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# Individual novices and collective experts: Collective scaffolding in wiki-based small group writing

Mimi Li

*Marshall University*, [limi@marshall.edu](mailto:limi@marshall.edu)

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Individual novices and collective experts:  
Collective scaffolding in wiki-based small group writing

**Abstract**

This article reports on a case study that explored the process of wiki-based collaborative writing in a small group of English as a Foreign Language (EFL) students at a Chinese university. The study examined the archived logs from the group wiki “Discussion” and “History” modules with a focus on the group members’ scaffolded interaction when co-constructing texts in the wiki space. The analysis revealed that the participants were actively engaged in reciprocal communication in terms of content discussion, social talk, task management, technical communication, and language negotiation. They were also found to have scaffolded each other’s writing efforts during co-constructing the product via multiple writing change functions, including addition, deletion, rephrasing, reordering, and correction. This study explicated a distinct case of collective scaffolding (Donato, 1994) in a truly collaborative writing activity, where group members were simultaneously individual novices and collective experts as they pooled their knowledge and mutually guided each other through problem solving. This study has important implications for instruction and future research on computer-mediated collaborative writing.

*Keywords:* Wiki; Second Language Writing; Collaborative Writing; Writing Process; Collaboration; Interaction; Collective Scaffolding

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## 1. Introduction

Collaborative writing, known as plural authors producing a singular text (Ede & Lunsford, 1990), has been increasingly implemented in second language classes during this decade (e.g., Dobao, 2012; Elola & Oskoz, 2010; Kessler & Bikowski, 2010; Mak & Coniam, 2008; Storch, 2002, 2005; Watanabe, 2008). Informed by social constructivism, collaborative writing allows multiple writers to co-author and jointly produce a written text, and thus encourages scaffolded performance throughout the writing process. Recently, with the development of Web 2.0 technology, the wiki has been gaining growing attention as a medium for group writing due to its “intensively collaborative” nature (Godwin-Jones, 2003, p. 15). Previous research (Lee, 2010, Lundin, 2008, Li, 2012b) reported that the affordance of wikis eases collaborative process, facilitates interaction, and supports student writing development. Despite the initial acknowledgement that wikis enhance collaboration, continual revision, and collective language production (e.g., Lund, 2008; Purdy, 2009), research involving the revision process as it occurs in wikis “has just begun to scratch the surface” (Ducate, Anderson, & Moreno, 2011, p. 515), and “there is still a lack of clarity of the nature of wiki collaboration” (Storch, 2011, p.285). Therefore, this study aims to explore students’ collective scaffolding, particularly their task/meaning negotiation and joint construction of texts, during wiki-based group writing activities.

### *1.1. Collaborative writing: theoretical support, and benefits*

Collaborative writing dates back to the 1980s, with the wide recognition of knowledge as a social construction and writing as a social process (Ede & Lunsford, 1990). In recent decades, interaction within the collaborative writing task environment has become a popular research topic, supported by sociocultural theory which posits that learning is a socially constructed process through interaction. Vygotsky (1978) noted that language and social interaction facilitate learning in the learner’s Zone of Proximal Development (ZPD), defined as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). Warchauer (1997) later examined computer-mediated interaction in second language classes, and argued that

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“collaborative learning, either among students or between students and a teacher, is essential for assisting each student in advancing through his or her own zone of proximal development” (p. 471).

A construct associated with ZPD that is widely cited in collaborative writing literature is scaffolding (e.g., Donato, 1994; Lee, 2010; Li & Zhu, 2013; Storch, 2005). Wood, Bruner, and Ross (1976) originally referred to scaffolding as a metaphor for a mother's verbal efforts to maintain conversation with her child to indirectly foster language acquisition. Scaffolds involve adult "controlling those elements of the task that are initially beyond the learner's capability, thus permitting him to concentrate upon and complete only those elements that are within his range of competence" (Wood et al., 1976, p. 90). Although scaffolding initially described the carefully attuned assistance from adults to children, much L2 research (Anton & DiCamilla, 1998; Donato, 1994; Ohta, 2000; Swain & Lapkin, 1998) has demonstrated that scaffolding can occur among peers, when they collaborate via group/pair work.

One prominent application of scaffolding to L2 acquisition is in Donato's studies (1988, 1994), where he identified mutual scaffolding among L2 learners. He proposed “collective scaffolding” to illustrate how learning took place via peer interaction. In the occurrence of collective scaffolding, “the speakers are at the same time individually novices and collectively experts, sources of new orientations for each other and guides through this complex linguistic problem solving”(Donato, 1994, p.46). With “collective orientation to jointly constructed activity” (Donato, 2004, p. 287), students accomplished higher levels of performance than they might achieve by working on their own.

Previous research has revealed a number of benefits of collaborative writing. In the L1 writing context, collaborative writing was found to provide the students with certain resources not accessible to students performing solitary writing (Bruffee, 1993). For example, students can assume multiple roles which are unique in the collaborative writing activity: that of tutor, sounding board, and critical reader (Weissberg, 2006). Also, considering writing as an emergent and social process, researchers (Higgins, Flower, & Petraglia, 1992; Keys, 1994) argued that collaborative writing is a way to foster reflective thinking, especially if learners are engaged in the act of explaining and defending their ideas to their peers. In the L2 context,

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Swain (2000) posited that collaborative writing pushed students to negotiate the language use and collaborate in the solution of linguistic problems. This perspective was echoed in many L2 research studies (e.g., DiCamilla & Anton, 1997; Storch, 2002; Swain & Lapkin, 1998) where learners, in the process of co-authoring, took into account not only grammatical accuracy and lexis but also writing discourse. As Storch (2005) described, collaborative writing promotes a sense of co-ownership and hence, encourages students to contribute to decision making on various aspects of writing. Furthermore, Hirvela (1999) detected students' linguistic gains after collaborative writing tasks, and he attributed the outcome to the opportunities that collaborative writing offered the students to reflect and effectively apply what they had learned (Hirvela, 1999).

Due to the above-mentioned benefits, collaborative writing is increasingly implemented in L2 classrooms. Particularly, the use of collaborative writing tasks in online L2 writing contexts is expanding and will grow in the future given recent developments in computer-mediated communication (CMC) technology (Kessler, Bikowski, & Boggs, 2012).

### *1.2. Computer (Wiki)-mediated collaborative writing*

As Kessler and Bikowski (2010) stated, “the evolution of collaborative writing may be intrinsically connected with the iterations of technology since new developments provide new opportunities for collaboration” (p. 43). In the CMC context, writing is moving in the direction of “a more social construction of the activity and interactivity of writing” (Pennington, 2003, p. 304). CMC tools allow students to contribute at their own time and pace and also enable them to practice their writing skills in a non-threatening environment (Colomb & Simutis, 1996). Ware and Warschauer (2006) argued that “asynchronous discussion formats, in particular, are believed to combine the interactive aspect of written conversations with the reflective nature of composing” (p.111). The wiki, an asynchronous CMC tool, is acclaimed as a medium naturally suited for online collaborative writing projects (Godwin-Jones, 2003).

The wiki is a collaborative web site that allows users to freely create and edit the contents of web pages. It has three defining modules that greatly afford collaborative writing:

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“Edit,” “History,” and “Discussion”<sup>1</sup>. “Edit” enables the users to freely write and revise writing on wiki pages; “History” reveals all the changes the page has gone through with the color coding of deleted and inserted texts; “Discussion” allows the users to negotiate writing tasks and meanings via asynchronous posting (Li, 2012a). Owing to these intrinsically collaborative features, learners are expected to embrace collaboration more readily in wiki-based collaborative writing projects (Storch, 2011). How students actually collaborate in joint wiki writing, however, deserves close investigation.

The current body of literature has begun to examine students’ wiki writing process, primarily the revising behaviors of writing groups (e.g., Arnold, Ducate, & Kost, 2012; Kessler & Bikowski, 2010; Kost, 2011; Mak & Coniam, 2008). For instance, Mak and Coniam (2008) found that ESL secondary school students were involved with four types of writing change functions, i.e., adding ideas, expanding ideas, reorganizing ideas, and correcting errors when they co-produced a school brochure to be distributed to their parents. A focused description of one small group’s revising behaviors revealed that the students contributed to group writing by mostly adding new ideas, and they paid insufficient attention to error correction. Later, Kessler and Bikowski (2010) conducted a wiki project in a large class of EFL pre-service teachers who synthesized the course contents about culture in the wiki environment. The researchers identified five types of attention-to-meaning revising behaviors, which they called language acts (i.e., new information, deleted information, clarification/elaboration of information, synthesis of information, and web links). Extending the taxonomy of revision types, Kost (2011) reported both meaning-related changes (e.g., addition, deletion, and substitution) and formal changes (e.g., spelling, word order, lexical revisions, and punctuation) that German as a Foreign Language college students made during wiki-based collaborative writing activities. Results indicated that the students were much more frequently engaged in formal changes than meaning changes.

The other emerging line of research concerning collaborative writing process

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<sup>1</sup> Although all wiki applications have the three defining modules, the specific features of these modules may vary among different wiki applications. The features reported in this study apply to Wikispaces, a wiki site widely used in higher education.

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discussed patterns of interaction. Bradley, Linstrom, and Rystedt (2010) analyzed the archived wiki records and identified different patterns of interaction over the course of text co-construction among pairs or small groups of EFL students in an ESP course. Three patterns of interaction emerged, including no visible interaction in which only one individual contributed to a whole text, cooperation in which individuals contributed to wiki writing in a parallel fashion, and collaboration in which group members engaged with each other's ideas in joint construction. More recently, Arnold et al., (2012) detected the pattern of cooperation evidenced by students merely revising their own contribution to wiki writing and the pattern of collaboration evidenced by students taking responsibility over the whole text. Their study yielded the interesting finding that students revised both their own and others' texts in forms, but they tended to merely change their own texts when it came to contents. Dissimilar to the previous two studies where "History" records were the major source of data, Li and Zhu (2013) drew on the primary data source of wiki "Discussion" and the secondary data source of wiki "Page" and "History," and captured a picture of "the ways in which students negotiated the writing tasks as well as the ways in which students acted upon their negotiated meaning through text construction" (p.67). In this study with small groups of EFL college students, the researchers identified three distinct patterns of interaction when small groups jointly produced wiki essays: collectively contributing/mutually supportive, authoritative/responsive, and dominant/withdrawn, and the first two patterns positively influenced students' perceived learning experiences.

Although previous studies explored students' wiki writing process in terms of writing/revising behaviors and interaction dynamics, in either pairs/small groups or a large group (class), a large research gap still remains. Revising behaviors were mostly explored by taking the whole class or the whole group/pair as a unit of analysis (e.g., Kessler & Bikowski, 2010; Kost, 2011), and few studies (Mak & Coniam, 2008) have addressed each group member's individual contribution to joint writing. No study to date has delved into how participants collectively discuss collaborative writing tasks and jointly construct the products via wikis. Particularly, no research has investigated how the joint wiki essay is evolved by members' engagements with each other's contribution, construction, and revisions in small

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groups. Such knowledge will yield valuable insights into the process of computer-mediated collaborative writing. Therefore, the present study draws on the construct of “collective scaffolding” (Donato, 1994) and explores a small group’s collective scaffolding and mutual engagement within wiki writing tasks in a Chinese EFL tertiary context.

### *1.3. Research questions*

This study seeks answers to the overarching question: How do EFL students collectively discuss and construct small group writing via wikis? This question can be addressed by answering the following two research questions:

- 1) How does a small group of EFL students collectively negotiate writing tasks and meanings via the wiki “Discussion” module?
- 2) How does a small group of EFL students scaffold each other in constructing a joint writing product, as evidenced in the wiki “History” module?

## **2. Methodology**

### *2.1. Context and the case*

This paper is a follow-up to a previous study on the patterns of wiki-based interaction in small writing groups conducted at a southwestern university in China (Li & Zhu, 2013). The study lasted five weeks, in which students collaboratively worked on three writing tasks<sup>2</sup>, and some of the students received post-task individual interviews. Via a focused analysis of group members’ “Discussion” posts under each group link, and a supplementary analysis of writing behaviors following up on the discussion revealed from “History,” Li and Zhu (2013) identified three distinct patterns of online interaction demonstrated by three different small groups: collectively contributing/mutually supportive (Group 3), authoritative/responsive (Group 1), and dominant/withdrawn (Group 2).

To further examine how group members collectively scaffold the joint writing process, this paper focuses on the case of Group 3, which displayed high levels of both “equality” and

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<sup>2</sup> Writing Task 1 required students to write a paper responding to the writing prompt: “What if we have an extra eye on the back of our heads?”. Task 2 requested a positioning paper concerning the functions of arts and sciences (AWA practice-GRE issue essay, 2010). Task 3 asked the students to describe and explain trends in cinema attendance illustrated in a graph (Longre Inc., 2010).



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“mutuality” (Damon & Phelps, 1989). That is, the three members in Group 3 made joint contribution to task/meaning negotiation and also mutually supported each other in text construction. As reported in Li and Zhu (2013), Group 3 was composed of three female third-year college students, named Li, Chen, and Zhang (all pseudonyms). All of the three participants were classmates. Li’s language proficiency level was intermediate high, while Chen’s and Zhang’s language proficiency level was intermediate. Li and Zhu (2013) offered a holistic perspective on different patterns of computer-mediated interaction in small group writing, but they did not intend to explore the small groups’ text co-construction process and recursive writing behaviors. Therefore, to better understand the nature of student collaboration in wiki writing, the current study illustrates a distinct case of collective scaffolding in wiki-based collaborative writing by closely examining Group 3’s joint writing process revealed from wiki “Discussion” and “History” records under this group link.

## 2.2. Data sources

Archived logs from the wiki “Discussion” and “History” modules under “Group 3” link constituted primary data sources, complemented with the transcripts of semi-structured individual interviews<sup>3</sup> with the three members of this group. Wiki “Discussion” (see Appendix A for sample “Discussion” posts) revealed how the group members communicated about the collaborative writing tasks and negotiated language/meanings; Wiki “History” (see Appendix B for sample “History” records) reflected how the group members mutually engaged with each other’s writing efforts and co-produced the essays. Interviews provided additional information about their interaction and collaboration. Details of data collection procedures can be accessed in Li and Zhu (2013).

## 2.3. Data analysis

### 2.3.1. Analysis of wiki “Discussion”

To analyze the wiki “Discussion” records in this group, the researcher printed the entire 36 discussion posts regarding three wiki writing tasks, and numbered each post sequentially. The researcher read and reread the “Discussion” posts and derived categories rather than

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<sup>3</sup> The semi-structured individual interviews were conducted in Chinese, and were transcribed and translated by the researcher. The interview protocol and the technique of analyzing interview data were reported in Li and Zhu (2013).

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imposing existing categories in the available data (Strauss & Corbin, 1998). Five thematic categories emerged concerning the group members' communication of wiki writing: content discussion, social talk, task management, technical communication, and language negotiation. Multiple categories may emerge from one discussion post. The definitions and representative examples of these categories are displayed in Table 1. Then, to analyze the students' mutual engagement, the researcher subcategorized the thematic categories into "initiating" and "responding" which indicated that the group members interacted with each other by initiating ideas and responding to others' ideas.

*(Insert Table 1 here)*

After establishing the taxonomy, a second coder was invited to analyze the wiki "Discussion" data. The researcher first trained the co-coder to code the wiki discussion in terms of thematic categories and sub-categories of "initiating" / "responding," and then the two coders coded the entire data independently according to the taxonomy. The inter-rater agreement reached 92.9% by Miles and Huberman's (1994) formula, and disagreements between the two coders were discussed and resolved immediately. Finally, the researcher counted the number of instances that fell into each category.

### 2.3.2. Analysis of wiki "History"

The wiki "History" records provided the researcher with the possibility to track every writing change automatically recorded with the color coding of added or deleted texts. The researcher cataloged these data in a chronological order in a Word document. According to original information reflected in "History," the researcher documented the text evolution by indicating a sequence of writing change instances using the combination of letters and numbers, as well as the names of the member who performed the corresponding change. Specifically, the writing behavior evidenced in the first thread under the "History" module was named as A1, and the writing changes tracked from the following "History" threads were named as B2, C3, D4... orderly. If the same thread revealed multiple writing changes conducted by the same group member, these changes were marked with the same capital letter and the same name. For example, in this study, regarding the thirteenth "History" threads under the small group link, Chen made 12 changes, and these changes were indicated

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as M13 Chen, M14 Chen,... until M24 Chen, sequentially.

Next, the researcher coded each writing change/revision in terms of five categories: addition, deletion, rephrasing, reordering, and correction, which were generally addressed in Li and Zhu (2013). To explicate the degree of students' writing and revising efforts, the researcher divided each of the five categories into global level (i.e., sentence, and paragraph) and local level (i.e., clause, phrase, and word). Table 2 below shows the taxonomy of writing change functions with representative examples taken from the wiki "History" module. Meanwhile, to delve into the students' mutual engagement with each other's texts, the researcher distinguished writing changes made to the texts constructed by self and those made to the texts composed by other member when coding each revision of different categories performed by each group member. As no previous research has delved into students' mutual scaffolding in constructing the joint writing product using wikis, this coding scheme emerging from the data would best fit into the study.

*(Insert Table 2 here)*

Also, the researcher trained the same colleague who had analyzed the "Discussion" records to code the "History" data according to the coding scheme. The two coders then coded all the data in regards to Writing Task 1 independently. The inter-coder reliability reached 88.2%, and the discrepancies were resolved by discussion. The researcher then counted the number of instances that fell into each category. Afterward, the researcher coded the data concerning remaining tasks individually following the same procedure.

### **3. Results**

#### *3.1. Research question 1: How does a small group of EFL students collectively negotiate writing tasks and meanings via the wiki "Discussion" module?*

To address this research question, the researcher first discusses some illustrative excerpts showing the group members' reciprocal communication throughout the writing process via wiki "Discussion," and then provides descriptive statistics of each group member's communicating behaviors within three writing tasks.

Data analysis of the "Discussion" records suggested that the three students in this small

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group were actively engaged with different types of communication, including content discussion, language negotiation, task management, technical communication, and social talk at multiple writing stages, i.e., pre-writing, writing, and revising stages. Excerpt 1 below, also reported in Li and Zhu (2013), illustrates how the group members brainstormed on Writing Task 1 (prompt: “What if we have an extra eye on the back of our head?”) and reached collective consensus on the task orientation at the pre-writing stage.

*Excerpt 1: Task management (pre-writing stage)*

2 Zhang: we’d better think of the topic with two aspects, advantages and disadvantages

3 Li: while I assume we can begin with the advantages—what and how the extra eye made our life colourful. Do you?

4 Chen: I agree. Let’s write some advantages first and then disadvantages.

5 Zhang: OK!

As shown in Excerpt 1, prior to the writing stage, Zhang initiated the basic structure of this essay: advantages and disadvantages of having an extra eye. This idea was developed by Li, who suggested concentrating on the discussion of advantages first. Chen agreed and stated clearly that they would write advantages first, followed by disadvantages. Zhang echoed this idea subsequently.

The group members’ reciprocal communication in terms of task negotiation was also evident within other two writing tasks. For instance, when this group worked on Writing Task 2 regarding the function of arts and sciences, Chen posted “Let’s discuss the purpose of the art roughly”. Both Zhang and Li made a quick response to this post by providing a brief sentence addressing the function of arts, respectively: “The art usually reflect the reality of our life we are going through” (Zhang), and “Yet creation is a crucial part of art” (Li).

The three members were also found to engage with task management at the revising stage. For instance, after they jointly completed the draft for Writing Task 3 regarding a graph description on the trends in cinema attendance, Chen suggested “Let us read through the paper closely once more”, and Li made a positive response “OK”.

Moreover, group members actively negotiated contents at the writing stage, an aspect in the process which has also been revealed in previous wiki collaborative writing studies (e.g.,

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Kost, 2011; Mak & Coniam, 2008). Excerpt 2 below illustrates how the group members extended on each other's ideas on content development.

*Excerpt 2: Content discussion (writing stage)*

15 Li: When we go to the cinema, the screen can be set both in the front and back. So what can we share through the extra eye from the two screen?...

16 Zhang: I think the two screens might be on the same pictures at the same time, and the position of each screen would be designed exactly to match your visual field. Thus, your brain couldn't be trapped into nerve block when it processes images into neural signal.

In the above excerpt, Li started the creative idea that an extra eye on the back of the head would bring about a fresh experience when watching movies. She posed a question, ended with an ellipsis (...), suggesting her invitation to her group partners to continue the flow of thoughts. Responding to Li's question, Zhang supplied her arguments on how the screens need to be set so as for the extra eye to work properly.

Further, the group members also discussed language use at the revising stage via "Discussion". Excerpt 3 is an example of language negotiation when two members communicated a grammatical issue.

*Excerpt 3: Language negotiation (revising stage)*

26 Li: If we do not add "we", what is the subject of "going to bed".

27 Zhang: I ignored the subject just now. We cannot use "doing" after "we", so it should be corrected into "when we go to bed".

28 Li: yes, you are right.

The interaction in the above excerpt occurred after Zhang changed "when we going to bed" into "when going to bed" after the clause "how to make the right lying posture", revealed from the "History" module. Li pointed out the missing of the subject "we" as to Zhang's modification. Accordingly, Zhang reconsidered this sentence and found the right version "when we go to bed". Excerpt 3 exactly shows the co-construction of peer assistance in language acquisition. Although some prior research studies have addressed students' attention to language forms in wiki collaborative writing tasks (e.g., Arnold et al., 2012;

Dobao, 2012; Kessler, 2009), few have depicted the process of their language negotiation within the wiki site.

Apart from the active discussion of task orientation, writing contents, and language points, the participants were engaged with social talk during the writing process. Excerpt 4 shows Zhang's appreciation of her partner's writing skills and Excerpt 5 reveals the other members' enjoyment of their partner's writing idea.

*Excerpt 4: Social talk (writing stage)*

7 Zhang: How I envy your appliance to words! You are so rich in complex and long English words. I think i'll work hard on memorizing my 5500.

8 Li: 承让承让, 有什么错误还望指正。[You are flattering me. Please correct me whenever I make mistakes.]

During the joint composing process, Zhang was impressed by her partner Li's vocabulary use and language skills after reading what Li had written. She expressed her admiration and her determination to work hard on vocabulary. As to Zhang's praise, Li modestly responded in the native language Chinese. Such social talk added a harmonious air to the collaborative writing activity, and the use of Chinese helped build rapport between the members. Excerpt 5 is yet another example.

*Excerpt 5: Social talk (writing stage)*

18 Zhang: we can shelter it (the extra eye) in daily life, and use it at special time, for example, searching for thieves on bus.

19 Chen: What you say is so funny that I can't help laughing.

20 Li: You are interesting!

As shown in Excerpt 5, both Chen and Li liked the creative idea that Zhang put forward, and they expressed their enjoyment of this idea. Under such circumstances, the members of this group conveyed their "affective support" (Lee, 2010, p. 269) to group partners, and thus created a relaxing co-working environment.

In addition, the group members occasionally discussed the use of the wiki technology. For instance, as shown in Excerpt 6, when this group revised their joint writing, Zhang inquired about a synchronous use of the wiki, since she believed that synchronous

communication was needed when the due date was approaching. In response to Zhang, Li suggested refreshing the page by continually “kicking” (clicking) on “Discussion”. In this way, the group members tried to make a “synchronous use” of the asynchronous tool. While wiki being an asynchronous tool was sometimes an obstacle for students in other studies (Lund, 2008; Zorko, 2009), the three students in this study seemed to have solved this technical problem.

*Excerpt 6: Technical Communication (revising stage)*

9 Zhang: i wonder whether you can view messages on these pages in time online [synchronously]?

thus i have to refresh my page.

10 Li: Me too, just refresh

11 Li: Or kick the button "Discussion".

To further explain how each individual in this small group contributed to wiki “Discussion”, and how the group members collectively negotiate the writing tasks and meanings, the researcher provides the following descriptive statistics, shown in Table 3.

*(Insert Table 3 here)*

As Table 3 indicates, the group members were actively involved with communication via wiki “Discussion” module. They conducted a total of 42 instances of communication, including content discussion (11), language negotiation (11), task management (8), social talk (8) and technical communication (4). All three members initiated writing ideas and also responded to their group partners’ viewpoints. Also, both Chen and Zhang initiated discussions on task orientation and all members provided positive feedback. Moreover, both Li and Chen initiated the communication of language use, and all members collectively produced language-related episodes (LREs). Further, all the three individuals had social talks, which created harmonious environment and hence, facilitated the collaborative writing activity. In addition, Zhang inquired about a technical issue, and Li provided relevant responses. Taken together, all three members had active participation in the wiki “Discussion”; their individual contribution accounted for 43%, 24%, and 33%, respectively. Zhang and Li were mostly involved in content discussion. Li made many comments on language points, and Chen contributed much to task management. The three, working as a

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cohesive group, scaffolded each other's efforts on task, meaning, and social negotiation via reciprocal feedback and favorable social interaction in the wiki "Discussion" module.

*3.2. Research question 2: How does a small group of EFL students scaffold each other in constructing a joint writing product, as evidenced in the wiki "History" module?*

To address the second research question regarding group members' text co-constructing and revising behaviors, the researcher focused on joint writing behaviors as they occurred when this group worked on Writing Task 1<sup>4</sup>, tracked from the wiki "History" module. Below, the researcher describes the group members' text co-constructing process, particularly group members' mutual engagement with multiple writing change functions. Table 4 shows the big picture of writing change functions that each group member contributed to in Writing Task 1.

*(Insert Table 4 here)*

As Table 4 indicates, the participants were engaged with five different types of writing change functions, namely: addition, deletion, reordering, rephrasing, and correction. Although such functions as addition, deletion, and correction were also identified in previous studies (e.g., Mak & Coniam, 2008; Kessler & Bikowski, 2010), little research has examined text-constructing performance conducted by each individual member of small groups. In this inquiry, it is encouraging to find that Li, Chen, and Zhang performed roughly equal instances of composing/revising behaviors, being 22 (32%), 20 (30%), and 26(38%), respectively. As noted in the earlier discussion, both global level and local level of writing changes were analyzed; changes to self-constructed texts and to other-constructed texts were also distinguished. Results revealed that the group members performed both global and local levels of addition, deletion, rephrasing, and correction acts, as well as the global level of reordering acts. Also, they offered mutual assistance and engaged with content composed by their group members in addition to their own contributions. In terms of individual contribution, the three members demonstrated distinct skills in different writing areas. Chen

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<sup>4</sup> Similar joint writing behaviors (i.e., types of writing change functions, occurrences of collective contribution and mutual engagement) were detected within this group in relation to remaining tasks, although the total instances of writing change functions are fewer. For instance, in Writing Task 2, three members were engaged with both self-constructed texts and other-constructed texts. Li made 6 additions, 1 rephrasing, and 2 corrections; Chen made 3 additions, 4 deletions, 1 rephrasing, and 3 reorderings; Zhang made 5 additions, 5 deletions, 3 reorderings, and 3 corrections.



focused on the global level of writing, and accordingly performed lots of re-ordering acts. Li seemed to heed to the use of vocabulary and was involved with quite a few rephrasing functions, while Zhang paid particular attention to language accuracy and hence, conducted a large amount of correction acts.

Drawing on the illustrative examples from the “History” module under this group link, the researcher explains below how the group members actively performed multiple writing change functions. First of all, they collectively built on writing contents, composing their own texts or adding to others’ texts in the wiki page. Excerpt 7 is an example of Zhang’s adding behavior.

*Excerpt 7: Addition (global and other)*

On the contrary, maybe one would wrathfully complain, if owning an extra eye, which is really a bad idea, he would pay additional money for its eyeglass. Once you lay on bed for a rest, your third eye were uncomfortably under a pressure for the gravity.

Excerpt 7 displayed Zhang’s global contribution in response to Li’s posts “Yet there are also disadvantages [of having an extra eye].” Zhang added to Li’s texts by supplying concrete examples to enhance thesis development. Excerpt 8 is yet another example of the group members’ local contribution.

*Excerpt 8: Addition (local and self/other)*

- 1) **Finally**, the third eye make tremendous troubles, such as [...] (Chen added to Zhang’s texts) →
- 2) Finally, the third eye **were very likely to** make tremendous troubles [...] (Zhang added to her own texts)

The first sentence in Excerpt 8 shows that Chen added a transition word, “finally,” to Zhang’s texts. This language act by Chen occurred when she reorganized the ideas that the members had posted to support the argument that “there must someone who would not like to own the third eye...”. After adding two transitions, “first of all,” and “in the third place,” to previous texts, Chen continued to add “finally” to Zhang’s texts, “the third eye make tremendous troubles, such as [...]”. Undoubtedly, these transitions made the jointly written texts more cohesive. It is worth noting that Zhang later added a hedge, “were very likely to,” before “make tremendous troubles” to better meet the criteria of academic writing.

Interestingly, all the participants had instances of deleting others' texts, in addition to Chen's deleting her own texts once. This seems contradictory with the previous observations about students' hesitance to make changes to others' writing contents (Arnold, Ducate, & Kost, 2009; Arnold et al., 2012). The interviews in this study helped to shed light on the possible factors for the group members' deletion of others' texts. First, the group members were good friends, and they considered the small group writing as their individual work, which helped them to feel free to make changes without hurting each other's feelings. Li commented, "we were happy with our changes because we made united efforts to make a good piece." Also, coherence and brevity were shared writing qualities this group valued. As Chen stated, "I bear coherence and brevity in mind when I write and revise, and I deleted both my partners' and my own texts when I see incoherence." Particularly, Chen was frequently involved with global deletion, while Li and Zhang were engaged with local deletion. For instance, Chen deleted the two sentences written by Zhang: "As we know, it is our double eyes that catch sight of 80% of all the information we acquire from outside. Whether an extra eye may make us receive a mass of useless information?" which seemed incoherent and trivial. Locally, Zhang deleted Chen's texts, as displayed in Excerpt 9.

*Excerpt 9: Deletion (local, and other)*

- 1) This is unfortunate for the poor actors who are required to go on repeating the same lines night after night. One would expect them to know their parts by heart and never have cause to falter. (Chen wrote the texts) →
- 2) This is unfortunate for the poor actors who are required to go on repeating the same lines night after night. ~~One would expect them to know their parts by heart~~ and never have cause to falter. (Zhang made a deletion)

In the above excerpt, Zhang deleted the clause "one would expect them to know their parts by heart". After this deletion, the texts shared the unified theme "poor actors", other than the switch of theme from "poor actors" to "one".

Another writing change function that the group members performed was rephrasing. Li conducted substantial local rephrasing of her group partners' texts, and Zhang and Chen conducted a few. For instance, Li substituted "black side" in the sentence "the broaden vision

oppositely make the black side of society more obvious” that Chen composed with a more sophisticated word “shadow”, which added to the tone of academic writing. Also, Zhang made local rephrasing, such as substituting “defusing” with “confusing” in the sentence “it would have an bad effect on the sensory information transmission, even defusing our sensory systems” that Chen composed earlier.

Moreover, Chen made conscientious efforts to re-order the texts to make the co-product more coherent. In Excerpt 10 below, Chen followed this group’s earlier agreement on the main structure of advantages plus disadvantages, and re-ordered her group partners’ texts appropriately.

*Excerpt 10: Re-ordering (global, and other)*

- 1) Perhaps one has been long for an extra eye on back of his head, especially when he have a special need. When one hurried on with his journey home late at night, he expected that an extra eye could help to go on carefully and smoothly. [...] (Chen moved Zhang’ texts to the former part of the essay)
- 2) Yet there are also disadvantages. Our brain may not accommodate ourself to accept such a large amount of information[...] (Chen moved Li’s texts to the latter part of the essay)

In addition, Zhang paid much attention to language accuracy, and she was highly involved with correction. For example, she corrected “lost” to “lose” and changed “usual” into “usually” in Li’s texts “life will lost its natural mysterious and positive effects what we usual imagine.” One instance of global correction was also identified. After a second round of revision, Li corrected Zhang’s ungrammatical sentence “maybe someone would wrathfully complain, if owning an extra eye, which is really a bad idea” to “someone would wrathfully complain that owning an extra eye is really an odd adventure.”

Moreover, the group members collectively performed several rounds of revisions on many occasions. Excerpt 11 and Excerpt 12 below are illustrative.

*Excerpt 11: Two rounds of revision (i.e., rephrasing, and correction)*

- 1) Once you lay on bed for a rest, your third eye were uncomfortably under a pressure for the gravity. (Zhang) →
- 2) (The third eye makes tremendous troubles)...how to post your body without pressing the

third eye, when go to bed. (Chen) →

- 3) (The third eye makes tremendous troubles)...how to make the right lying posture when we go to bed. (Li)

Excerpt 11 displayed two rounds of revising acts. To support the central idea that the third eye may bring about much trouble, Chen combined and rephrased her group partners' texts. Based on Chen's contribution, Li performed further rephrasing and correction acts, which resulted in a clearer and more accurate sentence. Excerpt 12, in addition, shows even more rounds of revision.

*Excerpt 12: four rounds of revision (i.e., rephrasing, addition, correction)*

- 1) On the contrary, maybe one would wrathfully complain, if owning an extra eye, which is really a bad idea (Zhang) →
- 2) On the contrary, maybe one would wrathfully complain, if owning an extra eye, which is really a bad idea, **although it also bring so much convenience and benefits at the same time.** (Chen) →
- 3) On the contrary, maybe **someone** would wrathfully complain, if owning an extra eye, which is really a bad idea, although it also bring so much convenience and benefits at the same time. (Chen) →
- 4) **Though**, maybe someone would wrathfully complain that owing an extra eye is really an odd, **despite** it bring so much convenience and benefits at the same time, (Li). →
- 5) Though, maybe someone would wrathfully complain that owing an extra eye is really an odd **adventure**, despite it **brings** so much convenience and benefits at the same time, (Li).

As Excerpt 12 indicates, Chen added a clause to Zhang's texts in the first round of revision, and then made a local rephrasing in the second round. Later, Li made further rephrasing by using more sophisticated words in the third round, followed by the fourth round of revision, specifically correction. After several rounds of revisions by different members, the written texts tended to be more readable and well-organized, although not error-free.

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#### 4. Discussion

This small group demonstrated a collective approach to wiki-based collaborative writing. The group members showed equal contribution and mutual engagement during the course of wiki-based writing. All the participants actively engaged in writing and scaffolded each other's performance in the collaborative process. Specifically, group members were involved with the discussion of writing tasks and recursive ways of writing concerning both global and local levels of joint texts.

The finding in this study was in line with Lee's (2010) observation that students scaffolded each other in developing contents as well as fixing errors in wiki-mediated collaborative writing activity. In contrast to Kessler and Bikowski (2010) and Mak and Coniam (2008) which both revealed few instances of language error correction, the students in this study paid sufficient attention to language forms apart from content development. Also, this study yielded different findings than those reported in Arnold et al. (2012) where students were engaged in the formal revision of others' texts, but seldom revised the contents that their classmates posted. Notably, the three members in the present study collectively constructed a scaffold for each other's writing performance (Donato, 1994), evidenced with mutual engagement with constructions and revisions in both content and form, be it their own texts or their partners' texts. The small group's mutual engagement in wiki-based collaborative writing witnessed in this study can be attributed to the group members' familiarity with each other and their shared goal of conducting the task together successfully (Donato, 1988). As revealed in the interviews, all the three members were classmates and good friends, and they felt quite comfortable correcting each other. Also, Zhang commented, "we are in the same boat, and we need to work as a united one".

Throughout the study, the three group members negotiated writing contents, pooled their individual resources, and discussed language points. Their active participation and mutual engagement in collaborative writing tasks contributed to the overall good quality of writing in the final product, reflected in rich contents, clarity, and coherence<sup>5</sup>. Taken together,

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<sup>5</sup> Analyzing the writing product is beyond the scope of this article. The good quality of this small group's writing product was observed when the researcher provided detailed feedback on each wiki essay while the project was undergoing.

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this group demonstrated the nature of a truly collaborative writing activity that Storch (2012) recently elaborated on:

A truly collaborative writing activity is a distinct process and product. The process is one in which participants work together throughout the writing process, contributing to the generation of ideas, deliberations about the text structure, and the editing and revision processes rather than each participant contributing discrete segments or contributing to only some phases of the writing process. The product is the final written output of the collaborative effort and one that cannot be reduced to the separate input of individuals. (p.113)

As Li and Zhu (2013) noted, “collective scaffolding” characterized the interaction in this group: The students were “at the same time individually novices and collectively experts” (Donato, 1994, p. 46). In this group, no one was a clearly identifiable expert; instead, group members, acting collectively, pooled their resources and scaffolded the collaborative writing activities (Li & Zhu, 2013; Storch, 2002). It is worthy of note that the group members’ individual linguistic differences existed at the beginning of their interactions: Li’s English proficiency level was higher than both Chen’s and Zhang’s. Li created a few writing scenarios and invited her group partners’ to continue with the flow of her thoughts. Li also initiated language negotiations when she identified inaccuracy in grammar as to her partner Zhang’s texts. Interestingly, through the scaffolded interactions between Li and Zhang, Zhang’s attention to language accuracy grew, and consequently she had a great contribution to the quality of their group writing by producing substantial instances of correction. This occurrence illustrated that the expert seemed unidentifiable over the course of collaborative writing activities, and “the co-construction of the collective scaffolding progressively reduces the distance between the task and individual abilities” (Donato, 1994, p.46).

Much evidence showed that the role of expert was quite fluid (Ohta, 1995; Storch, 2002; Swain & Lapkin, 1998) in this small group. Each individual offered a different expertise in writing and had a unique contribution to their group writing. Li engaged with lots of writing change functions, and she particularly demonstrated good skill in rephrasing ideas by applying academic and idiomatic expressions. Zhang paid special attention to the local level of the essay, and via frequent correction, she contributed greatly to the accuracy of joint

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texts. Chen, however, particularly heeded to the global structure of the essay, and performed nicely in reorganizing ideas throughout the writing process. In this way, students' "jointly constructed performance outstrips their individual competences" (Swain, 2000, p.111). In other words, via mutual scaffolding, this group, as a collective unit, reached higher levels of performance than each member might achieve by working individually.

This group's interaction and writing performance exactly represented the nature of collaboration that Donato (2004) proposed. This collaborative writing group recognized the individual as an essential part of cooperative activity, and acknowledged each other's contribution in the service of jointly constructed goal (Donato, 2004). As Li noted in the post-task individual interview, "we feel motivated to enter the Wikispaces and check what have been changed. Other group members' new posts can lead me to develop new ideas." Also, the members in this small group "build coherence within and among social relations and knowledge located and distributed in its members." (Donato, 2004, p.287). As noted in the earlier discussion, the three group members developed a positive social relation via much social talk and "affective support" (Lee, 2010), and they collectively pooled their knowledge and language resources over the course of collaborative writing activity. As Chen exclaimed in the interview, "there was no specific division of labor, but the group work was magically harmonious" (Li & Zhu, 2013).

Furthermore, this study reinforced wiki's great affordances for collaborative writing, specifically, its support for collaboration and continual revision. As Lee (2010) posited, a wiki serves as a mediating artifact for the writing process that involves collaboration and scaffolding at different stages. The participants in this study made full use of wiki "Discussion" to exchange ideas and negotiated meanings at multiple writing phases, i.e., pre-writing, writing, and revising phases. Also, each version of the wiki page was transparent to the group members via "History" module. As Li commented in the post-task interview, she continually checked each other's previous writing behaviors and contribution before making new changes. Also, the joint texts were found to have gone through several rounds of revisions, i.e., addition, deletion, rephrasing, re-ordering, and correction.

Similar to Keys' (1994) finding that collaborative writing fosters reflective thinking in

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a face-to-face mode, the researcher derived that the wiki, as an asynchronous tool, particularly encourages student reflections on writing. As noted earlier, when Li identified Zhang's changing "when we going to bed" into "when going to bed", she posed her question: If we do not add "we", what is the subject of "going to bed". Later, Zhang thought about this language point and corrected her own mistake, making the modification of "when we go to bed". As Storch (2012) asserted, "the time gap between the postings allows the learners to develop a considered response to other students' postings" (p.122). One comment from the group member Li in the interview nicely reflected how the group member took advantage of the wiki tool for collaborative writing.

I consulted the (wiki) "History" and find out the places where others made changes. If I do not think the revision is good, I pointed it out in "Discussion" and negotiated with group members about certain language points. We communicated, referred to the sources and reached the consensus consequently.

In addition, this study may suggest the effectiveness of a small group for wiki collaborative writing. The small group allows for collective scaffolding from multiple co-writers, while also tending to decrease the occurrences of "free rider" and "social loafer" (Piezon & Donaldson, 2005) that were more often identified within a large group as reported in previous studies (e.g., Kessler & Bikowski, 2010; Morgan, Allen, Moore et al., 1987). The effect of the small group size was also discussed in a recent study on face-to-face collaborative writing. Dobao (2012) examined the effect of the number of participants on collaborative writing product in Spanish as a Foreign Language classes, and detected that small groups produced more LREs and a higher percentage of correctly resolved LREs than both pairs and individuals, hence achieving more accurate texts.

## **5. Conclusion**

The present study examined how one small group of EFL students collectively performed collaborative writing tasks in the wiki space. The participants used wiki "Discussion" to actively negotiate writing tasks and meanings in various aspects, i.e., content discussion, task management, language negotiation, social talk, and technical communication.



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Their writing discussion process was represented by reciprocal feedback, a pooling of linguistic resources, and harmonious social interaction. Also, the group members scaffolded each other's efforts on writing development, and co-constructed written texts in the wiki "Page" via different writing change functions, i.e., addition, deletion, rephrasing, reordering, and correction. The three students in this small-group case were equally engaged with revisions in both global contents and local language points, with regards to either their own texts or their partners' texts. "Collective scaffolding" featured the collaborative writing process of this small group. The group members were collectively experts, and each individual devoted a unique expertise to the group writing. This case also mirrored a truly collaborative writing activity encompassing a distinct process and product that reflected each group member's thorough collaborating efforts (Storch, 2012).

### *5.1. Significance of the study*

This study represented an initial effort to examine the nature of collective scaffolding in wiki-based collaborative writing. It helped us understand how "wiki collaborations guide learners to co-construct texts", and "allow them to build on each other's contributions" (Storch, 2012, p.122). This study has contributed to the current body of research on wiki-mediated collaborative writing. First, it captured a comprehensive picture of students' collaborative writing process via wikis, highlighting group members' mutual engagement and co-construction of wiki tasks throughout the writing process. Second, it further explored the affordances of wikis for collaborative writing, particularly the use of wiki "Discussion" for communication, and the support of wiki "History" for continual revision. In this way, it explicated Lee's (2010) arguments that wikis provide affordances for collective recursive writing encompassing scaffolding at multiple writing stages. Third, this study introduced new coding schemes to analyze wiki-based discussion and text co-construction behaviors in small group writing, and it may shed light on the analysis of wiki collaboration process in future studies. Finally, this study advanced the computer-mediated collaborative writing research by underscoring the role of sociocultural theory, particularly ZPD and collective scaffolding, in describing and explaining student interaction and collaboration in CMC contexts.

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### 5.2. *Limitations and delimitations*

Some limitations of the study need to be acknowledged. The case of one small group was limited in scope and a close analysis of students' text co-construction behaviors regarding one writing task was also limited in depth. However, this specific small group has been a sufficient case to answer the research questions and illustrate collective scaffolding in wiki-based collaborative writing. Also, new coding schemes of wiki discussion and text co-construction were proposed in this study. Although the relatively high inter-coder agreement was achieved in this study, the new coding schemes need to be tested in future research.

### 5.3. *Pedagogical implications*

This study may yield several pedagogical implications. First, the wiki is a great potential medium for collaborative writing tasks in second/foreign language classes. As Storch (2011) posited, the wiki “bodes well for the future of collaborative writing tasks in L2 classrooms” (p. 285). Second, to help facilitate the smooth collaboration process, instructors need to take group member familiarity into account when assigning wiki writing groups (Li & Zhu, 2013). As indicated in this study, group partners who are familiar with each other are likely to collaborate in a higher degree, making more frequent and more constructive comments/corrections due to the solid comfortable level. Also, instructors need to try possible means to encourage affinity groups of shared responsibility, common goal, and harmonious social relationship. Moreover, group size deserves instructors' consideration when implementing wiki-based collaborative writing. It is suggested that the instructors limit the group size to three, as in this study, or four because such group size tends to enable students to interact and collaborate most productively (Dobao, 2012; Li, 2012b), while larger groups are likely to have one or more members who participate at a reduced level (Morgan, Allen, Moore, et al., 1987). Additionally, instructors need to train students to make full use of different functions of wiki technology (e.g., “Edit”, “Discussion”, and “History”) when organizing the collaborative writing tasks in language classes. Particularly, the pedagogical use of wiki “Discussion” module needs to gain more attention (Li, 2012b), since “Discussion” allows students to negotiate collaborative writing tasks at their own time and pace and also to

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make thoughtful response to others' posts, but much of the previous research did not incorporate the use of "Discussion" in wiki-based collaborative writing projects.

#### *5.4. Future research*

Wiki-based collaborative writing research is likely to increase in the future. To achieve a deepened understanding of the nature of wiki collaboration, future research needs to examine students' collaborative writing process via wikis using multiple cases of small writing groups in a similar or a different learning context. Research should further investigate how students' joint wiki writing process influences the quality of their co-product (Arnold et al., 2012) and their learning experiences/outcome (Li & Zhu, 2013). Particularly, if collective scaffolding occurred in wiki collaborative writing activities, as observed in this study, research needs to elucidate whether and how collective scaffolding results in writing and linguistic development in the individual student (Donato, 1994). Further study should also explore whether the mediating factors identified in face-to-face collaborative writing tasks may influence students' wiki writing behaviors/performances, such as students' language proficiency/proficiency grouping (Leeser, 2004), group size (Dobao, 2012), interaction patterns (Storch, 2002; Watanabe, 2008), students' attitudes towards collaborative writing task/activity, and their motives and goals in completing tasks (Storch, 2004). As to the topic of collaborative writing, it is important to further explicate the affordances and effects of wikis in comparison with face-to-face collaboration or collaboration via email. Such research will yield valuable insights into the distinct supportive role of the wiki technology in collaborative academic writing.

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Table 1  
Wiki discussion categories

Categories	Definitions and Examples
Content discussion	Group members discuss ideas about content development. e.g., We can shelter it [the extra eye] in daily life, and use it at special time, for example, searching for thieves on bus.
Social talk	Group members talk socially to maintain a friendly co-working environment by greeting, acknowledging, and encouraging, etc. e.g., What you say is so funny that I can't help laughing.
Task management	Group members handle the process toward completing writing tasks together. e.g., Let's discuss the purpose of the art roughly.
Technical communication	Group members communicate technical problems and solutions. e.g., --I wonder whether you can view messages on these pages in time online? I have to refresh my page. -- Me too, just refresh. Or kick the button "Discussion".
Language negotiation	Group members negotiate language points such as the grammar and word choice, as reflected in language-related episodes (LREs). e.g., If we do not add "we", what is the subject of "go to bed"?

Table 2  
Taxonomy of writing change functions

Writing change functions	Examples
Addition	Global Maybe it is abnormal that you have an eye on back of your head and will be treated as an alien.
	Local When it comes to the third eye, we easily see the available advantage <b>and enjoy interesting things</b> . <b>Finally</b> , the third eye make tremendous troubles, such as [...]
Deletion	Global <del>As we know, it is our double eyes that catch sight of 80% of all the information we acquire from outside. Whether an extra eye may make us receive a mass of useless information?</del>
	Local Such plot, as an eye on back of your head, we can regularly see in Science fiction, <del>no longer regarded as a creative idea.</del>
Rephrasing	Global Life will not be wonderful as imagined. → Life will lost its natural mysterious and positive effect what we usual imagine.
	Local The broaden vision oppositely make the <del>black side</del> <b>shadow</b> of society more obvious.

Reordering	Global	As the old saying, every coin has two aspects. So it is concern to how to use it effectually and do our best to avoid side-effect. As is known, time can change everything .so I believe we can adapt to the life of three-eyes one day. ( <b>Moved to the end of the essay</b> )
Correction	Global	Maybe someone would wrathfully complain, if owning an extra eye, which is really a bad idea. → Someone would wrathfully complain that owing an extra eye is really an odd adventure.
	Local	Life will <del>lost</del> <b>lose</b> its natural mysterious and positive effects what we <del>usual</del> <b>usually</b> imagine.

*Note: The examples were directly drawn from the wiki data and the language errors were not corrected. Local level of reordering was not identified in this case.*

Table 3  
Wiki “Discussion” engagements by three group members

	Li		Chen		Zhang		Total
	INIT	RESP	INIT	RESP	INIT	RESP	
Content discussion	4	1	1	1	2	2	11
Social talk	1	2	1	1	3	0	8
Task management	0	2	3	1	1	1	8
Technical communication	0	2	0	0	1	1	4
Language negotiation	2	4	1	1	0	3	11
Total	18(43%)		10 (24%)		14(33%)		42(100%)

*INIT=initiating, RESP=responding*

Table 4  
Writing change functions performed by three group members

	Addition				Deletion				Rephrasing				Reordering				Correction				Total
	G	L	S	O	G	L	S	O	G	L	S	O	G	L	S	O	G	L	S	O	
Li	4	3	6	1	0	1	0	1	1	8	1	8	0	0	0	0	1	4	3	2	22(32%)
	(7)				(1)				(9)				(0)				(5)				
Chen	4	4	5	3	2	0	1	1	1	1	0	2	7	0	2	5	0	1	0	1	20(30%)
	(8)				(2)				(2)				(7)				(1)				
Zhang	2	5	2	5	0	2	0	2	0	1	0	1	0	0	0	0	0	16	3	13	26(38%)
	(7)				(2)				(1)				(0)				(16)				
Total	22				5				12				7				22				68(100%)

*G=global level of change, L=local level of change, S=change to self-constructed texts, O=change to other-constructed texts*

*(N.)= the subtotal of each type of writing change functions produced by each member*

## Appendices

### Appendix A: Screenshot of sample wiki “Discussion” page

+ New Post  Filter by Subject

Subject	Author	Replies	Views	Last Message ^
some troubles	sunsunsun	0	21	Jul 19, 2010 7:54 pm by  sunsunsun
maybe art is to upset	sunsunsun	0	26	Jul 17, 2010 12:36 pm by  sunsunsun
art is life and life is art	sunsunsun	0	17	Jul 17, 2010 12:34 pm by  sunsunsun
science and technology are not always t...	sunsunsun	0	25	Jul 16, 2010 11:39 am by  sunsunsun
your opinion of the art's purpose	hahappy	2	35	Jul 16, 2010 1:23 am by  YogiShea
Relationship between science and art	YogiShea	0	31	Jul 16, 2010 1:11 am by  YogiShea
单词语法也让人纠结	sunsunsun	0	34	Jul 11, 2010 12:20 pm by  sunsunsun
the latest discussion	sunsunsun	0	32	Jul 11, 2010 11:52 am by  sunsunsun
disadvantage	YogiShea	4	51	Jul 9, 2010 10:20 am by  YogiShea
advantage	YogiShea	1	24	Jul 8, 2010 11:52 am by  sunsunsun
ideas about an extra eye on the back of...	YogiShea	1	32	Jul 8, 2010 10:18 am by  hahappy
i feel gloomy with the page	sunsunsun	3	40	Jul 7, 2010 11:56 am by  sunsunsun
Yet there are also disadvantages	YogiShea	2	34	Jul 7, 2010 11:53 am by  YogiShea
I agree with Yogishea's idea.	sunsunsun	2	39	Jul 7, 2010 11:28 am by  sunsunsun
Pay attention~	YogiShea	0	25	Jul 6, 2010 10:58 am by  YogiShea



### Appendix B: Screenshot of sample wiki “History” page

Date	Compare	Author	Comment
Jul 19, 2010 2:27 am	<input type="button" value="select"/>	YogiShea	
Jul 19, 2010 2:15 am	<input type="button" value="select"/>	hahappy	
Jul 19, 2010 12:58 am	<input type="button" value="select"/>	hahappy	
Jul 19, 2010 12:58 am	<input type="button" value="select"/>	hahappy	
Jul 12, 2010 11:36 pm	<input type="button" value="select"/>	SNU	
Jul 11, 2010 12:18 pm	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 12:14 pm	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 11:46 am	<input type="button" value="select"/>	hahappy	
Jul 11, 2010 11:25 am	<input type="button" value="select"/>	sunsunsun	
Jul 11, 2010 11:22 am	<input type="button" value="select"/>	sunsunsun	
Jul 11, 2010 11:07 am	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 11:03 am	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 10:43 am	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 10:42 am	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 10:31 am	<input type="button" value="select"/>	sunsunsun	
Jul 11, 2010 10:29 am	<input type="button" value="select"/>	YogiShea	
Jul 11, 2010 9:54 am	<input type="button" value="select"/>	hahappy	
Jul 11, 2010 9:51 am	<input type="button" value="select"/>	hahappy	
Jul 11, 2010 9:45 am	<input type="button" value="select"/>	hahappy	



On the contrary, maybe **one someone** would wrathfully complain, if owning an extra eye, which is really a bad **idea**, he would pay additional money for its eyeglass. Once you lay on bed for a rest, your third eye were uncomfortably under a pressure for the gravity. As we know, **idea**. **Despit** it is our double eyes that catch sight of 80% of all the information we acquire from outside. Whether an extra eye may make us receive a mass of useless information? Actually there would be an awful situation that our other sensory systems such as ear, nose, even brain were to suffer a function loss. There must be a **someone** who would not like to own the third eye, although it also bring so much convenience and benefits at the same **time**, like you won't give others the chance of sneak attack from the back. **They time, as mentioned before**. **First of all, they** would argue that human with two eyes has the history of several thousands years, and its existence has the laws of nature. once changed, the negative effects it produce, I am afraid, is so many that we can't stand. Furthermore, the broaden vision oppositely make the black side of society more obvious. the life will no wonderful as imagined. So to keep proper distance is always good, it is not necessary to see everything too clearly. **in the third place, Our brain may not accommodate ourself to accept such a large amount of information, it may lead to harmful body responses, and would possibly cause side-effects. Actually there would be an awful situation that our other sensory systems such as ear, nose, even brain were to suffer a function loss. Finally, the third eye make tremendous troubles such as, pay additional money for its eyeglass, how to post your dody without pressing the the third eye, when go to**



Sample texts under a "History" thread