EFL learners' peer negotiations and attitudes in mobile-assisted collaborative writing

SHIOU-WEN YEH [a]

CHENG-TING CHEN [b]

[a] *National Chiao-Tung University, TAIWAN*
Email: shiouwen@mail.nctu.edu.tw

[b] *Chung Yuan Christian University, TAIWAN*
Email: ting@cycu.edu.tw

Abstract

Based on the advantages of collaborative writing and the advanced development of mobile technology, this study investigated the communication process and attitudes of a group of college students toward collaborative writing using a *Google Docs* app on an English writing course. Online collaborative writing assignments were assigned by the instructor in class, while the English as a foreign language (EFL) students were required to work on the writing assignments online. The researchers examined participants' peer negotiations in this mobile-enhanced, collaborative writing project, focusing on these EFL learners' negotiation discourse patterns and strategies. With the aid of mobile technology, participants practiced English writing in a collaborative way. Their discourse functions, peer negotiation strategies, attitudes, and learning experiences were investigated. A mixed methodology was applied. The findings revealed that participants had a generally positive attitude toward the collaborative writing experience. The results are also discussed in terms of learners' peer negotiation strategies and types of discourse functions.

Keywords: mobile-assisted language learning, collaborative writing, English as a foreign language, peer negotiations, attitudes

Introduction

Collaborative writing is a complex process used in academia, government and industry. As such, it has prompted much interdisciplinary research that has included perspectives from rhetoric and composition, social psychology, communication and information technology (Lin, Liu, & Yuan, 2001; Elola & Oskoz, 2010; Yong, 2010; Yeh, Lo, & Huang, 2011). Collaborative writing is also a methodological innovation in second language (L2) teaching, in which language acquisition is

facilitated by students interacting in the target language (Larsen-Freeman, 2000), and students work

together to achieve shared learning goals (Nunan, 1993). Cumming (1990), for instance, demonstrated how students relied on only their own linguistic knowledge when writing in isolation. In contrast, in collaborative writing tasks students have more language knowledge to draw on, since they can discuss and come up with more ideas during the writing process. Such deliberations can contribute to the co-construction of new language knowledge in students (Cumming, 1990; McCarthy & McMahon, 1992; Manchon, De Larios, & Murphy, 2009).

Researchers often advocate collaborative writing as a good way of giving the English as a Foreign Language (EFL) learners opportunities to deliberate on linguistic elements while performing writing tasks. For instance, Storch and Wigglesworth (2007) analyzed transcripts of collaborative writing activities and found that EFL students spent thirty percent of their conversation deliberating on what language might best express their ideas. In a research by McCarthy and McMahon (1992), the researchers pointed out that since the writing tasks are composed collaboratively, students tend to be more accepting of peer suggestions and corrective feedback. Also, Swain, Lapkin, Knouzi, Suzuki, & Brooks (2009) suggested that peer feedback given in collaborative writing are considered to be more effective and useful than teacher's feedback. Hence, writing collaboratively allows learners occasions to co-construct new language skills they learned in the composing process.

Collaborative writing involves negotiations of meaning, such as requesting clarification, asking questions, arguing about decisions, co-constructing knowledge meaningfully in a group, etc. (Mendonca & Johnson, 1994; Artemeva & Logie, 2002; Yong, 2010). Knowing what actually occurs when students get together to talk about a collaborative piece of writing may provide important clues to why collaborative writing is or is not successful, and ultimately may help instructors to make decisions as to its use in the classroom (Mendonca & Johnson, 1994). Researchers (e.g., Hsu & Ching, 2013; Sung, Yang & Lee, 2017) have further suggested that collaborative writing (Yeh, Lo, & Huang, 2011; Hwang, Chen, Shadiev, Huang, & Chen, 2014; Li & Choi, 2015) and negotiations of meaning (Fallon & Khoo, 2014; Lin, 2014) can be enhanced in mobile computer-supported collaborative learning (mCSCL). By means of a collaborative writing project supported by the use of the Google Docs app, the current study aimed to investigate Taiwanese EFL learners' peer negotiations (discourse patterns and strategies) in a mobile-assisted, collaborative writing context. Students' attitudes and learning experiences were also examined in this study.

Collaborative Writing and Mobile-assisted Language Learning

Theoretically, collaborative writing accommodates the principles of social constructivism, as proposed by Vygotsky (1978). Collaborative writing is also consistent with communicative language learning and Krashen's (1985) assumption of second language acquisition; both emphasize the need for second language learners to interact actively with the external environment and hence, such learning environments are worth investigating.

The use of mobile technology for language teaching and learning is not new (e.g., Cui & Bull, 2005; Stockwell, 2007). With the continuing and rapid advance of mobile technologies, mobile-assisted language learning (MALL) has become a trend that provides a new opportunity for EFL educators to support the process of collaborative writing (Kukulska-Hulme & Traxler, 2005; Kukulska-Hulme & Shield, 2008; Godwin-Jones, 2011). Through MALL, language learners take an active role in 'self-regulated learning' and 'flexible learning' (Bidin & Ziden, 2013, p. 723). Since mobile-assisted language learning allows the learners to access information and learning materials 'anywhere, anytime' (Kukulska-Hulme & Shield, 2008, p. 273), learners can learn and interact at various places and take

an active role in 'life-long learning' (Bidin & Ziden, 2013, p. 723). In addition to these changing roles for learners, teachers could use MALL in instructional settings to encourage collaborative learning (Kukulska-Hulme & Shield, 2008; Bidin & Ziden, 2013).

In Taiwan, the use of mobile technology to enhance English learning has attracted the attention of many teachers and researchers (e.g., Lan, Sung, & Chang, 2006; 2007; 2009; Liu & Chu, 2010; Huang, Y. M., Huang, Y. M., Huang, S. H., & Lin, 2012; Hwang & Chen, 2013; Hwang et al., 2014; Lin, 2014; Liu, 2016; Wang, 2017). Since mobile-assisted language learning is provided over networked computers, using hypermedia and multimedia technology to access various online resources, mobile technology offers EFL learners a high level of learner control and an abundance of authentic materials to meet their learning needs (Kukulska-Hulme, 2009; Melhuish & Falloon, 2010). Some studies have further shown that the combination of mobile devices coupled with mobile software applications and collaborative learning could be beneficial to reading instruction (Lan, Sung, & Chang, 2006; 2007; 2009), vocabulary learning (Huang et al., 2012), speaking and listening (Liu & Chu, 2010; Hwang et al., 2014), etc.

In spite of the potential advantages of using mobile technology in collaborative writing, it seems that the blend of mobile technology in collaborative writing is most absent and still needs to be investigated. The question of how it might help EFL students' collaborative writing experiences has not been addressed. Furthermore, research on EFL learners' negotiation patterns and peer negotiation strategies in collaborative writing environments is still lacking. Therefore, the current study set up a collaborative writing project in a university in northern Taiwan in which mobile-enhanced collaborative English writing support was provided. Theoretically, this study could help to answer the questions posed by Chapelle (1997): "What kind of 'language' do learners engage in during a technology-enhanced language learning activity? How good is the activity's language 'experience' for L2 learning?" (p. 28).

Collaborative Writing and Peer Negotiations

Negotiations have been the subject of extensive research in applied linguistics (Gimenez, 2001). Second language acquisition theory and research generally recognize negotiation as an important type of interaction that can lead to learning (Qi, 2001). For instance, Pica (1994) defines negotiation as 'the modification and restructuring of interaction that occurs when learners and their interlocutors anticipate, perceive or experience difficulties in message comprehensibility' (p. 494). Researchers of L2 writing have further noted a variety of extra-linguistic features, behaviours, interaction styles, and reactions among group members during peer negotiation sessions. For instance, Mendonca and Johnson (1994) found that students use various functions during negotiations, including making suggestions, asking questions, offering explanations, restating what their peers have written and correcting grammar mistakes.

Pata, Sarapuu, and Archee (2005) have suggested that there are other negotiating behaviours that differ between modalities. Although peer negotiation has been widely adopted by writing teachers in first language and second language classrooms (Villamil & Guerrero, 1996) as well as online learning environments (Yeh, Lo, & Huang, 2011), studies investigating EFL peer negotiations in mobile-assisted learning environments are still lacking. An important question here, is: What are the peer negotiation discourse patterns and strategies used by students for helping each other when working in groups? In reality, this type of query cannot be adequately answered unless more is known about what happens when students go online to complete collaborative writing tasks. Therefore, more studies on the actual peer negotiations in collaborative writing and in different modalities are needed.

Discourse Functions in Collaborative Writing

Researchers of L2 collaborative writing have noted a variety of discourse functions and interaction patterns (Mendonca & Johnson, 1994; Heift & Caws, 2000; Gimenez, 2001; Elola & Oskoz, 2010; Hew & Cheung 2011; Yeh, Lo, & Huang, 2011). For instance, Mendonca and Johnson (1994) found that students use various functions during negotiations, including asking questions, offering explanations, making suggestions, restating what their peers have written and correcting grammar mistakes. The activities of student peers reported by Guerrero and Villamil (1994) consisted of various social aspects of behaviour, categorized as control, collaboration and adoption of reader/writer roles. These researchers found that collaboration was highly related both to the context of the group and to the group dynamics.

In computer-supported collaborative writing contexts, Cooney (1998) coded synchronous chats as being of three types: (1) discourse about the content, (2) discourse about the task and (3) off-task talk (cited in Orvis, Wisher, Bonk, & Olson, 2002). Based on Cooney's (1998) scheme, Orvis et al. (2002) constructed the following three-category coding system to analyze synchronous chats: (1) on task, (2) social interaction and (3) mechanics. In their study, the synchronous chats of both the experimental and control groups were coded using an augmented version of the above scheme, which included three categories defined as follows: (1) article-related interactions—which included any chats focusing on the writing task at hand, for instance, discussions on its organisation, content and number of paragraphs; (2) social interactions—which included chats about teamwork that were not related to the writing task, such as discussions to check that team members were still online; and (3) system operation-related interactions—which consisted of discussions about operations of the system, such as how to post messages, problems with the system, etc.

In Yeh, Lo and Huang's (2011) study, the researchers developed a computer-supported system to support EFL college students' collaborative technical writing. The system allows multiple students to work synchronously on collaborative writing tasks via the Internet. It also helps to develop collaborative writing strategies, such as creating team agenda, brainstorming, creating team outlines and generating team articles. The researchers administered an attitude questionnaire to evaluate learners' perceptions, acceptance, attitudes and continuing motivation toward the system, using the augmented coding scheme above modified by Orvis et al. (2002) to code the students' synchronous chats. In the current study, in order to examine EFL learners' peer negotiations in this mobile-enhanced collaborative writing project focusing on discourse patterns and strategies, their negotiations during synchronous chats were coded and analyzed using categories suggested by researchers (e.g., Orvis et al., 2002; Yeh, Lo, & Huang, 2011). Learners' attitudes and experiences were also evaluated using an appropriate questionnaire.

Research Questions

A review of the literature suggests that various aspects of mobile-assisted collaborative writing processes remain unexplored, particularly the question of what actually occurs when learners engage in peer negotiations during collaborative writing tasks. Therefore, the research aimed to investigate the following research questions:
1. What kinds of discourse functions do students produce in online collaborative writing tasks?
2. What kinds of peer negotiation strategies do students use in online collaborative writing tasks?
3. What are students' attitudes toward online collaborative writing tasks?

Methodology

Research Contexts and Participants

The participants in this study were students enrolled in an undergraduate English Writing class in northern Taiwan. At the beginning of the semester, 29 students were enrolled in the class. By the end, however, only 23 participants had completed the whole process by joining in the collaborative writing tasks. Instead of being asked to pair up for the collaborative writing tasks, students were offered the choice of working in pairs or small groups (no more than four students in each). Each pair or group was encouraged to co-operate in order to accomplish various writing tasks and complete a collaborative writing task in 50 minutes by the end of the semester. As the participants were asked to work on the collaborative tasks as their homework, they did not have enough time or opportunities to discuss the tasks face to face. Hence, they were required to complete the writing project using the Google Docs app. The details of the hardware and software requirements are described in the following section.

The English writing class in this study was a required course that carried two credits. Their instructor was one of the study's two researchers. Students met in class for two hours per week over an eighteen-week semester. A standard writing textbook and grammar textbook were used in the class and a number of writing activities assigned, including writing analytical essays in a variety of rhetorical modes. The task for which data was collected as part of the mobile-assisted collaborative writing project was to collaboratively compose an essay in comparison and contrast and classification rhetorical modes. As mentioned earlier, since class time was dedicated mainly to lectures and in-class activities, learners were required to complete the collaborative writing tasks outside of class. Details of the collaborative process are described in the Research Procedure section.

Hardware and Software Requirements

In the study, each student used a mobile device (either a smartphone or a tablet) during the collaborative writing period. The hardware requirement of the study was made possible by the high ownership of mobile phones in Taiwan. Prior to the study, a demographic survey carried out by the researchers confirmed that every participant owned a smartphone. A sufficient number of tablets were also available for participants to borrow in order to complete their writing tasks.

As to the software, the Google Docs app (Figure 1) was chosen for the collaborative writing tasks on the basis of participants' preferences. Many students even suggested that some online communication apps, such as LINE, WeChat and Instagram, would be convenient for them to transmit and receive information including time announcements among the groups. However, these types of apps were not considered useful in the current study because of their limited frame and editing functions. A number of studies have shown that in addition to Wikis, blogs and discussion boards, Google Docs is one possible and useful tool for online collaborative practice (Sapeth & Black, 2012; Chatterjee, 2015; Nithya & Muthamil Selvi, 2017). On the other hand, Google Docs allows users to create, edit, import and update documents in various fonts and file formats. It can also combine text with formulae, tables and images.

In addition, Google Docs is compatible with word processor applications, including all aspects of formatting and grammar checking, and provides a wide range of functions to facilitate online collaboration. For example, the commenting system allows editors to suggest changes to writers, while sharing via Google Drive makes it easier for different contributors to share documents throughout the team. Another important reason for choosing Google Docs for this project was its ability to provide a detailed history of revisions to the documents, allowing the writers as well as the researchers to observe who contributed or modified what and when.

According to the demographic survey, all participants were users of Gmail, so all had existing accounts ready to use. Moreover, most had used Google Docs before. Only one participant needed assistance and guidance to get onto the Google Drive system and start using Google Docs for the collaborative writing activity. Since all the typing actions would be recorded by the software, participants could concentrate on their discussion and writing process without worrying about recording their brainstorming and negotiation process. A participation sheet was prepared that explained the research purpose and procedure, and eligible participants who wished to join the study signed a consent form before the research began.
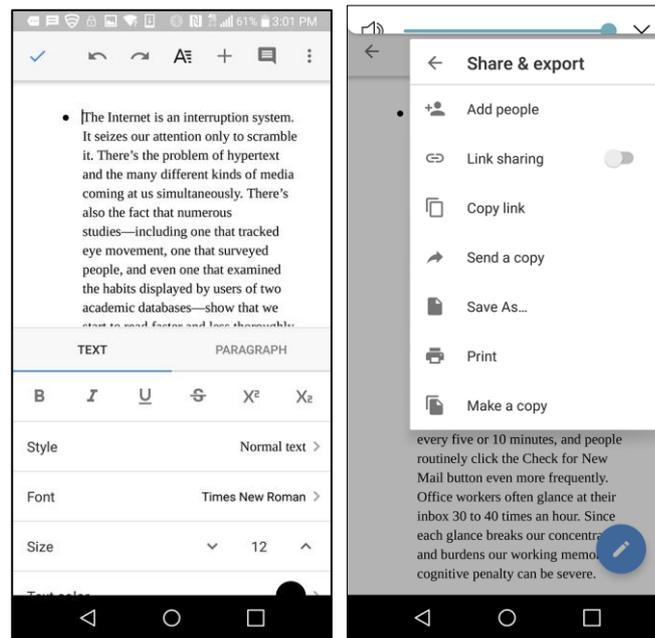
Figure 1. *Screenshots of the Google Docs app*

Data Collection and Data Analysis

This study employed both qualitative and quantitative techniques in order to collect research data (Table 1). Specifically, four instruments were used: (1) a demographic survey; (2) tracking records of students' online discourses in Google Docs; (3) an attitude survey; and (4) a semi-structured interview.

Table 1 *Research Questions and Data Collection Methods*

Research Questions	Data Collection Methods
1. What kinds of discourse functions do students produce in online collaborative writing tasks?	*Google Docs* version history; Chats
2. What kinds of peer negotiation strategies do students use in online collaborative writing tasks?	*Google Docs* version history; Chats
3. What are students' attitudes toward online collaborative writing tasks?	Attitude Survey; Semi-structured interviews

The following paragraphs give details of the data collection tools:

1.   Demographic survey: A demographic survey was designed and administered to participants, before the experimental data collection phase, with the aim of collecting information on gender, age, English learning experience, ownership of mobile devices and experience of using mobile technology to learn a language. The survey results provide a general picture of participants' background information, their mobile devices ownership, prior knowledge and experience of using handheld devices.

2.   *Google Docs* version history: Laufer and Hill (2000) highlighted the importance of using log files to investigate students' learning behaviour in computer-assisted language learning. In the current study, the *Google Docs* app was able to record the students' writing process and editing suggestions. In the data analysis phase, participants' shared files were collected, coded and analyzed.

3.   Attitude survey: The attitude survey including 15 items was designed to investigate students' attitudes toward the collaborative writing experience. The survey was designed around the following four constructs (Davis, 1989): (1) *Perceived ease of use*, which refers to the extent to which students believed that using the *Google Docs* app for the collaborative writing task would be free of mental effort; (2) *Perceived usefulness*, which refers to the extent to which students believed that the functionality provided by the app would be useful; (3) *Attitude toward use*, which refers to the extent of students' satisfaction with the *Google Docs* app; and (4) *Intention to use*, which refers to the subjective possibility that students would use the app in the future for collaborative learning. Participants were requested to complete the five-point Likert-scale attitude questionnaire after completing the study. The descriptive statistics arising from this survey are reported in the Results and Discussions section.

4.   Semi-structured interviews: To obtain more in-depth information after the collaborative writing phase about learners' perceptions and attitudes towards the *Google Docs* app, as well as their negotiation strategies, some students were invited to take part in one-to-one, semi-structured interviews. The interview questions (see Table 2) were adapted and revised based on previous studies (Pathak & Intratat, 2012; Lin & Maarof, 2013; Chatterjee, 2015). Additional follow-up questions were asked, while needed, with each participant. The questions focused on the following themes: (1) learners' experiences and strategies in using *Google Docs* for collaborative writing; and (2) the advantages and problems they perceived with using the app for collaborative writing. Each interview was conducted for around ten minutes and then transcribed for further analysis.

Table 2 *Questions of Semi-structured Interviews*

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1.   Have you experienced online collaborative writing before this course?

2.   What has been the most memorable issue that you have faced during the online collaborative writing process? What kinds of other issues arose?

3.   Have you seen problems in using *Google Docs* to support the collaborative writing process? If so, what kinds of problems? What happened?

4.   Have you found advantage in using *Google Docs* to support the online collaborative writing practice? If so, what are the benefits? How does that help you?

5.   What kinds of conflicts, if any, have you faced with your group members? Why do these occur? How do your group solve the problem?

6.   Do you consider collaborative writing essential for learning academic writing? Why or

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why not?

7. Do you consider *Google Docs* a useful tool for online collaborative writing practice? Why or why not?

8. Do you have any other thoughts about this online collaborative writing experience?

Research Procedure

Originally, 29 students were enrolled on this academic writing course focusing on essay-writing skills. All were invited to join the research project and offered the opportunity to borrow and use tablets for the three months of the data collection phase. Of those 29 students, 27 agreed, signing the consent form for participating in the research and borrowing one of the sponsored tablets. They also received a participation sheet explaining the research purpose and procedure of the study.

1. Classroom instructions: The collaborative writing project was based on rhetorical forms of *comparison and contrast* and *classification*. The instructions for the writing tasks were part of the English Writing course.

2. Grouping of participants: After receiving the instructions, students were encouraged to form small groups to complete the collaborative writing tasks. During the research period, participants were given opportunities to conduct several collaborative writing tasks, including mapping out an outline of a *comparison and contrast* essay, composing a thesis statement for a *comparison and contrast* essay, mapping out an outline for a *classification* essay, composing a thesis statement for a *classification* essay, and completing a five-paragraph *classification* essay. For the first three tasks, the class with 29 students was divided into seven groups with four to five students in one group. As to the final task, students requested that if they could form their own groups since some students did not show up in time while giving the instructions and they considered the assignment more challenging. Once the instructor agreed, eight groups were formed, however, with two to four people each, to complete the final collaborative writing tasks.

3. Collaborative writing phase: In the final collaborative writing task, each pair or group took six steps to create a *classification* article: Step 1: Brainstorming a topic for *classification*; Step 2: Identifying the subject—the group of objects to be classified; Step 3: Selecting the principle of division for the classification; Step 4: Outlining the paragraphs and assigning authors; Step 5: Starting to write; Step 6: Sending the completed document to the instructor. Further descriptions and guidelines for the six steps were given to the students in class. Because the students were using the *Google Docs* app, which allowed each pair or group to share their writing with the instructor, they were encouraged to share the document with the instructor as soon as possible.

4. Collecting *Google Docs* version history: During the research, each pair or group was encouraged to use the chat box in *Google Docs* to communicate with each other. However, the chatting process could not be recorded. Hence, students were required to report their communications to the instructors.

5. Administering surveys: The attitude survey was distributed to all participants after they had completed the collaborative writing tasks. These surveys provided data on participants' strategies and perceptions of the online collaborative writing tasks.

6. Conducting interviews: To obtain information about learners' perceptions and attitudes towards the *Google Docs* app after the collaborative writing phase, five students were invited to take part in one-to-one, semi-structured interviews. Each interview lasted around 10 minutes and was audiotaped and transcribed for further analysis.

7. Data coding, data analysis and documenting research results: To fulfill the purpose of this study, which lasted for three months, the researchers used both quantitative and qualitative data collection methods including questionnaires and interviews.

Results and Discussion

This study investigated the communication process during, and attitudes and perceptions of college students after, a collaborative writing task using the *Google Docs* app in an English writing course. Although the online collaborative writing assignments were assigned by the instructor in the classroom, the students were required to work on the assignments online. Initially, 27 students signed the consent form and borrowed the tablets prepared by the researchers. However, for various reasons not all 27 completed the last and most comprehensive writing assignment, which was to compose a five-paragraph *classification* essay collaboratively online. As a result, 23 students actually participated in the writing tasks and 11 completed the final online survey.

Toward the beginning of the semester, students were invited to join the research project by using tablets to improve their academic writing skills for three months. Many students were excited about the prospect of having a tablet that they could use for all kinds of purposes. However, after one week a number of them reported that they were not enjoying the trial because the tablets were not their own and they were worried about misplacing or damaging them. Thus, seven students decided to return the tablets within a month, claiming that they had not used the tablets for any writing assignments. Furthermore, even though the other students kept their tablets for the duration of the experiment, most chose to use their smartphones or computers to complete the online writing assignments. According to their interview responses, they were more used to typing on their own smartphones; although the bigger screen gave a better viewing experience, the tablets did not provide a better typing environment.

Types of Discourse Functions

In order to produce the outlines, thesis statements, and the *classification* essay, students tried various ways of discussing the tasks during the three months. At first, they continued to discuss them with each other face to face. Later on, when there was insufficient class time left in which to do this, they started trying to discuss the tasks online. Table 3 shows the number of occurrences and ratio of each major type of discourse functions: *interrogative*, *declarative*, *imperative*, and *exclamative*. The data collected shows that students usually started their discussion with *interrogative* sentences or phrases (N=319, Ratio=37.5%) such as, 'What should we do now?,' 'How should we start?,' 'Do you have any ideas about the assignment?' and 'What now?.' Subsequently other, alternative interrogative sentences would appear such as, 'Should we do some research online first or just start discussing?' and 'Do you want to choose a topic from the instructor's list or think of our own?' During the discussion process, various kinds of interrogatives were used by the students.

Table 3 *Types of Discourse Functions*

Discourse functions	Number of occurrences (N)	Ratio (Percentage)
Interrogative	319	37.5%
Declarative	203	23.8%
Imperative	182	21.4%
Exclamative	147	17.3%
TOTAL	851	100%

The second commonly seen type of discourse function was *declarative* (N=203, Ratio=23.8%). Some students would reply to their peers' questions by giving a direct response, such as, 'I think we should just pick one topic from the instructor's list,' 'I would prefer to do some more research online first' or 'We have to finish this fast, so I suggest that …' The third type of discourse function was *imperative* (N=182, ratio=21.4%). Sometimes, the sentences might be combined with *declarative* and *imperative* clauses, for example, 'Doing some research online first should help us better understand the topic, so let's take ten minutes to surf online first' and 'We don't have much time left for writing, so let's just start to write our respective parts right away!'

Principally, these three major types of discourse were usually directly related to the academic assignments, as a result of time limitations or the urge to finish the assignments. From time to time a few *exclamative* sentences (N=147, Ratio=17.3%), usually related to personal emotions, could be heard—for instance, 'I can't think now! I am so hungry!,' 'What a stupid idea!,' 'You're so smart!,' 'That's a great idea!,' 'How weird it is!' and 'Great! I'm done!' In this category, the discourse content might or might not be directly related to the writing assignment.

Types of Peer Negotiation Strategies

Among the various definitions and classifications of negotiation strategies, Pica's (1994) three common features of negotiation were applied in the current study: clarification requests, confirmation checks and comprehension checks. Moreover, the three kinds of negotiation strategies proposed by Breen and Littlejohn (2000) were also considered: personal, interactive, and procedural. According to Breen and Littlejohn, 'personal negotiation' engages learners' mental processing and 'interactive negotiation' involves people using language to clarify whether they have understood what has been said. As for 'procedural negotiation,' it occurs when learners reach agreement on a task issue and/or establish ways of working together.

In this study, participants employed *clarification requests* (N=116, Ratio=14.8%), *confirmation checks* (N=232, Ratio=29.6%) and *comprehension checks* (N=435, Ratio=55.6%) frequently. Table 4 shows the numbers of occurrences and ratios of the three major types of peer negotiation strategies.

Table 4 *Types of Peer Negotiation Strategies*

Peer negotiation strategies	Number of occurrence (N)	Ratio (Percentage)
Clarification requests	116	14.8%
Confirmation checks	232	29.6%
Comprehension checks	435	55.6%
TOTAL	783	100%

Personal negotiation appeared less often than did interactive negotiation. Among the eight groups of students, four were pairs, three groups had four members and one group had three. In one two-member group and one four-member group, one participant who preferred to make decisions for the group acted as its leader. In these particular groups, few negotiation conversations and only a few confirmation checks and comprehension checks were apparent during the process. Consequently, these groups reached and finished the procedural negotiation phase quickly. Clearly, once a leader had assigned group members their roles for writing which part of the essay, few spoke out against the decision.

As for the other groups, their leaders were not as dominant, so more negotiation sentences, such as: 'What do you mean? Why should we choose our topic from the list? I don't know how to write any of those topics. How about we choose another topic?' and 'I agree with A about the difficulties of writing on the topic of movie classification, but what if we narrow down the scope as the instructor suggested?' were involved. For these groups, more time was spent on the procedural negotiation phase in order to reach mutual agreement among all members.

Participants' Attitudes toward Online Collaborative Writing

Under *Perceived ease of use*, even though almost all the students were familiar with *Gmail*, a few reported being unfamiliar with *Google Docs*. Therefore, before using the app these students were more anxious than were those who had prior experience of it. Moreover, among the former, one student who completed the final survey responded negatively about using the app. Under *Perceived usefulness*, 90.9% of participants agreed that the *Google Docs* app had been helpful in their collaborative writing tasks. As to the effectiveness of communication using *Google Docs* for collaborative writing, 73% participants reported it as being either effective or very effective while 27 % were neutral, meaning that no participants were completely negative about the communication aspect of the task.

As to *Attitude toward use*, 36% of participants considered the collaborative writing assignment difficult, 45% considered it neither difficult nor easy and only 18% considered it easy. Thus, none of the participants thought the assignment was very difficult, which is interesting given that when they were first assigned it many students complained and declared that it would be too difficult for them to accomplish. When this was raised during the interview, most interviewees replied that they had felt it would be very difficult and even impossible to accomplish the assignment within the timeframe. Surprisingly, they all finished it in time because group members helped and also pushed each other.

Nevertheless, if we look at the results of the survey only, even though 64% of participants reported that their groups had conducted a considerable proportion of the task or everything collaboratively, 18% said that they had completed the assignment independently (Figure 2). Moreover, regarding the question, 'How did *Google Docs* affect your group's collaborative experience,' even though 63% of participants responded positively or very positively, 0.09% of participants gave negative feedback.
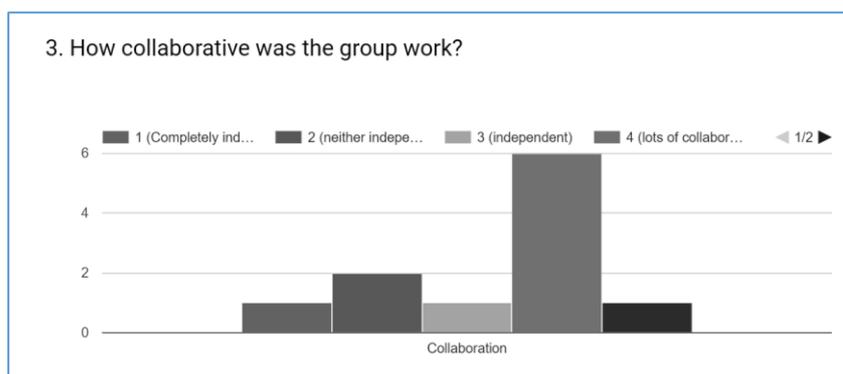

Figure 2. *Survey results for 'How collaborative was the group work?'*

With regard to *Intention to use*, the survey results show that 72.7% of participants reported using *Google Docs* to complete the assignment and the exact same proportion that they had enjoyed doing the assignment. Given these identical figures, we can assume that all the participants who used the *Google Docs* app were satisfied with its functions and results. This assumption was confirmed by the results of another question, which asked, 'Do you think *Google Docs* is a useful learning tool?' Even

though 27.3% participants claimed not to have used *Google Docs* to complete the assignment, only 18.2% gave negative feedback regarding the app itself.

In addition to their perceptions of the app, 72.7% of participants evaluated their group work as being good or very good, 27.3% as neutral. Thus, no-one considered their group work to be either bad or very bad. The results lead to the final question, 'Will you use *Google Docs* to do similar assignments again in the future?' The findings show that 90.0 % of participants responded 'yes' to this question, while only 9.1% replied 'no.' To sum up, most students were satisfied with the result of using *Google Docs* to perform collaborative writing tasks and would be willing to use it again for similar assignments in the future.

Conclusion

The results of the study suggest that most participants had a positive attitude toward the collaborative writing experience. Specifically, students benefit from the collaborative writing processes using the Google Docs app and become 'capable of constructing knowledge and developing writing and social skills through interactions with their peers' (Yong, 2010, p. 18). Such learning experiences could help the students to cultivate one of the key competencies for surviving in the twenty-first century, which is the ability to use languages and technology interactively (Rychen & Salganik, 2001).

The findings could be of value to language educators when designing similar collaborative writing activities to reach their instructional goals. As Lys (2013) observed, some instructors hesitate to integrate mobile devices into the language classroom because of a lack of understanding of how language learning and teaching could benefit from them. In addition, many teachers resist changes to teaching methods because they do not think of themselves as part of a new learning culture (Kim, Rueckert, Kim, & Seo, 2013). Practically, the results of this study could provide information that may help teachers and researchers to understand students' peer negotiations and responses to collaborative writing in an English writing class, as well as the factors that may facilitate or hinder effective use of such an online collaborative writing environment.

Although the design of the project and research procedure could be beneficial to researchers who are interested in related topics, further studies with more participants, longer-term experiments and more collaborative writing practices are recommended in order to capture more information on this topic. In addition, when this study was originally designed, tablets were considered the main instrument. However, in the real classroom situation, participants were allowed to use their smartphones as well due to their personal needs and conditions. Although the current study did not analyze the differences between the smartphone and tablet usages on learner strategies and attitudes, we suggest that future research could study whether there are different results caused by the use of smartphones or tablets.

English writing is an important academic and professional skill, especially for EFL students. University education should help prepare students for collaborative English writing, which is common in the workplace and professional life. Specifically, EFL instructors and researchers need to construct an interactive environment that can facilitate, as Ede and Lunsford (1992) proposed, 'social engagement in intellectual pursuits' and promote the idea that all writing is 'collaborative' (p. 15). The findings of this study may contribute to the field of technology-enhanced language teaching/learning by adding to the literature on the use of mobile technology to create collaborative and interactive learning environments.

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Author Biodata

Shiou-Wen Yeh is Professor in the Graduate Institute of TESOL and Language Teaching & Research Center at National Chiao-Tung University, Taiwan. She received her Ph.D. degree from Purdue University, USA. Her research interests include computer-assisted language learning, language learning strategies, English for academic purposes, and educational technology.

Cheng-Ting Chen is an assistant professor of the Department of Applied Linguistics and Language Studies at Chung Yuan Christian University, Taiwan. She is currently serving as Director of the Language Center of the university. Her research interests include computer-assisted language learning, multimedia-assisted language learning, second language acquisition, and distance education. She is one of the authors of *Six Principles for Teaching English Language Learners in All Classrooms*, published in 2009.