image_url)
Finally, from student B’s information acquisition and contribution, the interaction patterns of students who made only local revisions was almost a one-way process (Fig. 15). For instance, student 2 acquired information from student 3 but he did not contribute information to student 3. The process of interaction became a one-way process. In addition, when student 4 contributed information to student 2, student 2 did not read student 4’s information. As a result, student 4’s contribution of information could not benefit student 2 in text revision.

**Figure 15. Interaction pattern of students who made local revisions only**

**Discussion**

From the results of this study, we were able to identify a interaction framework to explain how online collaborative interactions influenced students’ text revisions (see Fig. 16). This framework indicates how students go from their first drafts (unshared information) to their final drafts (newly constructed meanings of texts) by interacting with peers.

**Figure 16. The interaction framework of students’ text revisions**

In text revision, students went through different stages by interacting with peers, namely, information acquisition, negotiation of meaning, and information contribution. In each stage, students might have taken several actions in order to achieve their goals of revising or rewriting their texts. In this study, students received suggestions and corrections from peers in the process of revision after posting their first drafts. They also read different peer writers’ essays on the same or different topics to imitate their writing styles and skills. In reading, student writers might encounter the conflicts between their prior knowledge and peer editors’ corrections and suggestions.
In encountering conflicts, a student writer negotiated the meanings with his/her peers through reading and writing. The student writer could compare his prior knowledge with the information he received. Negotiation of meanings led to agreement or disagreement of peer editors’ corrections and suggestions. It was important for a student writer to clearly express his agreement or disagreement, which represented his evaluation of peer editors’ corrections and suggestions. Without negotiating the meanings, a student writer would be unable to identify what had been done right or wrong.

Through agreement or disagreement with peer editors’ corrections and suggestions, a student writer revised his text. Integrating peer editors’ corrections and suggestions helped one construct new meanings and publish a new essay. In the construction of new meanings, a student writer might have played another role as editor or commentator. He needed to be equipped with the ability to help others revise their texts by providing corrections and suggestions. With the investigation of information acquisition and contribution in collaborative revision, students’ progress in the process of writing could be observed in this study. Different from previous studies (e.g., DiGiovanni & Nagaswami, 2001; Heift & Caws, 2000) that focus on the evaluation of students’ final drafts, this study emphasizes the importance of students’ writing process in text improvement.

Based on the framework proposed in this study, we suggest that the instructor explain the benefits of peer reviewing and make students aware of the importance of peer reviewing. For instance, the teacher can provide students with examples of peers’ first and final drafts. This comparison will clearly show students’ improvement in their final drafts. The comparison between first and final drafts is particularly important for low-participating students since they were found to ignore peer editors’ corrections and suggestions in this study. Through monitoring low-participating students’ progress in revisions, the teacher should also provide necessary assistance to them as they may have difficulties in writing texts, editing peer writers’ texts, and evaluating peer editors’ suggestions. Since reading and writing are important interactions in the process of peer review, the teacher should encourage students to play different roles and take responsibility for each role in the collaborative interaction and learning process.

Some limitations were also found in this study. First, the sample size was not big enough to generalize students’ collaborative interaction patterns, since only 25 participants took part in this study. The result of this study might not be able to fully illustrate the interaction patterns in EFL classes. Second, the teacher’s and students’ perceptions of writing development in the system should be further explored. An interview could be conducted to investigate their perceptions toward the impact of the system on peer review.

Acknowledgement

This study was supported by the National Science Council in the Republic China, Taiwan (NSC 97-2410-H-224-016-MY2).

References


