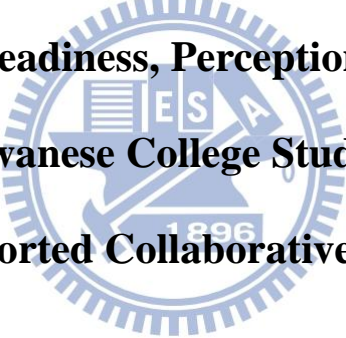# 國立交通大學

教育研究所

博士論文

台灣大學生使用電腦輔助英文協同寫作的

線上準備度、感受與互動之研究

Online Learning Readiness, Perceptions, and Interactions

of Taiwanese College Students in

Computer-Supported Collaborative English Writing

研究生：黃芸茵

指導教授：周 倩 博士

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摘要

近年來在工作與教學的場域中，日益需要電腦輔助協同合作，尤其是以英語為媒介的線上溝通技巧更顯迫切。透過線上工具輔助英語協同寫作教學（Computer-supported Collaborative Writing, CSCW），可提供學習者較真實的情境，有助於提升其相關線上學習與溝通的技巧。本研究旨在探討英語學習者在線上工具（同步聊天室與小組維基）輔助協同寫作環境中的線上學習準備度、電腦輔助協同寫作的感受，與其互動過程，藉以了解線上協同寫作過程中的交互影響因素，並希望藉此提供未來教學訓練的相關建議。

本研究首先調查學習者在電腦輔助協同寫作教學前的線上學習準備度(Online Learning Readiness, OLR)，包括電腦網路自我效能、自我導向學習、學習者控制、學習動機、線上溝通自我效能五大面向；並調查學習者於使用同步與非同步線上工具進行協同寫作後，對於相關教學設計、線上輔助工具，與溝通協同三方面的感受。在電腦輔助協同寫作教學期間，學習者個人與小組協同英文寫作表現則透過其期中考、期末考、英文寫作作業，與線上協同寫作(Wiki-based)記錄的成績進行分析。本研究針對學生線上準備度、感受，與寫作成績等各面向進行相關統計分析，並收集學習者線上同步的溝通互動之質性紀錄進行編碼，針對學習者的參與類型、學習活動(認知、情意、後設認知)與建立共識(consensus-building)的過程進行內容分析。

透過學習者調查問卷資料之統計分析，與同步線上工具輔助協同寫作過程的內容分析，本研究歸納出主要結果包括：(1) 協同寫作表現不僅是單純的個人學習表現總合；(2) 學習者偏好使用同步聊天室進行協同寫作初期的溝通協調，但認為使用小組維基協同寫作可產生較高的成就感；(3) 電腦網路自我效能、學習動機、與線上溝通自我效能和 CSCW 整體感受有正面顯著相關；(4) 電腦網路自我效能尤其與學習者對 CSCW 的科技輔助面向相關，而學習動機和線上溝通自我效能則與溝通協同面向相關；(5) 自我導向學習雖然與 CSCW 整體感受較無關連，卻與小組協同寫作呈正相關；(6)在電腦輔助英語協同寫作中，主動積極的參與似乎比學習者的個別英語能力更形重要；(7) 在擬定寫作題目與大綱的線上討論中發現成員間有較多社交與認知活動，在小組寫作修改的討論中則有較多後設認知活動，以及(8) 線上同步討論時，學習者傾向採用快速達成共識的策略。

根據分析結果，本研究對未來電腦輔助協同寫作的教學設計者與教師提出以下建議：(1) CSCW 教學前先對學習者的電腦網路自我效能、學習動機、與線上溝通自我效能進行評量，並提供相應之準備訓練，以達到最佳學習效果；如能輔以學習者線上準備度狀況進行分組，使不同型態風格的學習者可以在學習過程中互相支援；(2) 結合不同線上工具之特性，可輔助不同階段之協同寫作過程：同步線上工具可輔助學習者間的溝通協調並提高學習興趣；非同步線上工具則適合協同寫作後期的改寫與編輯；(3) 對於傾向避免衝突的台灣學習者，教師介入指導時，應適時彈性變化以促進學習者的主動參與、各種學習活動，與統合取向（integration-oriented）的建立共識過程。

　　總而言之，電腦輔助協同協作可以提供學習者較真實的線上英語溝通環境，並幫助建立學習者的線上溝通與合作技巧。本研究結果希望可提升台灣高等教育的英語教學場域中對學習者的線上學習準備度、相關感受、是否積極參與，與建立共識過程的重視，並提高電腦輔助協同寫作教學的成效。
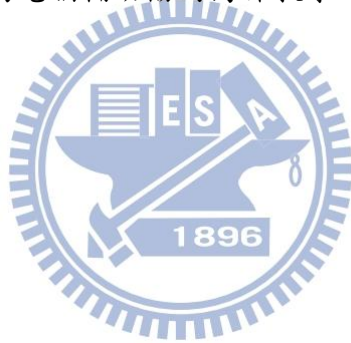
ABSTRACT

Communication among people largely takes place in digital formats, and the ability to efficiently communicate with others through electronic media is imperative. In globalized electronic contexts, there is often a demand for collaboration with adequate English literacy that across national borders. The present study investigates the five dimensions (computer/Internet self-efficacy, self-directed learning, learner control, motivation for learning, online communication self-efficacy) of learners' online learning readiness (OLR), perceptions of computer-supported collaborative writing (CSCW), and explores the critical computer-supported collaboration process learners engaged in. The interrelationships between OLR dimensions, perceptions, and individual/collaborative writing in different conditions are analyzed and discussed. Participation, learning activities (cognitive, affective, and metacognitive), and consensus-building in synchronous chat are interpreted with the teacher-researcher's perspectives.

The major findings of this study include: (1) Group performance is not found correlated with individual effort or ability of group members, and other factors seem to be involved; (2) Synchronous chat is found preferable for interaction and negotiation, and asynchronous wiki is perceived to generate a higher sense of satisfaction; therefore, different features of online tools could be applied in different stages of collaborative writing; (3) Computer/Internet self-efficacy, motivation for learning, and online communication self-efficacy positively influence CSCW perceptions; (4) Computer/Internet self-efficacy is associated particularly with learners' perceptions regarding technical support, while motivation for learning and online communication self-efficacy are significantly correlated with those of communication and collaboration aspects; (5) Self-directed learning is not associated with positive perceptions, but it is associated with better wiki collaborative writing; (6) Active participation seems more crucial than English proficiency for successful synchronous collaboration; (7) More cognitive and social activities are found in discussions on topics and outlines; more metacognitive messages are found in the last discussions about revisions; thus, learning activities seem vary in synchronous discussion of different tasks according to the nature of the shared goals; (8) A tendency of quick consensus-building is found in all synchronous online discussion.

Based on these findings, pedagogical implications regarding learners' prerequisites, interactions in online collaboration, and their actual writing performances proposed in this study include: (1) Need assessments, according training and grouping on students' literacy of online tools and Internet use, along with their motivation and their online communication self-efficacy, (2) Combination of various online tools utilizing different technical features; and (3) Flexible teacher intervention to promote all types of learning activities and integration-oriented consensus-building, particularly for Taiwanese learners with stronger conformity and collective attitudes.

The findings reveal further understanding of the complex nature of CSCW, especially in this case of college English education in Taiwan. The pedagogical implications, for both instructional designers and writing instructors, suggest further steps toward recognizing the connection between learners' readiness, perceptions, individual/collaborative writing, and interactions involved in computer-supported collaborative writing. It is hoped that writing instructors will gain a better understanding of how to prepare learner for online collaboration, and help those who need more guidance and scaffolding through the progress.
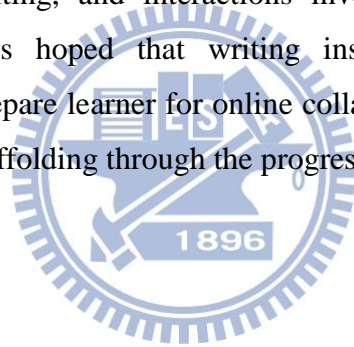
謝誌

在 2012 年末日前完成了博士班學業的我心中充滿感恩。我滿心感謝在這路上所有幫助鼓勵我的家人朋友與老師同學；沒有你們，我的這段學習旅程不會如此收穫滿滿。你們數不清的溫暖話語陪伴、互相打氣，以及長遠深厚的親情與友誼讓我的這段日子更加豐富，充滿意義，而且多采多姿。

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另外一位看著我懵懂成長的老師是陳昭秀教授。昭秀老師總是耐心修改我寫得亂七八糟的作業，給予許多詳細建議；昭秀老師也總是微笑鼓勵並適時導引我在課堂中提出的各種門外漢問題，讓我得以繼續厚臉皮地繼續發問。未來的研究與生活中，我都會繼續保持這樣越挫越勇的精神。謝謝你，昭秀老師，上你的課是我博士班生涯中又有趣又收穫滿滿的美好回憶。

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CHAPTER 1

Introduction

"The co-construction of linguistic knowledge in dialogue is language learning in progress."

(Swain & Lapkin, 1998, p.321)

With the widespread emergence of communication technologies, the demand for reading and writing in electronic contexts has increased (Warschauer, 1999). In the present era, communication among people largely takes place in digital forms, and the ability to efficiently communicate with others through electronic media is imperative. In globalized electronic contexts, there is a demand for both for adequate English literacy and for skills in electronic collaboration that spans national borders.

Workers, researchers, and students alike are often required to work together for a common goal, and the Internet is providing the mechanism for such collaboration. The trend toward computer-supported collaboration, fueled by the demand from various professions, is evolving as advancing technology results in increasing speed and realm. English language, as the well-established medium of international communication, is being used in most computer-supported cross-national collaboration and communication. In response to this increasing demand, this study aims to explore computer-supported collaborative writing (CSCW) in an L2 setting, which involves an even more complex scenario of group dynamics (e.g., the cultural aspects of foreign language) and individual factors (e.g., English writing ability, self-efficacy, familiarity of online tools).

While technology holds many advantages and potential, its emerging role in second language (L2) writing instruction is still being explored (Hartley, 2010; Kern, 2006). It remains unclear how L2 writing instructors can effectively facilitate collaborative writing through online tools, such as wikis. Although modern technology can provide technical support for many types of interaction among language learners, several foundational questions remain unanswered, particularly the possible factors influencing effective online collaboration, in both synchronous and asynchronous formats. When it comes to various contextual attributors, both the features of the online tools and the characteristics of the learners must be considered.

Learner characteristics include, but are not limited to, computer literacy and knowledge, communication skills, and their previous perception of online collaborative experiences. In addition, during the collaborative process, the interactions among learners and the roles they play may well explain the effectiveness of their negotiation, communication and collaboration. Moreover, the extent to which these factors contribute to an effective online collaborative writing process and the eventual completed work also needs to be explored.

While collaborative writing has been widely adopted in both professional and academic contexts, it is not often supported by technology in educational settings. The role and potential of online tools for collaborative writing in L2 context remain unclear, as does language learners' readiness for learning L2 collaborative writing using online tools. In order to prepare students to be better equipped with such communicative abilities, language "teachers should bring computers into the center of their own pedagogical practice" (Pennington, 2003, p. 287).

1. **Statement of the purposes**

The primary purpose of this study emerged from the teacher-researcher's immediate concerns of her practical teaching in the context of Taiwanese higher education, and it is to investigate the effectiveness of using collaborative computer tools, such as synchronous chat rooms and asynchronous wikis, in L2 writing instruction, and to identify the factors which influence learners' interactions and collaboration when using such online tools. This study aims to present language education researchers and writing instructors with best practices in relation to CSCW and to provide a clearer view of the role that online support plays in understanding how learners collaborate in L2 settings. Practical pedagogical suggestions and implementation will be discussed, including (1) how to prepare learners for this type of online collaboration, (2) how and when to provide guidance and scaffolding, and (3) how to plan the CSCW implementation. It is hoped that CSCW can be more widely incorporated into general education in college so that Taiwanese students can benefit from the findings of this study. Last, this study aims to shed light on further research in computer-supported collaboration and L2 writing alike.

In the following Chapter 2, relevant literature is reviewed to provide a theoretical framework and instructional design for this study. Chapter 3 describes the research methods in detail, including the data collecting process and the plan for data analysis. Chapter 4 presents quantitative results regarding learners' online learning readiness

(OLR), CSCW perceptions and individual/collaborative writing performance. The survey data are statistically analyzed to reflect the interrelationship between learners' readiness and differences in their perceptions regarding CSCW. Chapter 5 presents an analysis of the qualitative chat log, with particular attention on learners' participation, learning activities, and the consensus-building process. The chat logs of online discussions are coded and interpreted with the teacher-researcher's perspectives. In Chapter 6, relevant pedagogical recommendations for future CSCW instruction and studies are proposed.

2. Research foci

The present study investigates the five dimensions of learners' online learning readiness (OLR), perceptions of computer-supported collaborative writing (CSCW), and explores the critical collaboration process learners engaged in. The five dimensions of OLR include (1) computer/Internet self-efficacy, (2) self-directed learning, (3) learner control, (4) motivation for learning, and (5) online communication self-efficacy). Collected data covers the following aspects:

1. OLR and the interrelationships of each sub-dimension

2. Perceptions of CSCW supported by (a)synchronous tools

3. Individual and collaborative writing performance

4. Interrelationships of OLR and CSCW perceptions

5. Interrelationship of OLR and individual/collaborative writing

6. Participation in synchronous chat

7. Learning activities in synchronous chat

8. Consensus-building in synchronous chat

3. Significance of the study

As an emerging pedagogical method for learners of all ages, instruction in collaborative writing does not always fulfill its theoretical promises, such as active learning (Speck, 2002), reflective thinking (Bruffee, 1993), and motivation (Kowal & Swain, 1994). Collaborative writing is not a new concept in educational settings, but very few studies have applied it to L2 contexts, nor accumulated enough evidence for

effective use of online tools. Practical issues include how much to support students' collaborative writing, and when such support is most appropriate. In addition, it is important to determine how to provide sufficient scaffolding and guidance without disrupting the process of their active learning.

Storch (2011), a pioneering researcher of collaborative writing in L2, clearly pointed out that collaborative writing research in L2 is important and deserves much more attention because of its potential benefits for L2 learners. A few recent studies examined wiki-supported L2 writing instruction and reported positive findings (e.g., Lund, 2008; Pellet, 2012). In addition, Huang and Chen (2010) recognized the educational potentials of wikis and proposed an instructional model of collaborative writing in L2 for the higher education context in Taiwan, such as equalization of participation for students with various abilities, and access of shared space for multiple users to allow for collective writing.

Collaborative writing using wiki has been reported to mediate students' collective activity (Blin & Appel, 2012) and is associated with the development of learner autonomy (Kessler, 2009). However, there is not yet sufficient empirical evidence to draw conclusions about the actual benefits, pedagogical strategies, or learners' readiness for the use of wikis in L2 writing classes. Storch (2011) concludes that wikis are theoretically suitable for collaborative writing instruction, but seeks more wiki-based empirical evidence. The present study thus seeks to contribute to the growing understanding of how wikis and other online tools support interaction in CSCW and to what extent other contextual factors influence and shape L2 collaborative writing using these tools.

Literature review

1. Collaborative learning

As an umbrella term, "collaborative learning" implies instructional approaches or environments in which learners jointly construct knowledge and produce intellectual works (Smith & McGregor, 1992). The unique and significant features of collaborative writing, particularly in second languages (L2), as well as related issues, are reviewed to form the theoretical framework and instructional design of the present study. This section first introduces the social cognitive base of computer-supported collaborative learning (CSCL), then moves from online collaboration in general to its application to L2 writing instruction specifically. Second, the review highlights the influences of learners' perceptions of instructional design, technical support, and social interaction in the contexts of computer-supported collaborative writing (CSCW).

The social-constructivist view of learning

The sociocultural perspective of collaborative writing originated from the Russian scholar Lev Vygotsky (1978) and helps to justify the crucial role of social context and interaction in learning. In recent years, the concept of collaboration has drawn significant attention in the field of education, and the social nature of learning has been re-evaluated and re-examined for the networked learning climate. The idea of collaborative learning can be traced back to Vygotsky's sociocultural perspectives on learning. According to Vygotsky's pedagogical theory (1978), learners who receive scaffolding from teachers or more able peers can assist learners in their "zone of proximal development" (ZPD) to achieve more than if they worked alone. Types of instructional scaffolding include questioning, modeling, feedback, explanations or suggestions. His ideas have inspired researchers to consider not only the effects on individual writing but also on the social interaction that occurs throughout the writing process. Social interaction that occurs within the ZPD can help beginning writers to achieve better performance than with work that is done in isolation. From this sociocultural perspective, learning can only be effective within a larger motivational and interactive context, and that learning occurs largely through interactions among students (Stahl, et al., 2006). The benefits of scaffolding from peers constitute the basis of collaborative learning, in which learners work together, as they communicate

and negotiate with each other toward a common goal, usually to create an end product.

Second language learners bring their original culture and traditions to the classroom and shape the learning practice in unique ways. It is important to recognize what L2 learners already know, including the professional knowledge of the new language and their attitude toward and philosophy of the learning process. For instance, it is important to know if the learners are ready for frequent interaction with the instructor and negotiation with peers, as well as whether they are equipped with effective skills to express themselves. A similar concept can be found in Bakhtin's theory. Bakhtin's term "voice" refers to the "speaking consciousness," and for a writer, the voice is the point of view, a certain idea or a particular value he/she holds during writing. For Bakhtin, each piece of writing includes the writer's past interaction with the thoughts of others and anticipated future interactions (Cazden, 1993). Amhag and Jakobsson (2009), adopting Bakhtin's ideas, examined the dialogic interaction among learners and described how learners use dialogue as a tool for collaboration. Based on Bakhtin's view that written texts are dialogic and mediate activity, Wells (1996, 1999) also argued that individual learning is mediated by social discourse in dialogic learning.

When considering the ZPD concept, assistance and support from the teacher or a more capable peer in the writing process could be viewed as a scaffold for beginning writers. Compared to traditional written feedback and marking from teachers, peer feedback has proved to be effective in L2 writing as well (Jacobs, Curtis, Braine, & Huang, 1998; Yang, Badger, & Yu, 2006; Zhu, 2001). Learners help each other by identifying unseen mistakes and providing different perspectives. The extended and dynamic view suggests that ZPD could exist in a group just as it does in an individual. The scaffolding from peers helps learning (Cohen, 1994; Webb, Troper, & Fall, 1995) and reflects the concept of collaborative learning, in which learners work together, engaged in a shared task, communicating and negotiating toward a common goal, usually to produce or create a product (e.g., co-writing).

While cooperative learning is similar to collaborative learning, there is a distinct contrast. Cooperative learners generally "split the work, solve sub-tasks individually and then assemble the partial results into the final output (p.8)," while collaborative learners assume a high degree of responsibility for the collective work as a whole, rather than simply adopt the individual part assigned by the teacher. In collaborative learning, each participant stays engaged with a shared task, and they work "together"

throughout the whole learning process (Dillenbourg, 1996). This significant difference has also been identified in L2 writing instruction (Arnold, Ducate, & Kost, 2012). In collaboration, learning still occurs cognitively in individuals but is enhanced by more frequent interaction with peers and deeper engagement with the task (Cohen, 1994). In addition, the scaffolding among peers benefits both those who provide it and those who receive it (Webb, Troper, & Fall, 1995). Fortunately, the beneficial interaction for learning can be increased and promoted by the facilitation and support of computer tools (Pifarre, 2007), and the concept of collaboration has been incorporated into writing instruction in both first and second languages.

Collaborative writing in L2 education

Writing, as a profound process that helps to organize, reflect and refine ideas, has been integrated into the curriculum across disciplines; collaborative writing offers greater chances to practice reading and writing skills, to stimulate reflection, to share knowledge, and to think critically (Scardamalia & Bereiter, 2003). According to Speck (2002), collaborative writing can be a useful pedagogical tool that not only promotes active learning in higher education, but subsequently prepares students for the workplace. In addition to promoting ownership of the written product (Storch, 2005), collaborative writing encourages reflective thinking and awareness of audience (Bruffee, 1993) and motivation (Kowal & Swain, 1994). However, facilitating collaborative writing in class is typically time-consuming and is particularly challenging to implement when classroom hours are limited.

2. Technology-enhanced collaboration

In the 1990s, the advance of technology brought about computer-supported collaborative learning (CSCL) as a significant branch of learning science (Stahl, Koschmann, & Suthers, 2006), and the potential of networked tools for collaboration has since been rigorously studied. Koschmann (2002) defines CSCL as "a field centrally concerned with meaning and practices of meaning-making in the context of joint activity and the ways in which these practices are mediated through designed artifacts" (p.18). Computers, including word processors, networked tools and online resources, have universally revolutionized the way people read and write. Warschauer (1996) suggested that technologies provide language learners with an enhanced sense of communication, empowerment, and learning, thus making learners feel less isolated and afraid to communicate, while making them more independent and responsible for their own learning. Computers and the Internet can foster knowledge-building communities, like the pioneering Knowledge Forum project

(Scardamalia, 2004), which supports the social co-construction of knowledge through collaborative communication. Knowledge Forum was basically facilitated by networked text-based communication, that is, computer-supported collaborative writing (CSCW). In the following sections, relevant literature of CSCL in general and CSCW specifically will be presented.

According to the *Cambridge Handbook of Learning Science* (2006), three early CSCL projects were all involved with literacy (reading and/or writing) improvement: (1) the ENFI project at Gallaudet University; (2) the CSILE project at the University of Toronto; and (3) the Fifth Dimension project at the University of California San Diego. EFNI and CSILE were particularly designed to develop skills for engaged and meaningful writing, for either joint text production, or textual communication. The pioneering ENFI (initially for *English Natural Form Instruction*, and later became *Electronic Networks for Interaction*) project at Gallaudet University demonstrated that literacy education can help facilitate logical thinking and written language skills, while providing a scaffold for learners in a social, meaningful and authentic environment (Bruce & Rubin, 1993). The connected local network helps the writing become (1) a social act, rather than a solitary task; (2) a process, rather than a product;, and (3) a collaborative effort among students and the teacher (Batson, 1998). The technology used in the ENFI project might seem out of date by today's standard, but it provided sufficient support for textual communication, meaning-making and collaborative writing (Gruber, Peyton, & Bruce, 1995). more than software, ENFI was a concept that could be used to change the social dynamic of the writing classroom (Day, 1995). The application of networked tools helped learners to meaningfully participate in the discourse community and improve their writing. These early CSCW examples proved that fancy multimedia platforms are not necessary; appropriate facilitation though common networked text-based tools can achieve satisfying learning outcomes.

As a well-established pedagogical approach, CSCL has been widely used across many disciplines, from engineering, science, and math to literacy and language arts. However, collaborative writing instruction is not always successful, and is influenced by a variety of factors, such as how the working groups are determined (homogeneous or heterogeneous, randomly-assigned or self-determined), group size, teacher's direct instruction, pedagogical strategies, task design, assessment, and socio-cultural influences (Huang & Chen, 2009), as well as students' individual characteristics (e.g., individual motivation, knowledge of online tools, online communication skills). Students have raised concerns about fairness (Chisholm, 1990) and inaccurate peer editing (Nelson & Murphy, 1993). Furthermore, learners' preparation (e.g., word

processing skills) and motivation for online learning can greatly affect the process and quality of their collaborative writing (Littlewood, 1996; Saade, He, & Kira, 2007), as can their perceptions of the collaborative environment (Kessler, 2009).

Computer-supported collaborative writing (CSCW)

Second language learning requires comprehensive consideration of many issues, including individual motivation, metacognitive strategies, and knowledge transfer across languages. A chapter in the *Handbook of Educational Psychology* discusses nine broad aspects of the role of technology in education, and suggests group work activities that will emphasize this role and provide an opportunity for further investigation to better understand its effects on second language literacy and its social context (Padilla, 2006). CSCW in second language acquisition is an interdisciplinary idea, based in research emerging mainly from applied linguistic and educational technology, rooted in CSCL and computer-assisted language learning (CALL) approaches.

Concordancer and other corpus-based computer applications play a huge part in the relatively short history of CALL. The ability of computers to process large amounts of linguistic data opens up the flourishing development of this data-driven approach, while easy access to personal computers makes it possible to bring this tool into the classroom. Interest continues to grow, because it is beneficial for developing autonomy for individual learners, particularly for those learners with higher levels of proficiency (O'Sullivan & Chambers, 2006; Sun, 2007; Yeh, Liou, & Li, 2007).

On the other hand, the focus of language learning has transferred from merely personal development to a more communicative purpose. Languages, as a medium of communication, are supposed to be taught and used in context, with real people and real tasks. The sociocultural approach in L2 education has gained attention with an increasing number of studies concerning group dynamic (Jones, Garralda, Li, & Lock, 2006), peer interaction (Gijlers, Saab, Van Joolingen, De Jong, & Van Hout-Wolters, 2009; Peterson, 2009), and communication styles (Cho, Gay, Davidson, & Ingraffea, 2007). Networked tools are now being applied in language classrooms in more collaborative and dynamic ways. Weblogs and discussion forums are no longer for one-way assignment submission only, but are now also used as space for observation, reflection, peer feedback, and assessment. These applications are combined with new pedagogical methods to achieve more collaborative facilitation and more learner interaction.

Applied linguists have applied pedagogical practices in response to the social and collaborative nature of learning. Nowadays, various media and technologies, from the tapes and radio in the old times to audio mp3 files and podcasts, are being used widely in L2 education. Many computer tools have been applied for writing instruction, from word processors, e-mails, corpora, concordancer, to both synchronous and asynchronous online tools (Hyland, 2003). Networked computers as learning tools have been found to empower L2 learners by enhancing autonomous control, providing more equal participation, and developing independent and critical learning skills (Warschauer, 1996).

Recent CSCW studies applying technology for L2 writing instruction have demonstrated practical experiences in college composition classes and writing programs (e.g., Lackey, 2007; Zemliansky, 2008). Lackey (2007) suggested the process of establishing wiki pages could improve not only writing skills but also visual rhetoric skills, which are becoming increasingly useful. The idea of shifting from individual assignments to collaborative work is not easy to achieve and understand, but in James Madison University (JMU)'s first-year writing courses, some of the students are doing just fine. More cases of college-level collaborative writing instruction (Farabaugh, 2007; Hemmi, Bayne, & Land, 2009) showed positive responses from students and teachers. For instance, Kessler et al. (2012) recently documented a web-based collaborative writing project that used Google Docs and suggested that the online collaboration improved the accuracy of students' writing; furthermore, students were encouraged to focus on meaning rather than form.

Theoretically, collaborative writing provides language learners with more opportunities for negotiation of meaning, along with other potential benefits. In spite of the encouraging findings regarding CSCW, unsuccessful implementation and unexpected troubles still occur from time to time. Specific skills are needed in order for learners to effectively collaborate with peers, such as learners' autonomy, online communication skills, and online learning readiness (OLR) (Hung, Chou, Chen, & Own, 2010). Littlewood's (1996) framework of autonomy suggests that foreign language learners' knowledge and skills affect their ability to learn, while also indirectly influencing their willingness to become better communicators. The quality of CSCW instruction is also an important factor, particularly whether it is designed with the intended learners in mind.

Learning to write in a second language has both similarities and differences to learning to write in a first language. Research on each of these points of comparison can add to the body of research on writing instruction. For example, writing in a second language shares at least some features with writing in one's first language (i.e. planning, organizing strategies, and revision. Yet, collaborative writing involves a shared authorship among a group (more than two people), which is a distinctly different feature when compared to previous L2 writing instruction. It is suggested that relatively instant feedback (from both peers and instructor) and the online collaborative tools that grant this access to others' writing could promote more successful collaborative writing (Storch, 2005). The majority of relevant literature to date focuses on peer feedback or pair writing (no more than two people).

Computer-supported collaborative writing in L2 setting

As a pedagogical strategy, collaborative writing can be an effective realization of Swain's (2000) notion of collaborative dialogue in language development, by which learners solve linguistic problems and build knowledge about language together. In terms of L2 education specifically, learners can receive mutual scaffolding and feedback through collaborative writing tasks, and work together to generate a collective product through communication and negotiation in each phase of the writing process (e.g., brainstorming, outlining, revising, and editing). Moreover, a high frequency of negotiation during text revision could improve the language accurancy of the modified output (Suzuki, 2008). Furthermore, Storch (2011) argues that a collaborative approach can increase learners' awareness of language use (their own and that of peers), and allow learners to integrate the linguistic resources of the group, in order to develop more accurate written products.

Language educators have also noticed the social and collaborative nature of learning, and have applied pedagogical theories to practice accordingly. Many synchronous and asynchronous tools for online collaboration have been developed (Hyland, 2003; Murphy, Rodriguez-Manzanares & Barbour, 2011) and could potentially realize the collective and socio-cultural perspective of language learning (Lund, 2008). For instance, instant chat and net conferencing provide the opportunity for immediate feedback and frequent interaction, while blogs and wikis combine text-based and asynchronous features for reflective thinking and detailed revision. Such tools can be suitable and beneficial for L2 writers.

Computer-supported environments have been found to improve L2 students' writing skills, particularly in the use of more complex structures, more fluent conversational writing, and self-expression in greater quantities (Beauvois, 1998; Warschauer, 1996). Studies have shown that word processing software can dramatically affect the writing process, including aspects of planning, drafting, and revising. Pennington (2003) claimed that the planning—writing—revising process is easier to understand and use within computer contexts, which may be "especially valuable for L2 writers" (p. 291). When using word processing with L2 writing students, it is easier for them to learn about revision, to make more and better meaning-level changes, and to participate in more peer feedback.

Among the few studies done on L2 collaborative writing, Storch (2005) examined the quality of collaborative writing and found higher accuracy in the text produced, a result confirmed by later studies (Elola & Oskoz, 2010; Kessler, Bikowski & Boggs, 2012; Storch & Wigglesworth, 2007). These positive findings suggest that collaborative writing activities might provide L2 learners with more opportunities to develop "collaborative dialogue" (Swain, 2000), which leads in return to better learning performance and outcomes. Positive findings regarding wiki-based L2 collaborative writing has been reported in other studies as well (Arnold, Ducate, & Kost, 2012; Huang & Chen, 2010; Kessler, 2009; Pellet, 2012), yet many CSCW instruction projects were not as effective as expected (Judd, Kennedy, & Cropper, 2010). The reasons for the negative findings are not fully understood, and further research is necessary.

3. Issues of computer-supported collaborative writing (CSCW)

The complexities of the dynamic context of online collaborative writing process for L2 learners cannot be covered in brief; therefore, the present study focuses specifically on learners' online learning readiness (OLR) and their perceptions of CSCW, as well as the contextual factors (e.g., task design, technical support, and communication with peers) that may influence CSCW in L2 writing. In addition to learners' readiness, many other dimensions should be considered when it comes to the effectiveness of L2 writing instruction, including individual motivation, metacognitive strategies, knowledge transfer across languages, and the learners' socio-cultural backgrounds. In addition, pedagogical issues, such as the design and selection of content, instructional approaches, and the capability and application of online tools, are also important to investigate.

Some scholars have investigated group work activities and the role of technology for understanding L2 literacy and its social context (e.g. Padilla, 2006). Generally, research on collaborative writing has focused on learners' language and the socio-cognitive processes of their interactions (Storch, 2005); very little attention, meanwhile, has been given to the collaborative process itself or to learners' perceptions of it (Kessler et al., 2012, Storch, 2005). The possible factors influencing learners' online collaborative writing process are wide-ranging, such as group size, knowledge of other participants, clarity of task, and ownership of task (Tolmie & Boyle, 2000). Another area of research is how learners perceive (1) the features, usability and adoptability of online tools, (2) the instructional design, learning activities and selection of text, and (3) the communication and collaboration involved with CSCW tasks. Learners' perceptions of these three categories are presented as the technical, instructional and social aspects of CSCW.

Writing process: Phases and models

While writing as a process is influenced by various social, cultural and individual factors, there may be some aspects and stages that can be generalized. For example, composition researchers have developed writing models to understand the complexity of this mental process and hope to provide pedagogical implications for writing instructors. However, when these writing process models (e.g., Flower & Hayes, 1981; Hayes, 1996; Marlene Scardamalia & Bereiter, 1986; Zimmerman & Risemberg, 1997) were developed, the special situation of second language learners was not considered. Among the various models, two of them might provide some ideas that can be applied to second language writing instruction: *Flower and Hayes' cognitive model* and *Scardamalia and Bereiter's knowledge telling/transforming models.*

The well-known Flower and Hayes' process model (1981) suggests the pre-writing (brainstorming, planning), writing, and post/re-writing (reviewing, proofreading, editing) stages are recursive and even simultaneous. The writer can jump back and forth among all these activities. While this model is mainly about the cognitive aspects of individual writing process, it has received criticism because it does not consider social factors. Flower (1994) later revised the model to one of "discourse construction," which considers the language and social context together, as well as the purpose and goal of the writing—for both the writer and the reader—and activated knowledge and awareness. Both versions of the model were developed for L1; the potential differences between L1 and L2 writing, such as linguistic proficiencies, sense of audience and writer, and writing process, were not considered.

Scardamalia and Bereiter (1986) offered models of knowledge-telling and knowledge-transforming models, which focus on novice and expert writing processes, respectively. Contrasting beginners and skilled writers, these two models present different metacognitive strategies, knowledge of genre and text structure, different levels of goal-setting and planning, and mental/behavioral revision. Less-skilled writers tend to have less discourse schema, less goal formulation, and less mental revision, and these characteristics might be identified in L2 writers as well. Interventions such as teaching discourse elements, coaching, dictation, ending sentence task, and providing structure, can serve as scaffolding and may help L2 novice writers learn to move toward more expert performance in their writing skills and strategies.

The recursive feature of the writing process proposed by Flower and Hayes is universal in all writing, both in L1 and L2, even though the model does not specifically address the differences between L1 and L2 writing. While Scardamalia and Bereiter's knowledge telling and knowledge transforming models were developed for L1 writing, the knowledge telling (novice) model could also represent the cognitive processes of L2 writers with regard to limited linguistic and genre knowledge. These models integrate the problem-solving concept and provide a practical theoretical base for teaching L2 writing. By comparing these two models, clear differences between novice and expert writers can be used to understand similarities and differences between L2 and L1 writers.

Writing models cannot describe every subtle aspect of the individual writing process, let alone the more complex dynamics involved in group writing. However, the proposed writing phases and models—or process approaches-- could be used as pedagogical frameworks in writing instruction. For L2 learners in particular, the advantages of teaching writing online have been recognized, including a voice for the shy, easy access to resources, higher motivation, active learning, real writing in the virtual word, and continuous online communication (Pellet, 2012; Stine, 2004). While the merits of teaching writing online are recognized, L2 writing could benefit even more from the collaborative nature of networked tools. Web 2.0 tools are reported to support the guidance and meaning-making negotiation among L2 student writers (Blin & Appel, 2012; Huang & Chen, 2010). Various possible applications of the web 2.0 technologies have been reported (e.g., Goodwin-Jones, 2003; Huang & Chen, 2010; Lund, 2008), and preliminary findings confirm the learning/teaching potential of these tools (Chang & Schallert, 2005; Wang, et al., 2005).

Learners' readiness

When applying CSCL to knowledge management, both the cognitive and social processes of learners should be taken into account. User attributes that influence CSCL vary, and online learning readiness (OLR) is regarded as one of the most crucial factors in successful online learning (Hung, Chou, Chen, & Own, 2010). Online learning readiness is a broad concept, similar to Shetzer and Warschauer's (1999) notion of electronic literacies, and includes preferences of delivery, confidence in using online tools, and autonomous learning (Warner, Christie, & Choy, 1998). These aspects of students' individual qualities can significantly determine the success of online learning. Thus, self-directed study and autonomous learning have begun to receive greater recognition in language education (Godwin-Jones, 2011).

Because of the crucial role of students' readiness in successful online learning, instruments have been developed to measure this multi-faceted concept (e.g., McVay, 2001; Hung, Chou, Chen, & Own, 2010), such as motivation for learning, learner control, computer self-efficacy, and online communication self-efficacy. While OLR has been generally recognized as an important predictor of successful online learning, such learning is typically more self-paced and individual. As a result, it has not yet been confirmed whether the same constructs that predict successful online learning in general will also affect online collaboration among learners in the same way. It is worth investigating the interrelationships between each readiness dimension and students' perceptions, to better understand how educators can help and prepare students for collaboration in digital contexts.

Technical support: Synchronous and asynchronous

Storch (2011) suggested that using wikis may be the new direction for facilitating online collaborative writing in the L2 classroom. Indeed, wikis allow users to easily edit text-based content online. Like the mechanism used on Wikipedia, online collaboration enables revisions among distributed learners. As a feature of asynchronous online tools, the delayed nature of wikis allow learners more time to reflect and produce more in-depth intellectual responses. Successful cases of wiki-supported writing instruction have shown a wide range of positive perspectives from students and teachers (Farabaugh, 2007; Hemmi et al., 2009; Kittle & Hicks, 2006; Lackey, 2007; Zemliansky, 2008), and the application of wikis appears suitable for higher education contexts (Huang & Chen, 2011).

No longer limited to computer engineers, online content on wikis can be easily edited by anyone with an account. Due to the loose structure of wiki sites, users can freely link online resources in and out of wikis in multiple ways. Wikis allow direct access without the limits of time and place, which is the key element in collaborative learning (Hodgson, 2006; Wilkoff, 2007). Being web-based, wikis also provide users with a sense of authorship and audience for their textual production. Huang and Chen (2010) proposed a *Wiki Collaborative Writing* (WCW) model for collaborative L2 writing instruction, utilizing the collaborative nature of wikis to equalize participation of less able students and to increase peer feedback. Kessler (2009) reported an association between learner autonomy and wiki collaboration, and positive findings on wiki-based writing instruction have increased in recent years (e.g., Arnold, Ducate, & Kost, 2012; Pellet, 2012). Collaboration through wiki writing has been reported to mediate students' collective activity (Blin & Appel, 2012) and is associated with the development of learner autonomy (Kessler, 2009). However, there is not yet sufficient empirical evidence to draw conclusion about the actual benefits, particular in L2 contexts, as pointed out in a recent review (Storch, 2011).

On the other hand, synchronous online tools (e.g., chat rooms) can facilitate simultaneous communication and allow learners to get real-time feedback from each other. Because this type of feedback is more similar to face-to-face interaction and is preferred for second language acquisition, synchronous chat is more effective when well-structured. Synchronous chat can foster social presence and lead to a greater sense of community, which is beneficial for a comfortable and successful learning environment (McInnerney & Roberts, 2004). In addition, the powerful social nature of wikis for collaborative writing can be enhanced through the support of synchronous text application (Elola & Oskoz, 2010; Oskoz & Elola, 2010).

As these findings suggest, synchronous communication seems to better support motivation, as well as the social and personal aspects of writing, while asynchronous communication is more tailored to the development of cognitive aspects and reflection (Hrastinski, 2007, 2008). Different tools may affect students' perceptions and preferences for online collaboration; yet many other factors are also involved in the learning context, such as pedagogical approach, teaching style, and task design. Sotillo (2000) investigated the discourse features of both synchronous and asynchronous online tools in the ESL setting and concluded that asynchronous and synchronous online communication have "different discourse features which may be exploited for different pedagogical purposes" (p.82). For instance, collaborative web tools can help realize the collective and socio-cultural perspective of language

learning (Lund, 2008). Even when acknowledging the benefits of online tools, it is also important to recognize how learners perceive the tools. If a learner's "cognitive-affective response" (understanding and attitude) toward electronic tools is positive, high-quality writing may ultimately be produced (Pennington, 1999).

Instructional design

While the intrinsically collaborative nature of wikis theoretically suits learners' needs, and chat rooms enable instant feedback, they do not always generate promising interaction and cognitive development among learners. Pennington (2003) claimed that "networking student writers electronically does not guarantee better writing" (p.299); accordingly, collaborative tasks must be carefully planned and executed with consideration of learners' schema and cognitive load. The pedagogical design of appropriate learning tasks should reflect the nature of the tools and aim for its optimal potential. As discussed earlier, synchronous and asynchronous can facilitate different types of interaction among learners for various pedagogical purposes (Sotillo, 2000); in a similar vein, student motivation can by increased by choosing appropriate online tools and learning tasks based on specific learning objectives for collaborative writing. The resulting sense of achievement would be the key to successful online collaborative writing tasks.

When considering the factors that influence the effectiveness of collaborative writing in L2, the majority of past research focused on task types (e.g., Storch & Wigglesworth, 2007) and proficiency grouping. Other factors must be considered. For example, carefully designed tasks and instructions, including a common goal for the group, are necessary to ensure interaction and cognitive development. Some learners' prefer extra time to process information; some excel in visual approaches of learning rather than text-based communication. To fit different styles and types of learners, carefully-designed, yet flexible, collaborative writing tasks are the cornerstone of successful CSCW.

Other than individual and cognitive characteristics, CSCW instruction should be based on social and cultural aspects of the learning community and provide an authentic goal and audience for learners and situates them in real contexts (Drisccoll, 2007). Relevant consideration also includes the degree of teacher intervention in the writing process, as well as the strategies used to facilitate online discussion and provide feedback. Teaching methods for collaborative learning significantly contributed to self-efficacy (Fencl & Scheel, 2005), a personal characteristic that influences achievement behaviors, persistence and effort (Schunk, 1995; Schunk &

Pajares, 2002). Reflecting the ideas of social cognitive theory (Bandura, 1986), the three presence components (cognitive, social, and teaching) of the web-based *Community of Inquiry model* (Garrison & Vaughan, 2008) support the design of online interaction-based learning, in which the teaching presence, also known as the instructional aspect, is essential.

Learners' interactions: Participation, learning activities, and consensus-building

Compared to cognitive aspects, social and affective factors influencing CSCL were less investigated and discussed (Jones & Issroff, 2005); however, engagement in online activities is greatly influenced by socio-cultural factors (Hickey, 2003). The contextual factors of computer-supported instructional environment might determine the quality of computer-mediated communication (CMC) and the effectiveness of CSCL (Tolmie & Boyle, 2000). Furthermore, learners' perceptions of their online learning are related to their perceptions of the quality and quantity of learning (Piccirano, 2002; Stepp-Greany, 2002); students expressed preferences for computer-supported talk when collaborating with others (Jonassen & Kwon, 2001). Jonassen and Kwon (2001) compared participants' perceptions of the problem-solving process in both face-to-face and computer-mediated settings; they found that participants experienced more personal reflection, critical thinking and better decisions, even if they needed to put out more effort to communicate with others in their groups. In particular, students' perceptions of social presence are associated with performance on written assignments (Picciano, 2002).

The community of inquiry model (Garrison & Vaughan, 2008) also points out the other indispensable element of online learning: social presence. Yet, the social aspects of learning in digital contexts seemed to be ignored in many cases (Kreijns, Kirschner, and Joshems, 2003). Taking social interaction for granted and restricting it for cognitive processes are the two common pitfalls of CSCL; effective interaction does not happen automatically, and the problem usually lies in the social level, rather than in the technical level. The social interaction among learners plays an important part in the learning process, echoing the principles of constructivist philosophy, which facilitate collaboration, while constructing both personal and collective knowledge (Jonassen, Davidson, Collins, Campbell, & Haag, 1995).

Among various issues regarding the social and cognitive aspects of online learning, learners' participation, learning activity, and consensus-building process are of significant importance. The social aspect can be supported by both synchronous and asynchronous computer-supported communication, which can provide different

patterns of interaction for various pedagogical purposes and facilitate negotiation in group learning.

In computer-supported environments, interaction generally refers to explicitly or implicitly responding to the messages of others, while participation involves multiple posts or posted messages of a certain length (Schrire, 2006). Learners' online participation can be basically categorized as active and passive (Veldhuis-Diermanse, 2002; Pifarre, 2007). The importance of active participation in online learning has been emphasized for decades (e.g., Hiltz, 1986), yet it has not been fully explored in computer-supported collaborative contexts. Schrire (2006) proposed a model for analyzing online communication from perspectives of interaction, cognition, and discourse, incorporating a qualitative approach to examine in-depth communication and collaboration among learners in the higher education context. It is suggested that computer-supported collaborative learning (CSCL) research incorporate qualitative and quantitative analysis for understanding the group learning processes (Schrire, 2006).

Cognitive, affective, and metacognitive learning activities affect learning in different ways and play significant roles in both individual and group learning (Veldhuis-Diermanse, 2003, Laat &Lally, 2003, Pifarre, 2007). In general, cognitive activities include applying external information and experiences, linking or repeating internal information, and debating ideas; metacognitive activities include planning, monitoring (e.g., keeping track of the discussion), and rephrasing and expanding ideas; and affective activities include asking for general feedback (e.g., is this a good idea, or what do you think?), chatting, and social talk. Understanding learners' attitudes toward these learning activities in a computer-supported collaborative writing process could be a key to effectively support and guide their learning.

One of the important issues of CSCL research is how learners construct knowledge in online synchronous discussions. Weinberger and Fischer (2006) proposed a framework for analyzing argumentative knowledge construction in CSCL environments. Suggested categories for learners' reactions to each other's ideas include: (1) quick consensus-building, (2) integration-oriented consensus-building, and (3) conflict-oriented consensus-building. The first type, quick consensus-building, is when students try to reach consensus without fully exploring or understanding the actions or ideas of their peers (Chan, 2001). The second type, integration-oriented consensus-building, refers to the way that "learners build on the reasoning of their partners, work with each other's ideas and are willing to adjust their own ideas based

on the sound arguments of their fellow students" (Gijlers, Saab, Van Joolingen, De Jong, Von Hout-Wolters, 2008, p.254). In conflict-oriented consensus-building, students may not be able to accept others' ideas, resulting in further exploration of other's points or a request for more specific explanation. Each type of consensus-building can occur in any stage of the collaborative learning process, but it is unclear which type is the best strategy for group learning. Different types of consensus-building activities are suggested to achieve a variety of positive effects on learning (Weinberger & Fischer, 2006).

Written language cannot be separated from its purpose, function and other contexts. In order to fully understand communication and information exchange in a computer-assisted setting, a social-cultural perspective could provide a lens to help address various fundamental questions in L2 writing instruction and learning. With concepts and framework proposed by Vygotsky, Bakhtin, and many other sociocultural theorists, the online interaction and learning process could be understood and analyzed through a more comprehensive lens.

Second-language writers usually write with rich context and logic originating from their own cultures and from their awareness of the first and second languages. How they view language and how they identify themselves with the language are sociocultural contexts that play a large role in the learning process. The review of relevant literature demonstrates the emerging trend of CSCW, and findings of previous studies can also provide a solid and fertile ground for the further development of this research field. Of the reviewed studies, more than two-thirds embrace a more qualitative-oriented approach to understand the ecology of the collaboration among learners. Quite a few ethnographic studies (Edasawa & Kabata, 2007) and case studies (Kobayashi & Rinnert, 2008; Peterson, 2009) appeared. A case-study method was used to study computer-mediated communication (Godwin, Thorpe, & Richardson, 2008). A longitudinal study (Ducate & Lomicka, 2008) combined weblog record, student reports, focus group interview and questionnaire, in order to obtain a whole picture of the context. Data collection of studies regarding computer-mediated communication and computer-assisted language learning has been diverse, multiple and mixed. In order to embrace the rich contexts involved in the learning process, this study applies a mix-methods and classroom-based approach, which is detailed in the following chapter.

CHAPTER 3

Research Methods

Previous studies have examined individual features of technologies or individual phases of learning, rather than the entire dynamic nature of computer-assisted L2 learning (Lajoie & Azevedo, 2006). Owing to the complexity of L2 writing, the uniqueness of different contexts, and the advantages of different research approaches are increasingly recognized (Mackey & Gass, 2005). Further studies are suggested to move beyond descriptive experiences of implementation in the L2 writing classroom (Storch, 2011). In order to gain a more comprehensive view of the dynamics of computer-supported collaborative writing (CSCW), this study uses a mixed-methods research design to examine the variety of features and aspects of this classroom-based approach.

A mixed-methods approach involves multiple data sources and analytical methods to provide diverse methodological perspectives and to increase the breadth and depth of the study (Creswell & Plano Clark, 2011). Tashakkori and Creswell (2007) defined mixed methods as "research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry" (p. 4). It is argued that educational technology research needs alternative methodologies (Kozma, 2000) because of the increasingly complex nature and variety of the variables involved in such research. In this study, a mixed-methods design is an appropriate choice for research involving the use of technology in collaborative learning (Teddlie & Tashakkori, 2009).

In this study, quantitative data collected from surveys are used for understanding learners' OLR and perception of online tools and learning tasks before and after the designed CSCW instruction. Qualitative data such as computer logs of online chat-room discussion, wiki revision processes, and final collective text production are obtained to identify reoccurring themes, and depict the nature of the learners' collaboration process. The results of data analysis are interpreted by the teacher-researcher in consideration of the particular characteristics of the specific Taiwanese higher education context, local cultures, and common values. Altogether, the multiple data sources could shed light on related aspects of the research questions and provide a more holistic and comprehensive view.

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1. Demographics of participants

This section provides the demographic profiles of the 61 participants (45 males, and 16 females) in this study. The participating students were from a compulsory English course of a national university northern Taiwan. As seen in Table 3.1, they were studying in a variety of disciplines, such as Mathematics, Physics, Chemistry, and Electronics Engineering, the with majority of participants being Industrial Engineering majors (49.2%) In terms of gender, male students accounted for 72.6% of the sample; 26.2% were female.

Table 3.1

Demographic characteristics of participants (N=61)

		N	%
Gender	Male	45	72.6
	Female	16	26.2
Major	Industrial Engineering	30	49.2
	Computer Science	9	14.8
	Electrical Engineering	8	13.1
	Physics	6	9.8
	Bachelor program of College of Science	3	4.9
	Undergraduate program of Electrical Engineering and Computer Science	2	3.3
	Chemistry	2	3.3
	Mathematics	1	1.6

2. Instructional procedures

The present study implemented a CSCW-based intervention and collected data during two consecutive semesters. The pilot study was conducted in the first semester, and the instructional design was revised based on practical issues and the learners' needs. Instructional procedures and task design were iteratively modified. The official CSCW instruction was then launched in the second semester. For the L2 writing instruction, a process approach was incorporated into CSCW by which students would receive feedback from peers and the instructor throughout the writing process.

Figure 3.1. CSCW instructional procedures

As illustrated in Figure 3.1, the CSCW instructional procedures had three phases: (1) face-to-face brainstorming and planning in class, (2) synchronous online chatting outside of the classroom for further planning, outlining, and negotiating their ideas for the collaborative writing projects, and (3) asynchronous group wikis for drafting, revising, reviewing and editing. The three phases followed a linear but not strict sequence. In general, students were guided through the first, second and the third phases, but were also encouraged to return to the previous stages of writing, as the writing process itself is iterative in nature. Meanwhile, students were also encouraged to use different means of communication through face-to-face discussion, online chats and wiki space whenever needed or desire.

In the first phase, students had face-to-face group discussions in class; however, the type of physical interaction was strictly limited by the class hours. The course aimed to improve comprehensive language skills (listening, speaking, reading, and writing), and only a small portion of the class hours could be spent on the writing projects. Thus, students could use online chat rooms at times that were convenient for them in order to continue their discussion and refine their ideas, which was the second phase of the CSCW instructions. In the later stages of the collaboration, students started using group wikis to put ideas in words, drafting, revising and editing their collaborative writing. The role of the online tools (chat rooms and wikis) in the context of this study was to support and enhance the interaction and communication

among learners, which is a crucial and necessary part of successful collaborative learning. In addition, the synchronous and asynchronous features of the online tools were meant to promote both the social and cognitive aspects of students' learning.

The CSCW instructions were implemented over two school semesters. In the first semester, participants were encouraged to become familiar with the functions of the discussion forum, the chat rooms and the wiki on Moodle. Each student was responsible for two individual pieces of English writing of about 300 words. They were required to post their own writing in online discussion forums and to provide feedback on another student's previous posting. In this activity, they experienced both the online tools and practiced providing feedback to other students. In the second semester, participants were asked to complete collaborative writing projects on wikis, with the support of online chat-rooms, as illustrated in the following figures. These two online tools were embedded in a school-wide course management system (Moodle), and every student had a default log-in account. Students were encouraged (1) to use chat rooms for collaboration another exchange of ideas, and (2) to share, revise and edit drafts on wiki at each writing stage.

The instructional design of this course was based on a constructivist approach to provide "meaningful learning," while fulfilling the five features of such instruction: that it be active, constructive, intentional, authentic, and cooperative (Jonassen, Howland, Moore, & Marra, 2003) (Figure 3.2). For the L2 writing instruction, a process approach was incorporated into CSCW by which students would receive feedback from peers and the instructor throughout the writing process.

Students familiarize online tools and basic English grammars.

Students form consensus and work together toward a shared goal.

Students exchange ideas, negotiate opinions and make compromises.

Students write about real objects on campus and provide personal observation.

Students interact and communicate throughout the collaborative process.

Active (Manipulative/ Observant)

Intentional (Reflective/ Regulatory)

Constructive (Articulative/ Reflective)

Authentic (Complex/ Contextualized)

Cooperative (Collaborative/ Conversational)

Figure 3.2: Five attributes of meaningful learning (Jonassen, Howland, Moore, & Marra, 2003, p.6)

In order to engage students in *meaningful learning*, the CSCW instructional design reflects the five interdependent attributes, as shown in Figure 3.2 and detailed below.

(1) The *active/manipulative/observant* attribute was presented in the first semester, along with early stages of collaborative writing in which students were encouraged to get familiar with online tools, and general English grammars. Learners were prompted to experiment with the functions of the online tools (e.g., editing others' writing pieces), observing others' manipulations, and completing grammar exercises in groups.

(2) The *constructive/articulative/reflective* attribute was also presented in the early stages of writing, especially in the online discussions when students were negotiating with others, making meaning of others' opinions, and integrating new ideas into their prior knowledge.

(3) The *intentional/reflective/regulatory* attribute was presented in the middle stages of collaborative writing when students had to decide what to write (e.g., topics, outlines) and worked together to achieve the goal they set for themselves, using the online tools available to them.

(4) The *authentic/complex/contextualized* attribute included topic selection for the collaborative wiki writing projects in which students were required to choose a campus landmark to write about. Students could then observe the chosen landmark and collect first-hand information for their work. Thus, students wrote something tangible and situated in real life, rather than something distant from their personal experience that they didn't really know personally.

(5) The *cooperative/collaborative/conversational* attribute was used throughout the collaborative writing projects through online discussions in which students appropriated each other's ideas and learned multiple perspectives of the situated problems as a part of knowledge-building communities.
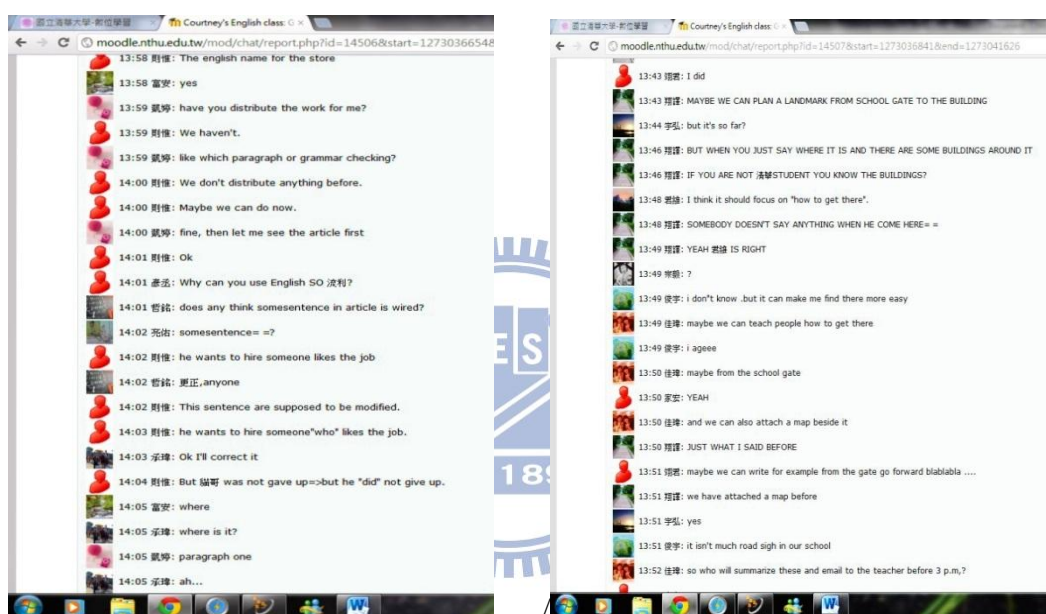
Figure 3.3: Screen shots of group online discussion.

Students could self-select into groups (6 to 9 individuals), and each group had its own online chat room for discussing and exchanging ideas (see Figure 3.3), as well as its own wiki for drafting and revising texts (see Figure 3.4). To incorporate authenticity in the CSCW instruction and promote "situational interests" (Krapp, Hidi, & Renninger, 1992), students first independently selected a campus landmark, such as a department building, a pond, a dormitory, a pathway or a cafeteria, as a starting point for their writing topic. As freshmen, the participating students were eager to explore unfamiliar buildings and areas and were encouraged to visit the targeted places themselves to obtain first-hand observational records. Following this, the groups were guided through the general writing process (brainstorming, outlining, writing, revising and editing) in weekly classes and were also asked to undertake online discussion and paragraph writing throughout the 18-week CSCW instructions.
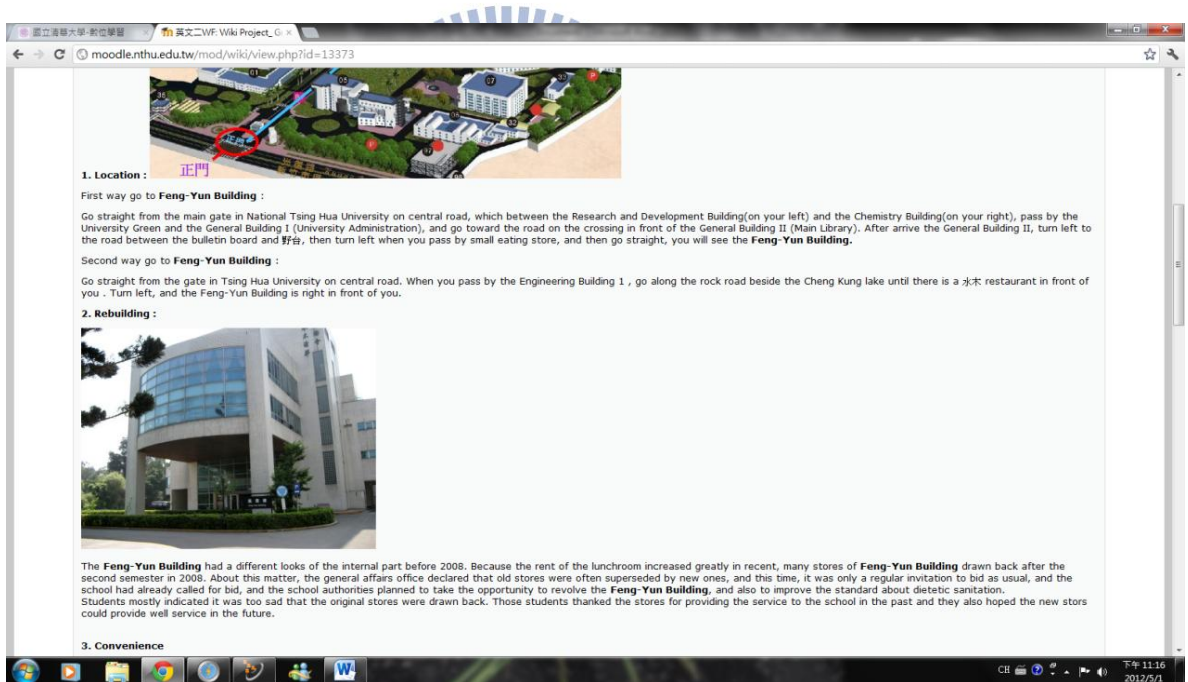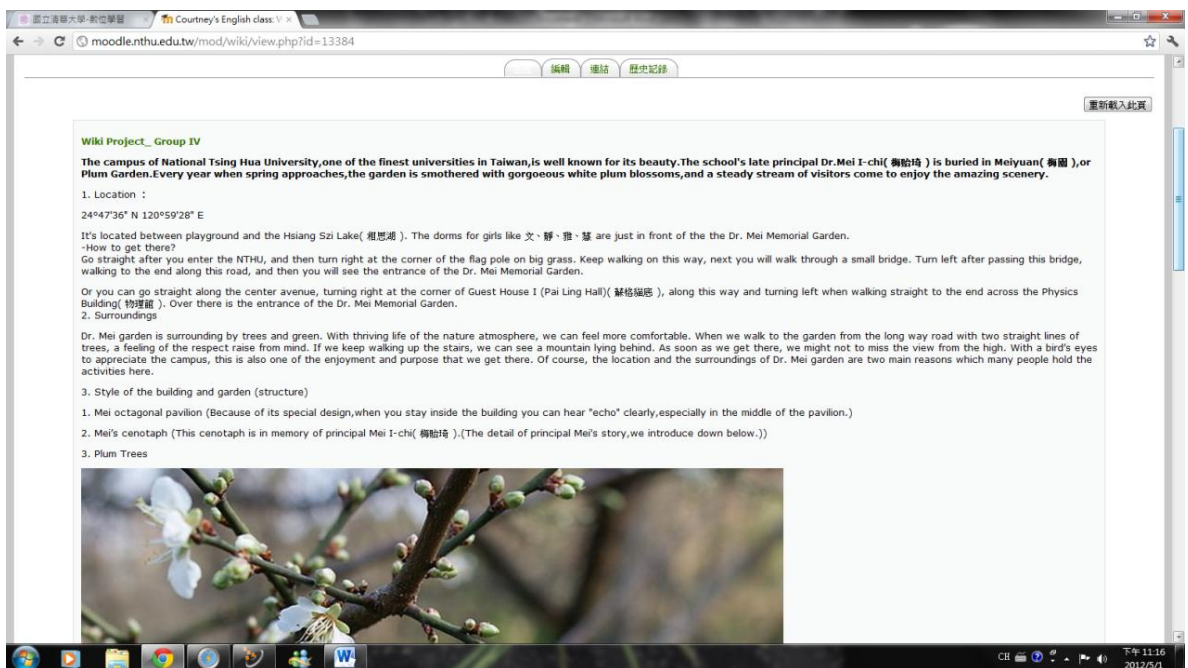
Figure 3.4: Screen shots of students' wiki writing.

Three times during the semester, students were required to log-on to group chat rooms at designated times: first for brainstorming, then for a planning session, and finally to discuss the revisions. These hour-long synchronous discussions were guided and monitored by the instructor and were structured for the students to generate ideas and then outline their ideas (see Appendix IV & V for details). The wiki for each group also served as an ongoing space for sharing short pieces of writing, and chat

rooms were available for timely communication and negotiation among the group members. Both tools were used as "mindtools" (Jonassen, Howland, Moore, & Marra, 2003) and as mediating artifacts (Engestrom, 2008) to develop students' autonomy, language awareness, and meta-cognitive skills.

In this study, teacher intervention was limited to the following: (1) providing written feedback on individual writing assignments and wiki writing, (2) asking clarifying questions only when online discussion was obviously off-track or ineffective, and (3) providing technical support for online tools (chat rooms and wikis). The instructor regularly monitored contributions to the wikis, but tried not to intervene in the collaborative process, providing feedback online or in class only as necessary, such as when the discussion was off the topic or to remind students of how much time was left.

The instructional guidelines of all tasks (take-home assignments, online discussions, and collaborative wiki-based writing projects) were specific and well-structured in details. Students had much flexibility in the content of their writing, but less on the actual process of completing the task. While the instructor tried not to intervene in students' communication and collaboration unless it is necessary, the students' were all aware of the instructor's presence in all tasks. Students were also told that their chat log and wiki revision would also be reviewed and checked.

3. Data sources and collection

The collection of qualitative and quantitative data started and ended during the period of CSCW instruction with only some time lapse. Three major sources of data in this study are (1) surveys, (2) students' grades and test scores, and (3) computer logs.

Surveys: Online learning readiness and CSCW perceptions

In order to explore students' readiness of using computer-supported tools for collaborative writing and perceptions of the learning task, online tools, and the CMC experience, two surveys were used for quantitative data collection. The first survey on students' online learning readiness (OLR) was administered at the beginning of the course. The Online Learning Readiness Scale (OLRS) (Hung, Chou, Chen, & Own, 2010) was adopted to determine how well the participants were capable of learning effectively in online contexts. The validated OLRS covers five dimensions, including computer/Internet self-efficacy (CIS), self-directed learning (SDL), learner control

(LC), motivation for learning (MFL), and online communication self-efficacy (OCS) in 18 items. The internal consistency of OLRS was acceptable (Cronbach's α=.798). See more details of this survey in Appendix I.

At the end of the course, participants were surveyed about their perceptions of the synchronous (chat rooms) and asynchronous (wikis) online tools that were used for collaborative tasks. Administered on paper, this second survey was self-developed to examine how learners perceive the use of online tools for collaborative tasks, focusing on participants' experiences of the group writing project, the tools, and the online communication throughout the collaborative writing process. Experiences of using chat rooms and wikis were surveyed separately; participants answered the same questions twice, once for their perceptions about the chat rooms and once for their perceptions about wikis.

The 14 survey items covered three aspects involved in online collaborative learning: (1) the learning task, (2) the online environment and tools, and (3) the collaboration and communication. The survey design and question items were based on a review of the existing literature and both teachers' reflection and students' feedback on previous experience with using online tools for collaborative writing. The content and the language of these questions were revised by the researcher together with another English instructor who was teaching the same course and using similar online tools for the students' collaboration efforts. The internal consistency of both the chat room section (Cronbach's α=.796) and the wiki section (Cronbach's α=.771) were acceptable. See Appendix II for the survey items.

Writing tasks and test scores

Individual writing ability was measured three times during the 18-week CSCW-based intervention. First, the participants were asked to complete an online take-home individual English writing task in the semester prior to the official CSCW implementation to determine their original English writing ability. The second and the third measurements were obtained from the essay writing section of school-wide uniform English examinations, administered in the middle of the semester and at the end of the semester, in accordance with the CSCW instruction. Data reflecting the English writing ability of the participating students thus were collected before, during, and after the CSCW instruction, in order to assess their changes in writing ability throughout their participation in the course.

In order to reflect the students' writing performance throughout the course, all writing assignments and exam essays were graded separately by three different raters: the researcher herself and two English-major graduate students who served as the teaching assistants of this course. All three raters have relevant professional training and background in L2 writing instruction. The three aforementioned measurements of individual writing ability were assessed though a grading rubric (see Appendix VI), adapted from *The Reading Teacher's Book of Lists* (Fry, Kress, & Fountoukidis, 2000) and developed to better fit the characteristics of the study participants. The adapted rubric assessed the relevance, organization, sentence/grammar, and vocabulary variety of the writing. If discrepancies occurred in the scoring, the three raters negotiated through discussion or compromised by using the average scores.

Two different evaluation rubrics were used to assess students' work; one for their individual contributions and another for final wiki document (see Appendices VII & VIII for details). Both rubrics were similar to the rubric used for their individual writing assignment and tests, so students were familiar with the aspects of writing that would be assessed. Computer logs of wiki revisions were reviewed to assess student contributions to the wiki work. Students' wiki scores were based on both individual contributions to the wikis throughout the writing process and the quality of the final wiki document.

Students were encouraged to edit and revise the content, language, and format of their collaborative writing. Each individual wiki revision was evaluated by these three general categories; each includes different descriptors with various points. For instance, if a student added a relevant photo to the wiki-based writing, she would be awarded 0.5 point, and if she added or revised the textual content, she would be awarded 2 points on her individual wiki grades (Table 3.2). The minimum points that a student could receive was 60, and the student received extra points by making wiki revisions. Since each student was responsible for a certain part of the very first draft, the minimum points of 60 was given to all students; when putting more effort to refine and revise the writing, they were rewarded with extra points. The design is to promote contribution and encourage less-able students to write and use English. It is possible that a less-able but active student who put greater effort on format editing ended up receiving a higher score than a more advanced student who did not contribute so much.

Table 3.2

Individual wiki contribution criteria

	Descriptors (total points)
Format	• Add graphics, hyperlinks to sources and other non-textual materials, including adjusting font, text size, or graphics. (0.5)
Content	• Add (or revise) content. (2)
	• Add substantial amount of content (or revision) to the writing. (4)
Language	• Correct punctuation, case, spelling errors, or any grammatical errors (tense, agreement, etc.). (1)
	• Revise sentences or change vocabulary for better expression. (2)

Adopted and adapted from http://k12online.wm.edu/WikiGradingRubric.pdf.

Each revision, no matter of the content, the language, or the format, on wiki, adds up the student's grade from 60 points. The grades of individual wiki contribution were calculated by how many and what type of revisions each student made. For example, if a student made 5 format revisions (at 0.5 points each), 4 minor content revisions, 2 major content revisions, and 3 sentence revisions (language), she would receive a final grade of 84.5 [60+ (0.5*5) + (2*4) + (4*2) + (2*3)] points. The wiki revision counts are based on the computer log retrieved from the Moodle system.

Equal weight was given for grades for both the students' individual wiki revisions and the final collaborative wiki-based project of their respective groups. The wiki-based project accounted for 30% of the final grade in this compulsory class; 15% for students' individual revisions and 15% for the final wiki work of the group. The final CSCW collaborative products were evaluated using six aspects of the writing: collaborative effort, visual appeal, organization, language, hyperlinks to sources, and grammar, as presented in Table 3.3 (see also Appendix VIII). Each aspect has its own weight in various portion of the final grade, from 3 to 30 points according to its importance in CSCW. The criteria included descriptors of collaborative effort, visual appeal, organization, language and grammar used in the writing, and hyperlinks to the sources. Participants were informed about the criteria at the very beginning of the project to have a clear picture of the goal they should work toward. The instructors explained and elaborated the criteria as needed.

Table 3.3

Collaborative wiki writing criteria (Total points: 100)

	Descriptors (total points)
Collaborative effort	(as seen in the log history) Several participants have contributed. Wikis are collaborative. Each person brings their strengths and contributes things that they are good at to the project. (20)
Visual appeal	Graphics are used appropriately as needed. Non-textual content is not distracting and used where needed to further explain a topic. (10)
Organization	Paragraphs start with interesting, well-stated main ideas or topic sentences. Good flow of ideas from topic sentence, supported by details; strong paragraphs ordered to develop story or exposition. (25)
Language	Use appropriate vocabulary, suitable for topic and audience. Vocabulary and sentences have a variety in length and types. No errors in agreements, numbers, tenses. (30)
Hyperlinks to sources	An effective wiki hyperlinks sources and gives additional information about the topic. Make sure that you have checked your hyperlinks and that they work. (3)
Grammar	Correct punctuation and case; no typos, spelling errors. -1 each up to max. (12)

Adopted and adapted from http://k12online.wm.edu/WikiGradingRubric.pdf.

Computer logs: Synchronous online discussion

Students' synchronous online discussions in chat rooms were recorded and analyzed to assess learners' participation, learning activities, and consensus-building processes. The online discussion logs were electronically copied and stored separately since the online material is erased after certain period of time. All discussion logs were saved in Microsoft Word documents for later analysis.

Three synchronized online discussions were scheduled, each lasting about an hour, and students were evaluated based on the quality of their participation. In the first scheduled online discussion, students brainstormed a landmark or a building on campus as their topics to write about. In the second scheduled online discussion, students produced an initial outline for their collaborative writing on wikis. In the third scheduled discussion, students reviewed their wiki writing in advance and generated ideas for future revision. Individual contribution and performance were assessed by a uniform rubric, which included categories for evaluating engagement, participation, communication, problem-solving, and collaboration. The rubric had descriptors for each dimension, as partially presented in Table 3.4 below (see

complete rubric in Appendix IX). Each descriptor was assigned zero (lowest) to three points (highest), labeled as beginning, developing, good, to outstanding. The scores for each of the five categories—engagement, contribution, communication, problem-solving, and collaboration—were then added to get the student's total score.

Table 3.4

Assessment rubric for synchronous online discussion (excerpted)

Category	Outstanding (3)	Beginning (0)
Engagement	• A true team member who contributes a lot of effort, and encourages and supports the efforts of others in the group.	• Sometimes chooses not to participate and does not complete assigned tasks.
Contribution	• Consistently stays focused on the task and what needs to be done. Very self-directed.	• Rarely focuses on the task and what needs to be done. Let others do the work.
Communication	• Respectfully listens, interacts, discusses and poses questions to all members of the team and helps direct the group in reaching consensus.	• Has great difficulty listening, argues with teammates, and is unwilling to consider other opinions. Impedes group from reaching consensus.
Problem-solving	• Actively looks for and suggests solutions to problems.	• Does not try to solve problems or help others solve problems.
Collaboration	• Consistently makes necessary compromises to accomplish a common goal.	• Rarely makes compromises to a common goal and has difficulty getting along with other group members.

Adopted and adapted from
http://www2.uwstout.edu/content/profdev/rubrics/secondaryteamworkrubric.html

The textual data of this study consists of the logs from one-hour structured online discussions of eight groups. Participants were asked to review the current stage of their collective writing on wikis in advance, and to refer to the grading rubric for language accuracy. In addition, they were required to respond to each teacher's

feedback in the discussion and to propose ideas for future revision. On the same day of group online discussion, each group submitted a summary of their discussion to the teacher, which also served as a part of data collected for the present study. After the initial review of the text-chat record, three students volunteered to clarify several points about their group collaboration and communication. In addition, the final collaborative wiki writing was used to (1) examine the quality of the group writing, and (2) to compare it with their discussion record for a better view of their group decision-making and revision process.

4. Data analysis

The present study integrates statistical and thematic techniques for data analysis. Through combining and comparing multiple data sources and analytical methods, the influences of each factor explored in the present study could be triangulated, and could present a more comprehensive picture of the CSCW dynamics among learners. The quantitative data were processed using a statistical computer software program, and the qualitative data were analyzed manually using a coding scheme as detailed below.

Textual analysis was basically processed by the researcher. The researcher was the instructor of the target course of this study, who was sensitive to the class climate and the context of each event. With personal understanding of each student and experience of the group dynamics herself in online chat rooms, the entire discourse could be interpreted in a holistic way. The researcher also employed field notes (her teaching journal) in the analytic process. For instance, the researcher considered herself more a participant than an observer of the interaction process when analyzing the group online discussion logs, allowing for subtle cues from the scene to be included.

Quantitative data

The initial OLRS survey and the self-developed survey on CSCW perceptions regarding using chat rooms and wikis for online collaborative writing both had acceptable internal consistency. These two questionnaires both used a four-point Likert rating scale; that is, strongly disagree, disagree, agree, strongly agree. All responses were recoded so that the most positive rating has the highest code number.

The collected data included five dimensions of online learning readiness, as well as 14 independent items that measured students' perceptions of online collaborative

writing during the 18-week period. The scores for individual items were then averaged within each dimension. Paired t-tests and bivariate correlation analysis were applied to understand the relationship between variables (e.g., learners' OLR, learners' perceptions, learners' grades and test scores). The SPSS 15 package was used for statistical analyses.

Qualitative data

An analysis of the computer logs of the online discussions was done to generate emergent themes in the learners' negotiations and communications throughout the learning process. The online discussions were meant to generate ideas, outlines and revisions for group collaborative writing projects, and learners underwent cognitive processes of making choices for a common goal. Learners' interactions were analyzed with particular attention on (1) participation (active or passive), (2) learning activities (cognitive, metacognitive, or affective), and (3) consensus-building. Well-established coding schemes were adopted and adapted to fit the context of this study, as elaborated below. All codes (descriptors) are given and illustrated by real examples.

The first focus of the analysis was whether the learners' participation in the synchronous environments was active or passive (Veldhuis-Diermanse, 2002; Pifarre, 2007). In this study, active participation referred to giving feedback, providing suggestions, and proposing solutions, while passive participation referred to lurking and only responding with irrelevant messages. This part of the analysis was based on the assessment of individual performance in online discussions (Table 3.4).

The second focus of the analysis was learning activities: cognitive, metacognitive, and affective (Veldhuis-Diermanse, 2003; Laat & Lally, 2003; Pifarre, 2007). Textual logs of online discussion were coded using the scheme adopted and revised from Veldhuis-Diermanse (2003), as shown in Table 3.5. (See Appendix X for the complete scheme and codes.) In general, cognitive activities included applying external information and experiences, linking or repeating internal information, and debating ideas; metacognitive activities included planning, monitoring (e.g., keeping track of the discussion), and rephrasing and elaborating on ideas; and affective activities included asking for general feedback (e.g., Is this a good idea? or What do you think?), chatting, and social talk. Examples that illustrate code descriptors were taken from the raw data (see Appendix X). Finally, some messages could not be coded into the aforementioned three categories, such as emoticons, and these messages were not coded or included in the analysis.

Table 3.5

Coding scheme of learning activities (messages) in online discussion

Category (Code)	Description
Cognitive learning messages	
Debating	
CDIF	An idea is proposed or presented with a reason/argument, such as brainstorming.
CDINF	An idea is proposed or presented without a reason/argument, such as brainstorming.
CDAF	A student does or does not agree with the opinion/ideas contributed by another student. The viewpoint is followed by a backing, refutation, or restriction
CDANF	A student does or does not agree with the opinion or the ideas contributed by another student. The viewpoint is NOT followed by a backing, refutation, or restriction
CDAQ	Asking a content-directed question
Applying external information and experiences	
CARI	Referring to information or contributing new information found in other information sources than the discourse
CASI	Summarizing or evaluating the information found in other information sources than the discourse
CARE	Referring to earlier or personal experiences
Linking or repeating internal information	
CLI	Linking facts, ideas, or remarks presented in the discourse, or referring explicitly to a contribution in the discourse
CRI	Repeating information without drawing a conclusion or interpreting that information
Affective learning messages	
AG	Reacting emotionally and generally to messages of peers, without directly reacting to the content of that message. This reaction can be positive, negative, or neutral
AA	Asking for feedback, responses or opinions by peers
AC	Chatting or social talks; contributions that are not relevant to accomplish the task
Metacognitive learning messages	
Planning	
MPP	Presenting an approach or procedure to carry out the task
MPA	Asking for an approach or procedure to carry out the task
MPE	Explaining or summarizing the approach already adopted
Keeping clarity	
MCS	Structuring the contributions to the task, making conclusions
MCA	Asking for an explanation, clarification or illustration as a reaction to a certain message
MCE	Explaining unclear information in messages, answering a question asked by another participant
Monitoring	
MMM	Monitoring the original planning, aim or time schedule
MMR	Reflecting on one's own actions or on certain contributions to the task, such as self-correcting English usage.

Adopted and revised from Veldhuis-Diermanse (2002, p58).

The third focus of the qualitative analysis was to observe how learners construct knowledge in online synchronous discussions. In this study, participants were given three distinct online discussions tasks—on the topic, outline, and revision of their collaborative writing projects. They were instructed to reach consensus and to produce intellectual works that every member agreed on. Weinberger and Fischer's (2006) framework for analyzing argumentative knowledge construction in CSCL environments was applied. Learners' reactions to each other's ideas were categorized into three types of consensus building: (1) quick, (2) integration-oriented, and (3) conflict-oriented. Descriptions of each category are shown in Table 3.6.

Table 3.6

Categories of argumentative knowledge construction

Category	Description
Quick consensus-building	Accepting the contributions of the learning partners in order to move on with the task.
Integration-oriented consensus-building	Taking over, integrating and applying the perspectives of the learning partners.
Conflict-oriented consensus-building	Disagreeing, modifying or replacing the perspective of the learning partners.

Note. Adopted from Weinberger, & Fischer (2006).

In this part of the analysis, only learners' reactions to each other's ideas or opinions would be examined, including messages related to making compromises, expressing agreement or disagreement, and modifying ideas and opinions. This is a different way of exploring the online discussion logs from that of analyzing the learning activities. The interconnections among statements and events were emphasized, with a focus "on the wholeness of experience rather than solely on it objects or parts" (Moustakas, 1994, p. 21). After initial analyses, the researcher had follow-up interviews with three volunteer students, to clarify events and patterns observed in discussion logs and to see if the results were plausible (Merriam, 1998).

5. Ethical considerations

All participating students were adults and were informed of the content and procedures of the study. Oral consent was obtained in class before the administration of the surveys and students were advised that the results of the survey would not affect their grades in any way and would be used for research purposes only. They were also informed that they could refuse to complete the surveys. Oral consent to use their computer log and text production for research purposes was requested again before each structured online discussion and at the end of the wiki collaborative writing projects. Participants were encouraged to communicate with the teacher researchers regarding any concerns of the use of information obtained from them during the study.

Participants' anonymity was well protected in the study. As the participating students were told, the survey data collection and analysis was anonymous. In the presentation of the findings of textual data collected from online discussion logs, participants who were quoted were given pseudonyms to protect their identities.
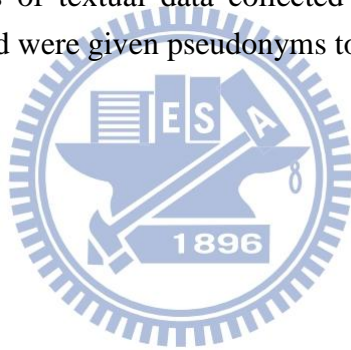
CHAPTER 4

Results and discussion (1)

Learners' Online Learning Readiness, CSCW perception, and writing

This chapter presents the results regarding learners' online learning readiness (OLR), their perceptions of computer-supported collaborative writing (CSCW) perceptions, and their actual individual and collaborative writing performance. The quantitative data are represented numerically and provide descriptive statistics for learners' OLR dimensions, CSCW perceptions, and individual/collaborative writing scores, as well as correlations between these variables. This chapter includes five sections: (1) descriptive characteristics of the participants; (2) learners' OLR and the correlations among dimensions; (3) learners' CSCW perceptions of synchronous and asynchronous tools; (4) the quality of and correlations between individual and collaborative writing; and (5) the interrelationships among learners' OLR, CSCW perceptions, and individual/collaborative writing.

1. Learners' OLR and correlations between dimensions

Participants were surveyed regarding the five dimensions of OLR: computer/Internet self-efficacy (CIS), self-directed learning (SDL), learner control (LC), motivation for learning (MFL), and online communication self-efficacy (OCS). As shown in Table 4.1, more than 80% of the participants strongly agreed or agreed on all three survey items related to CIS, suggesting that they generally considered themselves competent in operating computers, commonly-used software, and Internet-based tools for learning. According to the mean score of the CIS dimension (M = 3.39), students appear to consider themselves the most capable in this aspect of OLR. In online contexts, basic operational skills (e.g., word-processing or web searching) are more crucial than any other OLR construct. Previous studies (e.g., Tsai & Tsai, 2003) have shown that students with high Internet self-efficacy did learn better than those with low Internet self-efficacy. Thus, CIS appears to be a prerequisite for CSCL. Without sufficient literacy in commonly-used software (e.g., MS Word) and online tools (e.g., blogs and search engines), students have difficulty engaging in online interaction and instruction, and are not able to communicate and collaborate comfortably and effectively with others.

Table 4.1

Online learning readiness of the participants (n = 61)

Construct/Survey item	Strongly agree	Agree	Disagree	Strongly disagree	Mean	S.D.
	n (%)					
Computer/Internet self-efficacy (CIS)					**3.39**	**.437**
I feel confident in performing the basic functions of Microsoft Office programs (MS Word, MS Excel, and MS PowerPoint).	21 (34.4)	35 (57.4)	4 (6.6)	1 (1.6)	3.25	.650
I feel confident in my knowledge and skills regarding the use of software for online learning.	27 (44.3)	29 (47.5)	5 (8.2)	0 (0)	3.36	.633
I feel confident in using the Internet (e.g., Google and Yahoo) to locate and gather information for online learning.	36 (59.0)	24 (39.3)	1 (1.6)	0 (0)	3.57	.531
Self-directed learning(SDL)					**2.56**	**.470**
I prepare my own study plan.	3 (4.9)	23 (37.7)	30 (49.2)	5 (8.2)	2.39	.714
I seek assistance when facing learning problems.	3 (4.9)	30 (49.2)	25 (41.0)	3 (4.9)	2.54	.673
I manage time well.	0 (0)	28 (45.9)	26 (42.6)	7 (11.5)	2.34	.680
I set my own learning goals.	9 (14.8)	41 (67.2)	10 (16.4)	1 (1.6)	2.93	.680
I have higher expectations for my learning performance.	5 (8.2)	28 (45.9)	27 (44.3)	1 (1.6)	2.59	.716
Learner control (LC) *(in an online context)*					**2.82**	**3.967**
I can direct my own learning progress.	3 (4.9)	8 (13.1)	32 (52.5)	18 (29.5)	1.93	.793
I am not distracted by other online activities when learning online (instant message, Internet surfing).	3 (4.9)	30 (49.2)	24 (39.3)	4 (6.6)	2.52	.698
I review the online instructional materials on the basis of my needs.	4 (6.6)	29 (47.5)	25 (41.0)	3 (4.9)	2.51	.766
Motivation for learning (MFL) *(in online contexts)*					**2.93**	**.486**
I am open to new ideas.	5 (8.2)	35 (57.4)	19 (31.1)	2 (3.3)	2.70	.667
I have motivation to learn.	17 (27.9)	38 (62.3)	6 (9.8)	0 (0)	3.18	.592
I learn from my mistakes.	12 (19.7)	40 (65.6)	8 (13.1)	1 (1.6)	3.03	.632
I like to share my ideas with others.	8 (13.1)	35 (57.4)	17 (27.9)	1 (1.6)	2.82	.671
Online communication self-efficacy (OCS)					**3.07**	**.580**
I feel confident in using online tools to effectively communicate with others.	20 (32.8)	29 (47.5)	12 (19.7)	0 (0)	3.13	.710
I feel confident in expressing myself (e.g., through emotions and humor) in text.	15 (24.6)	34 (55.7)	12 (19.7)	0 (0)	3.05	.669
I feel confident in posting questions in online discussions.	13 (21.3)	36 (59.0)	12 (19.7)	0 (0)	3.02	.645

The second strongest dimension of OLR is online communication self-efficacy (OCS) (M = 3.07). Participating students reported a relatively high level of confidence in sharing ideas, expressing themselves and communicating with others through various online tools. OCS is crucial to successful online collaborative learning, because collaboration is based on frequent idea exchange and negotiation among peers. OCS involves various types of communication tools, including instant messaging, e-mailing, chatting, and other text-based interaction through networked digital devices. L2 learners can communicate and practice L2 writing simultaneously in online contexts, since the boundaries of speech and writing become blurred in textual computer-mediated communication (Warschauer, 2006). When assigned collaborative writing tasks are supported by networked computers, L2 student writers are able to interact, negotiate, and collaborate for a shared goal. However, the potential and promise of CSCW requires L2 writers to communicate, express ideas, and understand others effectively through various online tools. OCS, therefore, may be even more important for successful CSCW than for other types of online learning.

In addition to the basic operational skills included in the computer/Internet self-efficacy (CIS) dimension, and the communication ability covered by the online communication self-efficacy (OCS), more than 60% of students strongly agreed or agreed on all surveyed items regarding motivation for learning (MFL) in an online context; thus, MFL ranked only slightly lower than OCS (M = 2.93). In particular, students were likely to consider themselves motivated to learn and improve from their mistakes. Motivation can affect the quality of online learning (Saade, He, & Kira, 2007), and it is also positively related to perceptions of others' presence in an online setting (Yang, Tsai, Kim, Cho, & Laffey, 2006). Participants in the present study appeared to be equipped with sufficient motivation for learning, suggesting that they were generally open to receiving and sharing ideas, both of which are important qualities for online collaboration. Therefore, MFL might also be an adequate predictor of students' positive attitudes toward CSCW.

On the other hand, self-directed learning (SDL) and learner control (LC) ranked relatively low. SDL received the lowest average score (M = 2.56); less than half the students reported that they carried out their own study plan and managed time well. However, in the same dimension, more than half of the students claimed they set their own learning goals and had higher expectations of their learning performance. These results may indicate a gap regarding online learning, between what students hope to achieve and whether they think they are capable enough to achieve it. In terms of learner control (LC), which is related in some respects to self-directed learning (SDL),

participants similarly exhibited general disagreement. The question item asking if they directed their own online learning progress received the lowest average score (M = 1.93) among all OLRS items; 82% of the participants strongly disagreed or disagreed with this statement. The students seem to lack confidence in controlling their learning, or they do not feel responsible for their online learning progress.

Self-directed learning (SDL) and learner control (LC) are both related to autonomous learning (e.g., setting goals, selecting content), which is considered a significant construct of OLR; studies have indicated that higher SDL and LC could lead to better learning (e.g., Lin & Hsieh, 2001). However, it is possible that while this is true for forms of computer-based learning that place less emphasis on the presence of teachers and peers, it is less pertinent for CSCW, which involves a great deal of negotiation and interaction with others. In this study, students' SDL and LC appear to be less relevant to students' attitudes and perceptions than the other three OLR dimensions (CIS, MFL, and OCE), which might be due to the fact that students do not work as freely and individually on collaborative projects as when they are asked to complete tasks on their own.

In terms of the interrelationships among the five OLR dimensions, they are not consistently related to one another in the data. As seen in Table 4.2, only CIS, MFL, and OCE demonstrate strong, positive associations with each other. High correlations were found between CIS and MFL (r=.327, p<.005), CIS and OCE (r =.472, p<.001), and MFL and OCE (r=.475, p<.001). On the other hand, no significant links were found among SDL, LC, and the other three dimensions. The interrelationships among the five OLR dimensions echoed the initial assumption that in a CSCW setting such as that of the present study, students' CIS, MFL, and OCE may have a more significant influence than their SDL and LC, insofar as CIS, MFL, and OCE were strongly correlated, while SDL and LC were not.

Table 4.2

Intercorrelations for Dimensions of Online Learning Readiness (OLR)

	[a]CIS	SDL	LC	MFL	OCE
CIS	—				
SDL	-.080	—			
LC	-.117	-.014	—		
MFL	.327*	.236	.004	—	
OCE	.472**	.059	-.218	.475**	—

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

[a]CIS refers to computer/Internet self-efficacy; SDL refers to self-directed learning; LC refers to learner control; MFL refers to motivation for learning; and OCS refers to online communication self-efficacy.

2. Learners' CSCW perceptions of synchronous and asynchronous tools

The participating students generally held positive attitudes toward and perceptions of CSCW tasks. With the support of online, synchronous chat rooms, small groups of students brainstormed ideas and developed outlines for the semester project. They three two specific, monitored discussions at designated times, each lasting about an hour. Wikis, meanwhile, were used voluntarily (and with less supervision), for drafting, revising, and editing, over a longer period of time. In the first five survey questions regarding their online collaborative learning experience, participating students reported a preference for chat rooms (synchronous interaction and immediate feedback) over wikis. It should be noted that the different tools were used in different collaborative writing tasks, but all tasks were interrelated and designed for an ultimate common goal, which was to produce an article about a campus landmark, selected by the student themselves, as their group project for the semester.

While the general perceptions about CSCW were positive, participating students preferred chat rooms to wikis, as indicated by several survey items. However, the difference between their perceptions about using chat rooms and wikis for online collaborative writing was not totally clear: significant differences are found only in specific item pairs (3, 4, 5, and 6), as seen in Table 4.3. Paired-samples t-tests were conducted to compare students' perceptions of using chat rooms and wikis according to each survey item. The variables were paired by questionnaire item; that is, comparing a specific question about chat rooms with the same question about wikis.

Table 4.3

Differences between mean scores of perceptions of online collaboration

Online tools	Synchronous (Chat rooms)		Asynchronous (Wikis)		t	p
	Mean	S.D.	Mean	S.D.		
Instructional design						
1. I like to learn in a group this way.	3.02	.719	2.79	.733	-1.948	.056
2. The learning activity is interesting.	3.02	.750	2.92	.737	-1.417	.162
3. I do well in the activity.	3.08	.586	2.87	.785	-2.427	**.018***
4. Everyone should be able to complete the learning activity.	2.98	.885	2.77	.864	-2.427	**.018***
5. Completing the activity gives me a sense of satisfaction.	2.93	.704	3.08	.714	2.012	**.049***
Technical support						
6. The online tool provides a means of social interaction.	3.13	.670	2.93	.655	-2.558	**.013***
7 The online tool provides a sufficient tool for communication.	2.93	.772	2.92	.690	-.198	.843
8. The online tool is stable.	2.79	.777	2.84	.711	.536	.594
9. The online tool makes me nervous and stressed.	3.46	.647	3.39	.640	-1.271	.209
Communication and collaboration						
10. I think I fully understand my teammates in the learning process.	3.00	.577	3.02	.591	.299	.766
11. I think I clearly express myself to others in the learning process.	2.95	.590	2.82	.592	-1.927	.059
12. I think the collaboration of my team is very successful.	2.96	.625	2.92	.714	.256	.799
13. I think I like to collaborate with others in this way.	3.08	.690	2.97	.706	-1.988	.051
14. I think I and my team communicate effectively.	2.72	.777	2.62	.840	-1.180	.242

*Correlation is significant at the 0.05 level (2-tailed).

Students appear to prefer slightly synchronous chat rooms for their writing process, and to have more confidence using this tool for designated tasks. This confirmation of the OLR of the participating students means that students did not have any problem using the synchronous tool for discussion and negotiation. They could deal comfortably with interaction and communication in the text-based chat room, and even preferred the immediate feedback and rich social presence that it provided. As seen in Table 4.3, paired-samples t-tests support the significance of the differences in the mean scores of item 3 for using chat rooms (M = 3.08, SD = .586) versus using wikis (M = 2.87, SD = .785): t(61) = -2.427, p = .018. The mean scores of item 4 show similarly significant differences (chat rooms: M = 2.98, SD = .885; wikis: M = 2.77, SD = .864): t(61) = -2.427, p = .018. These results suggest that different online tools have different effects on students' perceptions of CSCW. Specifically, chat rooms were favored for online collaboration.

In terms of the satisfaction derived from the activity (item 5), however, there was a higher mean score for the wikis than for the chat rooms (Table 4.3). A paired-sample t-test supports the significance of the difference in mean scores for this item, between perception of using chat rooms (M = 2.93, SD = .704) and wikis (M = 3.08, SD = .714); t(61) = 2.012, p = .049. This result might suggest that students tend to value "products" created through tasks. Because synchronous chat was associated with brainstorming the topic, outline, or content of a written piece, rather than with creating the actual piece of work, students might perceive synchronous discussions as less productive without tangible or specific results, compared to their experiences of wiki-based writing.

In terms of technical and functional support (item 7), chat rooms and wikis were both considered sufficient tools for communication, with almost identical mean scores. Chat rooms were considered to provide more social interaction than wikis (item 6), but also made students more nervous and stressed (item 9). Among items 6 through 8, only item 6 showed a significant difference in scores. As elsewhere, chat rooms (M = 3.13, SD = .670) scored higher than wikis (M = 2.93, SD = .655); t(61) = -2.558, p = .013. While chat rooms received higher mean scores on most survey items in this section, wikis were reported to offer better performance in terms of stability (item 8). This result might reflect the synchronic nature of the tool, which requires more hardware resources, perhaps causing students annoyance and stress, if the immediate feedback they expect is delayed.

Synchronous chat is considered easier and preferable for online interaction and negotiation, while asynchronous wiki can provide a greater sense of satisfaction and achievement. A combination of synchronous and asynchronous online tools for different writing stages in CSCW is strongly suggested. Previous studies in both L2 writing (e.g., Elola & Oskoz, 2011) and online learning community in general (e.g., McInnerney & Roberts, 2004) have suggested implementing both synchronous and asynchronous tools, yet have only focused on the promotion of social presence in online learning, through the immediate feedback and instant interaction provided by the tools. According to the findings of the present study, students expressed a preference for synchronous chat over the theoretically suitable wikis in the brainstorming and planning stages of online collaboration. While wikis might be used for the subsequent drafting and revision of collaborative writing, synchronous negotiation and interaction is preferred for earlier writing stages.

With regard to social interaction and collaboration, students essentially experienced no problems expressing themselves or understanding others through either the chat rooms or wikis. Online collaboration on the writing tasks was generally considered successful (item 12), effective (item 14), and enjoyable (item 13). No significant difference was found for any of the survey items in this category. These results suggest that both online tools were used to support different phases of the group writing process, and that each had its designated task type and function. As previous findings suggest, synchronous communication seems to better support social and personal aspects, as well as motivation; while asynchronous communication is tailored to developing cognitive aspects and reflection (Hrastinski, 2007, 2008). Different tools may affect students' perceptions and preferences for online collaboration; yet many other factors are also involved in the learning context, such as pedagogical approach, teaching style, and task design.

3. Individual and Collaborative Writing: Students' efforts and performances

Four types of student writing were examined: (1) individual test scores, (2) a take-home individual assignment, (3) wiki-based individual contributions, and (4) a wiki-base collaborative group writing project. Each type of writing was evaluated by three independent raters (e.g., the instructor and TAs), applying uniform rubrics. See Chapter 3 for detailed description of the grading procedure and the complete rubrics in the appendices. Results are shown in descriptive statistics with appropriate figures and textual description. Correlations between each type of writing were analyzed and discussed.

Learners' individual writing abilities were assessed with two uniform timed examinations (once at mid-term and again at the final) and a take-home writing assignment that students posted online. The two test scores and the assignment grades were given by the researcher and two other raters according to grading rubrics. The means of all rating were calculated for further analysis. See Chapter 3 for a detailed description of the evaluation procedure and the appendices for the complete grading rubrics.

Individual test scores and assignment

According to national policy, all college freshmen are required to enroll in a compulsory English course. In the target university, the course, titled *Freshman English*, is also a core course for all students. In the target university, the objectives of the course include enhancing students' overall English competence for academic

purposes, developing a global view on cultural diversity, and cultivating self-learning habits and skills. The CSCW instructions were designed to promote these skills and competencies in order to meet these objectives. CSCW learning activities of this course include individual wiki revisions, synchronous online discussion, and final wiki collaborative writing. The course was predominantly delivered face-to-face in the classroom, supported by online tools for various learning tasks.
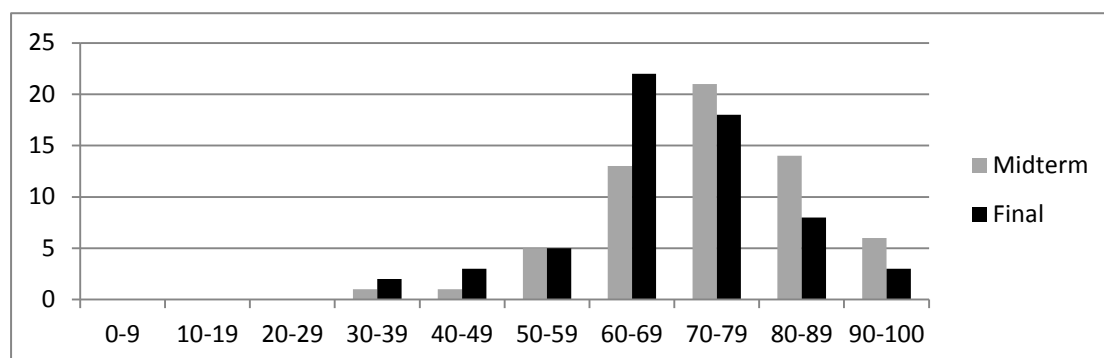
Figure 4.1: Distribution of participants' overall mid-term and final exam scores.

Two school-wide uniform examinations (listening, reading, and writing) were implemented in the middle and at the end of the semester. The scores of these two exams could fairly reflect the participants' general English ability. As shown in Figure 4.1, their midterm exam scores range from 30 to 93.5 out of 100 points (M=73.77; SD=12.560), and their final exam scores were from 32 to 93 out of 100 points in total (M=68.66; SD=13.325). The highest and lowest scores were almost identical; however, the score frequency in each point band presents a different pattern. In terms of the mid-term exam, the majority of scores falls in the 70-79 point band, as for the final exam, those are in the 60-69 point band. Not only in the 70-79 point band, but also fewer students received scores in 80-89 and 90-100 point band for the final exam.

The two uniform exams each have an essay writing section, accounting for 10 points out of the 100. As shown in Figure 4.2, participants' midterm writing scores ranged from 0 to 10 out of 10 points (M=7.53; SD=1.743), and their final exam writing scores ranged from 2 to 10 out of the total 100 points (M=7.51; SD=1.84). The score frequency reflects different patterns between the mid-term and final exams. For the mid-term exam, the majority of the scores fell in the 7.0-7.9 point band; for the final exam, the majority fell in the 9.0-10.0 point band. However, the differences in writing scores between the mid-term and final exams (M = .02, SD = 1.55): $t(61)$ = .082, p = .935) were not statistically significant; nor were they as dramatic as that of the total scores mentioned earlier in this section.
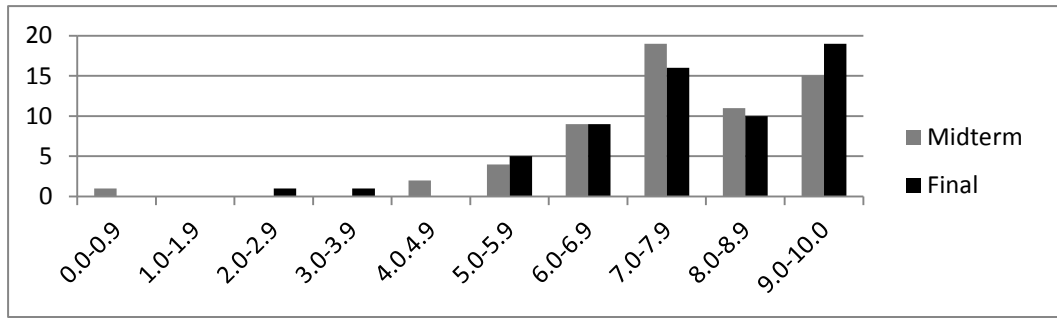
Figure 4.2: Distribution of participants' mid-term and final writing test scores.

Take-home assignment

The writing assignment (M=24.24; SD=5.873) reflects a very different aspect of learners' writing performance from their test scores. The mean of assignment scores of all participants is 24.24 (SD= 5.87) out of 30 points. The distribution of their grades evenly ranges from 20 to 29 points out of 30, and the most frequent grade is 25.5, which is received by 11 students out of the total 61 participants, as presented in Figure 4.3.
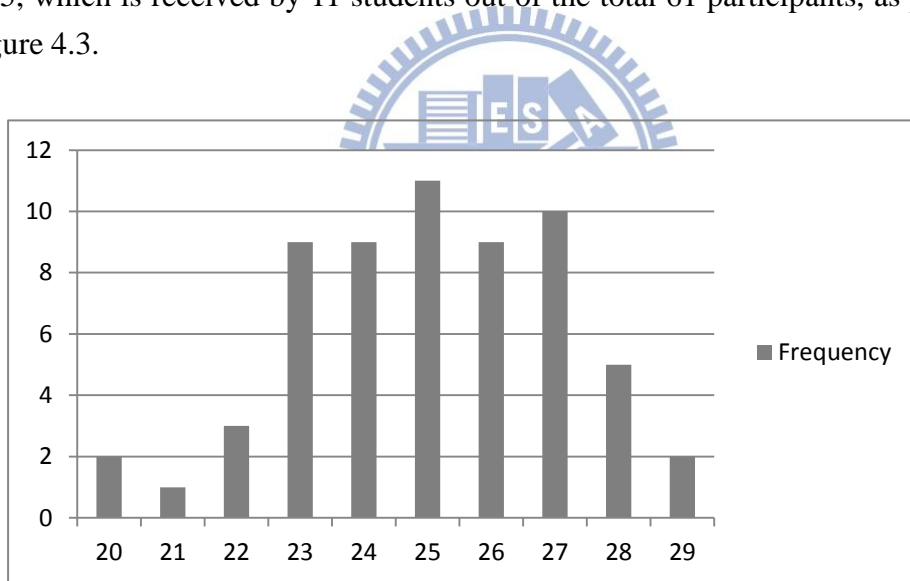
Figure 4.3: Frequency of writing assignment scores

The nature of take-home writing task is different from timed tests. Test conditions affect students in a number of ways, including limited time, nervousness and hand-writing speed; a timed test is a particularly unfavorable option for less speedy writers. On the other hand, students are allowed much more time and to refer to any available resources when completing a writing task at home. Writing assignments may provide more advantages for students who are more motivated and engaged in the task; more effort usually results in satisfactory performance. The more evenly-distributed pattern may be a result of less-able students working harder at

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home for a longer time, decreasing the variations in English writing performance. This possible explanation may also apply to their individual efforts on wiki-based collaborative project. It is found that take-home assignment scores are significantly correlated with individual wiki contribution grades (r=.261, p<.005). More discussions regarding individual wiki contribution are in the following section.

Individual wiki contributions

Participating students' individual contributions in wiki-based collaborative writing were evaluated in terms of the number and the quality of revisions (See Chapter 3 for detailed description of evaluation procedure and the appendices for the complete grading rubrics.) The scores range from 60 to 98 points, while 60 is the minimum point. Each score adds up from 60 with every revision of format, content, or language. A detailed description of the evaluation procedures can be found in Chapter 3; complete grading rubrics are in the appendices.

Regardless the revision type (format, content, or language), the revision counts of each student varied dramatically, from only 1 to 50 throughout the 18-week semester, as shown in Figure 4.4. Also, the revisions were not contributed by group members evenly, but only by single or a few students of the group. For example, group 3 has 74 total wiki revisions, but 50 of them were made by one student. On the contrary, group 5 has 131 total counts of wiki revision throughout the project period, and the most active student contributed 21 of them. The contributions each student made and the degree of collaboration were very different from group to group.
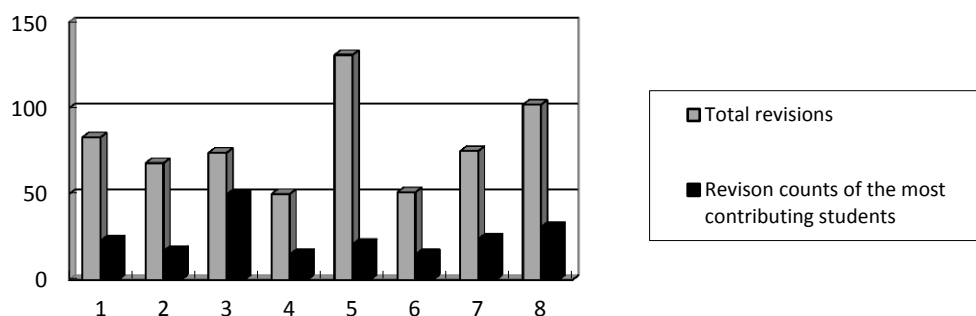
Figure 4.4: Revision counts of the whole groups and the most contributing student in the group.

Students' individual wiki contributions were significantly correlated with both their take-home assignments (r=.261, p<.005) and wiki revision counts (r=.718, p<.001), as shown in Table 4.4. This finding may suggest that the more motivated and engaged students put more effort into the collaborative projects (making more

revisions) and performed better on the take-home assignment. Neither the wiki-based writing nor the take-home assignment was carried out in timed test-like conditions; students had more time and they could refer to resources, rather than having to rely on only the knowledge that they could recall. The strong links between these types of individual writing activities may point out other aspects of writing abilities that are not easily examined under timed test conditions. Students who excel in research skills, collecting information, and presenting in this way may not perform as well as others in tests where those skills are not measured, since no significant correlation was found between this type of individual performance and their test grades.

Table 4.4

Intercorrelations for different types of writing performance

	Individual wiki contribution	Take-home assignment	Wiki revision count	Midterm writing score	Final writing score
Individual wiki contribution	—				
Take-home assignment	.218	—			
Wiki revision counts	.718**	.261*	—		
Midterm writing score	.057	.047	.128	—	
Final writing score	-.037	.158	.220	.625**	—

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

It is well noted that revision counts cannot determine the quality of each students' contribution and effort to the collaborative work, so the evaluation design includes types (format, content, or language) of revisions in order to reflect the quality of each revision. However, it is found that revision count is significantly associated with the quality of individual contributions to wiki writing (r=.718, p<.001). The strong link between revision count and revision quality suggests that the revision count could possibly be a reliable indicator for CSCW assessment.

Collaborative wiki writing

In this study, eight groups of 6 to 9 members each completed eight wiki-based collaborative writing projects in the foreign language, English. Due to the fact that the majority of engineering-related majors were male, the gender distribution was not even in each group. Usually, there were fewer female students in each group, with

group 6 being the exception (See Figure 4.5). The length of the collaborative writing ranged from 680 words to almost a doubled 1356 words (See Figure 4.6). It is noted that although the length (word count) cannot determine the quality of the writing, it helps provide a more comprehensive view of the writing projects.
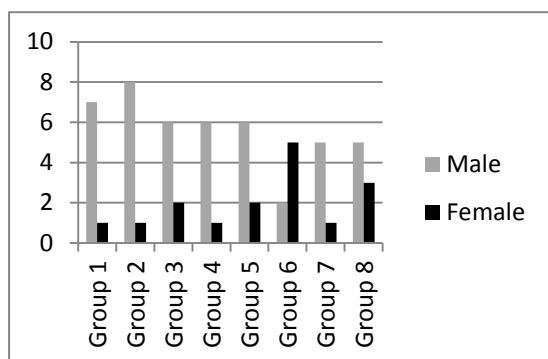
Figure 4.5. Gender composition of each group
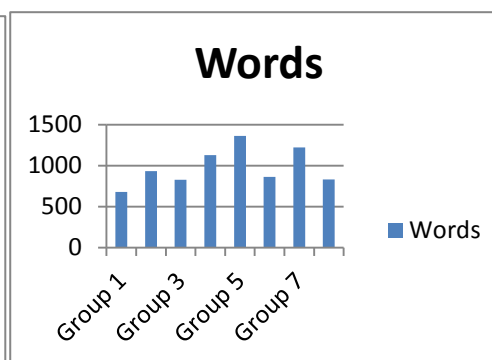
Figure 4.6. Word counts of wiki-based collaborative writing

The final wiki writing of each group was evaluated for its collaborative effort, visual appeal, organization, language, hyperlinks to sources, and grammar. Each aspect was weighted in different proportions of the final grade, from 3 to 30 points out of 100 points. A detailed description of the evaluation procedures in Chapter 3, and the complete grading rubric can be found in the appendices. The final grades of the eight groups were 92, 78, 69, 65, 89 77, 72, and 77. No significant correlation was found between the number of members, the length of the writing (word count) and the final grades. Each group consisted of members with various levels of English writing abilities, motivation to collaborate, and other personal differences; obviously, the group dynamics during the CSCW process cannot be determined by counts and figures. The interaction and negotiation of CSCW process during synchronous chat among learners might provide a different perceptive to understand the group dynamics of this study; these results are provided in Chapter 5.

In terms of individual writing, participants' mid-term test scores and the final test scores are significantly correlated ($r=.625$, p<.001) (Table 4.4). The scores of individual writing tasks (assignment) and that of individual wiki contributions are also significantly correlated ($r=.261$, p<.005). The two tests were designed and administered very similarly: the content came from uniform textbooks and the amount of time given for the test was the same. Thus, it is not surprising that these two scores are strongly correlated. The other two types of individual writing, take-home assignment and wiki contribution, were considered similar, compared to the timed test conditions, in which students could spend longer time, look up references (e.g. dictionary, online thesaurus) and even discuss with others. These results indicate that writing under similar types (or conditions) would produce similar performance, echoing the previous score comparison of mid-term/final exam writing and take-home assignments.

4. Interrelationships between OLR dimensions, CSCW perceptions, and student writing

In order to determine whether relationships exist among OLR, perceptions of CSCW, and student writing affect one another, bivariate correlation analyses were applied to the results of the first survey. In previous sections of this chapter, each variable was examined in detail to provide an overall picture of factors of this study. In the last section of this chapter, correlations between each aforementioned variable are discussed.

OLR dimensions and CSCW perceptions

In general terms, perceptions of CSCW showed significant correlation with *Computer/Internet Self-Efficacy* (CIS), *Motivation for Learning* (MFL), and *Online Communication Self-Efficacy* (OCE), but not with *Self-Directed Learning* (SDL) or *Learner Control* (LC). Each specific correlation between OLR dimensions and perceptions of CSCW is discussed below.

As Table 4.5 indicates, several dimensions of OLR, including CIS, MFL, and OCE, are highly correlated with positive perceptions of chat rooms (item 1, 2, 3, and 5). Each survey item is accompanied with two rows of figures; the first row of figures shows perceptions regarding chat rooms, and the second row shows perceptions regarding wikis. The results suggest that students with better readiness, particularly those with higher CIS, MFL, and OCE, are more likely to have positive perceptions and experiences of CSCW. On the other hand, only CIS is highly associated with one

particular perception (*r*=.395, p< .001), learning activity (item 2). Compared to chat rooms or other similar online instant messengers, wikis proved to be more complicated and unfamiliar to the students. It is reasonable to suppose that students with better CIS were able to become more engaged in the use of wikis for the collaborative writing task, and consequently expressed more positive perceptions.

Table 4.5

Pearson correlations between perceptions of instructional design & OLR dimensions

Online learning readiness	[a]CIS	SDL	LC	MFL	OCS
Survey items on instructional design	Chat room/Wiki				
1. I think I like to learn in a group this way.	**.262***	**-.284***	-.014	.182	**.331****
	.232	-.044	.048	.157	.086
2. I think the learning activity is interesting.	**.293***	-.238	-.037	.207	.220
	.395**	-.125	.018	.158	.091
3. I think I do well in the activity.	**.327***	.000	.002	**.401****	**.392****
	.088	-.023	.040	.195	.166
4. I think everyone should be able to complete the learning activity.	.175	.207	-.116	.152	.240
	.228	-.076	-.093	.209	.118
5. I think completing the activity gives me a sense of satisfaction.	.247	-.129	.014	**.339****	**.283****
	-.069	-.151	-.019	.045	.013

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

[a]CIS refers to computer/Internet self-efficacy; SDL refers to self-directed learning; LC refers to learner control; MFL refers to motivation for learning; and OCS refers to online communication self-efficacy.

Interestingly, more significant correlations are found between OLR and CSCW perceptions of using wikis regarding the functions of the tool itself (item 6 to 9), as presented in Table 4.6. CIS, MFL, and OCS all exhibit strong positive correlations with perceptions of sufficient social interaction (item 6) for both chat rooms and wikis, suggesting that better CIS, MFL, and OCS skills could lead to more positive perceptions of online social interactions.

Table 4.6

Pearson correlations between perceptions of technical support & OLR dimensions

Online learning readiness	[a]CIS	SDL	LC	MFL	OCS
Survey items on technical support	Chat room/Wiki				
6. I think the online tool provides a	**.295***	-.036	-.215	**.324***	**.391****
means of social interaction.	**.324***	-.128	-.176	**.326***	**.319***
7. I think the online tool provides a	.144	-.108	-.151	.233	.134
sufficient tool for communication.	**.311***	-.205	-.170	**.269***	**.361****
8. I think the online tool is stable.	-.059	.004	-.112	.070	.056
	-.003	.020	-.139	.027	.147
9. I think the online tool makes me	**.273***	-.148	-.069	.196	.066
nervous and stressed.	.171	-.147	-.072	.184	.093

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Note: Original data for item 9 was recoded to reflect the more positive rating in higher numbers.

[a]CIS refers to computer/Internet self-efficacy; SDL refers to self-directed learning; LC refers to learner control; MFL refers to motivation for learning; and OCS refers to online communication self-efficacy.

Strikingly, the students' OLR seems totally unrelated to their perception of chat rooms as a sufficient tool for communication. The reason for this might be the fact that online synchronous text-based chat is a common medium for today's college students, requiring no specific technological skill or knowledge for comfortable and effective communication. In contrast, higher OLR, especially in CIS, MFL, and OCS, is significantly correlated with the perception that the wikis were a sufficient tool for communication. Students more advanced in CIS, MFL, and OCS, might find it easier to fully utilize the capability of wikis and have effective communication with others. Students' lack of familiarity with hardware or software has long been identified as a disadvantage of using technology in the classroom (e.g., Barker, 1982). Higher MFL could also enable students to put more effort into learning, and so eventually become more skilled in the use of wikis.

It is noteworthy that feeling stressed and nervous is highly correlated with CIS (item 9) for chat rooms, but not for wikis. This result might indicate that even for more technologically literate students, the synchronic aspect of the chat room might still be somewhat intimidating, due to its demand for immediate reactions.

As shown in Table 4.7, the scores for CIS, MFL, and OCS in the communication and collaboration category are highly related to self-expression and comprehension in the online collaborative process, as described in the survey items (items 10 and 11). These results suggest that it is experience using the online tools, motivation to learn in this way, and the ability to communicate with others in the online setting that help students develop a more positive perception of the collaborative learning process in both synchronous and asynchronous settings. When it comes to students' perceptions of the communicative aspect of CSCW, it is noteworthy that CIS is less significant than for the other two aspects (items 12 and 13), while MFL is more influential when considering perceptions of the communication and collaboration aspect of CSCW than on the aspects of instructional design or technical issues.

Table 4.7

Correlations between perceptions of communication/collaboration & OLR dimensions

Online learning readiness	[a]CIS	SDL	LC	MFL	OCS
Survey item on communication/collaboration	Chat room/Wiki				
10. I think I fully understand my team members in the learning process.	**.329****	.012	.007	**.297***	**.531****
	.318*	-.094	-.008	.149	**.385****
11. I think I clearly express myself to others in the learning process.	**.378****	.065	-.189	**.497****	**.627****
	.321*	.034	-.154	**.362****	**.423****
12. I think the collaboration of my team is very successful.	.165	.145	.033	**.417****	**.387****
	.034	-.040	.014	**.296***	.229
13. I think I like to collaborate with others in this way.	.168	.031	-.003	**.341****	**.486****
	.169	-.094	.008	**.358****	**.399****
14. I think I and my team communicate effectively.	.002	.170	-.085	.179	.178
	.093	.046	-.091	**.282***	**.258***

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

[a]CIS refers to computer/Internet self-efficacy; SDL refers to self-directed learning; LC refers to learner control; MFL refers to motivation for learning; and OCS refers to online communication self-efficacy.

MFL and OCS influenced effective communication among team members (item 14), but only when using wikis. The functionality of wikis, as asynchronous tools for online collaboration, may not be as intuitive for students as chat rooms; therefore, using wikis effectively for online collaborative might require greater motivation for learning and communicative skills in online settings.

In short, CIS, MFL, and OCS may all be effective indicators of CSCW perceptions; CIS appears to be important in terms of instructional design and technical support, while MFL and OCS are more relevant for communication and collaboration. These results suggest that CIS, as a basic operational skill for using online tools, affects students' perceptions of collaborative tasks and the tools used to complete them. In other words, students lacking the sufficient knowledge to use online tools effectively are at a disadvantage when it comes to CSCW, and they will likely experience difficulties in such a learning environment. Similarly, MFL and OCS are premised on sufficient literacy in online tools and play important roles in effective and active engagement in online collaboration.

Two major dimensions of OLR, self-directed learning (SLD) and learner control (LC), appear to be irrelevant to the perceptions of CSCW investigated in this study; nor are they correlated with the other three dimension of OLR. These two dimensions might affect online learning in general, but they appear to be less influential than CIS, MFL, and OCS in online collaboration. These results are consistent with one another, in that SDL and LC seem both to be less effective in all aspects of students' perceptions of CSCW and to have no significant correlation with the other three dimensions of OLR.

OLR dimensions and individual/collaborative writing

When looking at relationships between the OLR dimensions and the four types of writing-related grades examined in this study, significant correlations are only found with self-directed learning (SDL) and motivation for learning (MFL). As seen in Table 4.8, the two exam writing scores and the final collaborative wiki writing project are associated with SDL, while the mid-term exam writing assignment and the collaborative wiki writing are associated with MFL. The take-home assignment and the individual wiki contributions, although significantly correlated with each other, are not associated with any OLR dimension.

Table 4.8

Pearson correlations between writing-related scores and OLR dimensions (N = 61)

Writing-related grades	CIS	SDL	LC	MFL	OCE
Take-home assignment	.040	.229	.036	-.213	-.113
Mid-term exam	-.042	**.333****	-.159	**.327***	.177
Final exam	-.018	**.282***	-.159	.185	.239
Individual wiki contribution	.098	.142	-.093	-.029	.142
Collaborative wiki writing	-.015	- **.254***	-.023	**-.272***	-.222

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

   Self-directed learning (SDL) has strong links with both test scores, mid-term (*r* = .333, p < .001) and final exams (*r* = .282, p < .005). While SDL seems irrelevant to CSCW perceptions due to the collaborative nature of the instructions and learning tasks, it does involvs identifying learning needs, setting goals, choosing strategies and evaluating outcomes (Knowles, 1975) and can be considered as a crucial ability in test preparation. The test environment is a strict condition, in which each learner must work alone without references or any type of help from peers. In order to successfully complete such a task (i.e. do well in the exam), SDL seems play an important role in the test preparation, ultimately resulting in good grades.

   Along with SDL, another relevant OLR dimension is motivation for learning (MFL). Both SDL and MFL were significantly correlated with mid-term exam scores and collaborative wiki writing. Unlike strict test environments, collaborative wiki writing involves many contextual aspects, including personal characteristics and writing abilities of multiple learners, and collaboration among the learners. Group dynamics cannot be explained by one single correlation; more observation and discussion on the negotiation and communication style of each group can be better determined by qualitative data, the results of which can be found in Chapter 5.

   Among OLR dimensions, it may be that CIS and OCE appear less related to the four types of writing scores because the nature of these writing tasks is more individual. Undoubtedly, take-home assignments, and test scores from mid-term and final exams can be considered individual learning activities that require neither negotiation with others nor computer skills to complete. The weak associations with CIS and OCE are understandable, while the other irrelevant OLR dimension of learner control (LC) seems to be a more complicated issue.

Leaner control is defined as the degree of how learners direct and pace their own learning experience (Reeves, 1993; Shyu & Brown, 1992), which is the degree of how individualized the learning experience is. According to the instructional procedures described in Chapter 3, all learning activities and tasks in the class itself were well-structured with specific guidelines for students to follow in order to complete them. While students had the freedom to choose their topics and content, the format and genre were fixed. Participants of this study had a great amount of control on how to collaborate and negotiate with other, but little control on test writing and the details of the assignments. As for collaborative wiki writing, in which students had the most freedom on the content and arrangement of their writing, LC did not seem to play a role. Unlike other dimensions of OLR, learner control did not seem to predict learning outcomes. This is similar to the disagreement in the literature: some studies argue higher learner control enhances motivation and involvement (e.g., Corbalan, Kester, & Van Merrienboer, 2009), while other studies suggest it has possible negative effects (Azevedo, Moos, Greene, Winters, & Cromley, 2008).
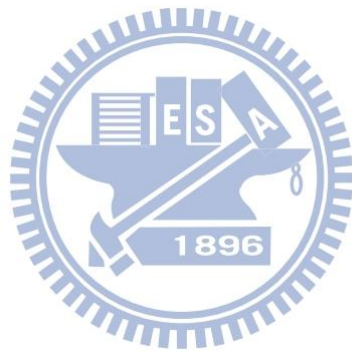
CHAPTER 5

Results and discussion (2)

Learners' participation, interactions, collaboration

This chapter focuses on learners' synchronous interactions in the CSCW process, and presents data collected from three synchronous online discussions of eight participating groups of students. Each discussion lasted roughly one hour and learners were required to generate topics, outlines and revision points, respectively, for their semester collaborative writing project. Textual materials of synchronous online discussion were analyzed with particular attention on (1) participation; (2) types of learning activities (cognitive, metacognitive, or affective); and (3) the process of consensus-building. Types of participation, activities, and consensus-building were identified, counted and analyzed with detailed examples. Results were presented and categorized in tables and some highlighted in quotations according to each focus of the analysis.

1. Participation in synchronous CSCW

Assessment of individual performance in online discussion evaluates learners' (1) engagement with the task, (2) contributions to the task, (3) communication, (4) collaboration with each other, and (5) problem-solving skills. The criteria in Table 3.4 show how students were graded for their synchronous online discussion performance. However, the rubric assessment cannot cover other contextual factors that influence participation in the synchronous online environment, such as leadership, attitude, and positive/negative atmosphere. In order to present a more holistic picture of the synchronous online discussions of this study, this section provides profile descriptions to better illustrate these other factors.

First, the evaluation of individual participation in synchronous online discussion is shown in Figure 5.1, followed by profiles of individual learners. Each profile presents a specific type of participation. Participating students were required to actively engage in and encouraged to actively contribute to the tasks and discussions. However, some participants were more active than others, and there were lurking members in every group. Various combinations of participant types created a variety of group dynamics during the CSCW contexts.
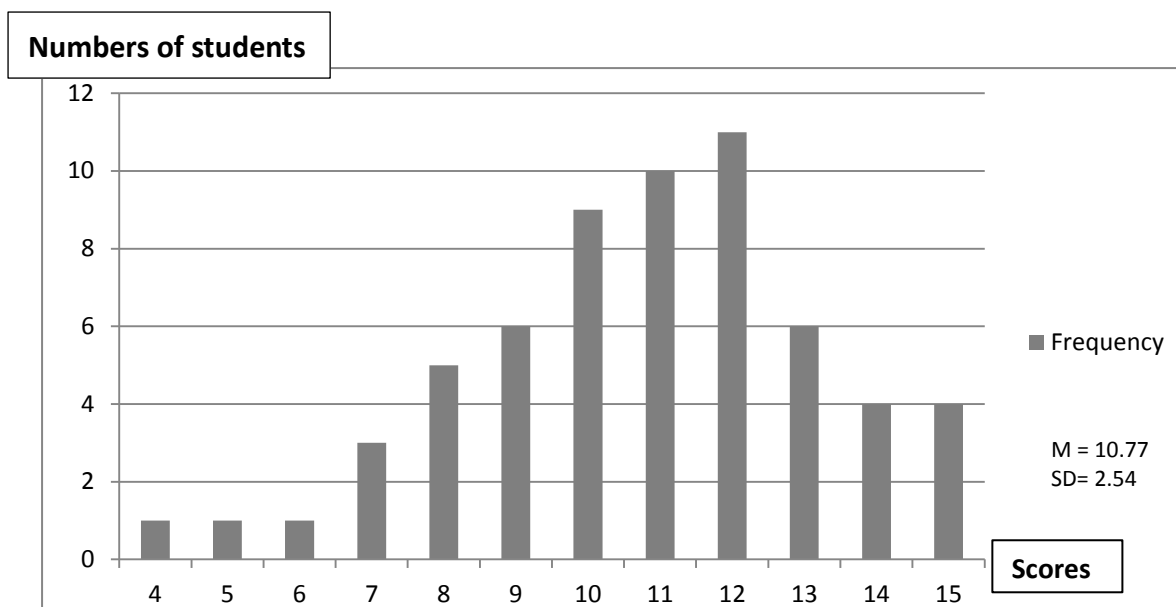
Figure 5.1: Individual participation scores of online discussion.

Bivariate correlation analysis was conducted to examine the associations between learners' participation (grades) and other variables, including the five dimensions of online learning readiness, perceptions of the tasks, communication with others, and the tools supporting the tasks. Details follow in the remaining sections of this chapter; however, no significant correlations were found between any of the possible variables. It is possible that other factors are involved and may influence the CSCW process.

Participation Profiles

Throughout the three online discussions of each group, several types of learner participation emerged. Although a few special cases cannot be easily categorized, broadly speaking, participation types fall into a two-by-two matrix with axes of "generally English ability" and "participation," as illustrated in Figure 5.2. The matrix depicts English proficiency and active/passive attitude as two major factors influencing learners' participation in synchronous online discussion. The common types of participation observed in this study can be categorized into four main types: *advanced-active*, *advance-passive*, *limited-active*, and *limited- passive*. While the categorization is just a general view of the participation patterns, each type of participation is illustrated by example profiles, presenting the variation and extreme cases of each type. The names used are random-selected aliases, and the gender does not have any implication.
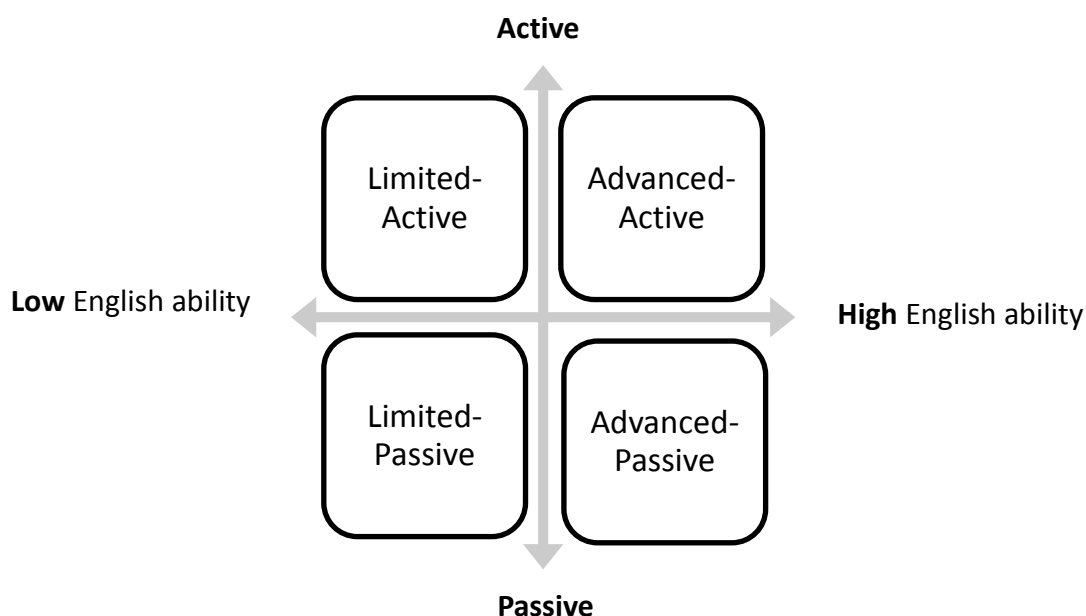
Figure 5.2: Matrix of synchronous online participation types

A student with a leading role in the group discussion usually falls in the quadrant of advanced-active, but a student with advanced English knowledge did not always act and collaborate actively. In most situations, the English proficient learners would have more to say and appear more active; however, it is not always the case and there seemed to be other factors influencing learners' participation in the synchronous online discussion. The categorization and the matrix is a general view of analyses of this study and it is noted that there might be exceptions to each type of participation. More details would be provided in the following *participation profiles* section.

Limited-active participation is represented by whose general English ability was limited to average or below, according to their test scores and general performance in class, yet they were deeply engaged in the task and actively collaborated with peers in online discussions. This type of participation often involved with bringing up many new ideas (e.g., the content to be covered, how to collect information) and other contributions less related to English language. William and Lee were typical example of this type of participation. Another case, Brian, is also presented to illustrate active participation without true engagement to the task.

- *William* provided the leading role in his group. He led the discussion, monitored the progress, and made conclusions at the end. Yet, he sometimes misunderstood the task and took the group in the wrong direction. His general English ability was just average, and he could not do much to help refine the English language used in

the writing; however, his effort and leadership made all three online discussions of his group very efficient and effective. He was authoritative but not oppressive.

- *Lee* was the leader of his group, leading the discussion and contributing to the task in a significant proportion. He demonstrated excellent preparation and fully understood the tasks and goals they were working toward. He was able to clear the doubts about the tasks for his peers. He took pieces of the discussion and offered conclusions. When problems came up or conflicts happened among members, he could offer appropriate solutions or alternative approaches. Lee could not provide much help on English language issues, but was definitely a successful contributor in the group.

- *Brian* was active but more interested in the social interaction with others than the task itself. He did contribute to the task to a certain degree, such as providing a hyperlink of a content course about their writing topic, but his contribution was very limited; more often he brought up unrelated topics (e.g., the soccer game, or the physics assignment) and misled others' attention. He contributed to the majority of the messages in quantity but not in quality. In short, he frequently detracted from the discussion and was disruptive when others were presenting ideas.

Advanced-active participation is presented by whose general English ability was above average and who were able to significantly contribute to the English revision of the collaborative writing, and at the same time, were willing to help, to communicate (especially in English), and to put individual effort on the collaborative project. Participation of this type was often seen in the leading role of the group; examples of this type of participation include Tina, Katty and Sharon.

- *Tina* showed another type of leadership, different from *William*; she was less direct. Tina monitored the progress of the discussion (e.g., reminding others of the time left) but in a less authoritative manner. For example, she would say, "I think we should move on to the next point quickly," rather than "Okay, next point." At the same time, she was very attentive and supportive. She followed every member's ideas closely, which was not an easy task for a group of eight people. She expressed her agreement and encouragement about others' opinions. She frequently asked follow-up questions to have the whole discussion more elaborated and focused.

- *Katty* was a contributing member of her group who was engaged in the tasks of each online discussion. She responded to other ideas quickly, no matter whether she liked them or not. She expressed ideas her points of view clearly with details (e.g., the focus of the writing project), and refined opinions proposed by others. Her general English ability was above average, and she contributed the most in the last discussion on revision. Her knowledge of English language helped a lot to provide revision suggestions on grammar and better expression. However, she did not play a leader role during the discussion since she basically only followed or responded rather than taking initiative.

- *Sharon* was a strong member for sure, who always provided constructive comments. She always proposed thoughtful ideas with convincing reasons. She was not the person who talked the most in the discussion, but it seemed that she was the one who was consistently thinking and reflecting on others' messages. She also, more than once, pointed out a problem they might have during the writing process, and followed up with an effective solution.

Advanced-passive participation involved students with above average English ability who were reluctant to contribute to the collaborative task. A student of this type usually seemed very indifferent to the collaborative task and remained "silent" most of the time. Occasionally, she or he would respond or express opinions, but usually in a negative manner. Profile examples below present the two sub-types of Advanced-passive participation: the indifferent Darren and the aggressive Arthur.

- *Darren* was not motivated. His English ability was advanced but he did not take on the leading role in his group. He showed no interest to proposing new ideas; yet, he still seemed to be attentive to the ongoing discussion because his response was always focused. He had no problem completing the part of work assigned to him in the group, and he never complained nor disagreed with people's decisions. He didn't cause trouble for the group, nor did he contribute much. He simply did not take action even when he might be the only one with the English ability to refine their group writing.

- *Arthur* was a trouble-maker, an extreme case of this type of participation. He chatted a lot with others and talked about irrelevant events, making the discussions off-track and ineffective. He also often picked on a quiet student in the same group, making fun of his silence and even threatening to kick him out of the group. Fortunately, others students in the same group did not follow his bullying

behaviors. In addition, he refused to use English for the discussion and somehow affected others' willingness to use English language as the medium. He did not even try to use English and complained about the ineffectiveness of communicating in English during the online discussion. Arthur demonstrated the aggressive side of Advanced-passive participation category.

Limited-passive type of participation refers to students with limited English ability who have no interest to improve or to work with others. Students of this type share the indifferent attitude with those of advanced-passive type. They usually act passively, and do not propose ideas or actively contribute to the discussion. Their online discussion performance might be limited by a lack of English vocabulary and proficiency; however, they generally do not contribute to the task at all, whether about language, content, or format. With limited English ability, students could still collaborate with others and contribute to the task, as did the limited-active participants, but limited-passive participants chose to remain totally silent and indifferent.

- *Jimmy* was a lurker. He logged on to the chat room on time for scheduled discussion (mainly for his grade). He was a very limited English user and did not even try to engage in the discussion, even when he was reminded that some Chinese expression was allowed. Occasionally, he voiced one or two words, like "ok" and emoticons. He did not contribute to the task and remained silent throughout the first and second discussion he attended and skipped the last one about revision. He was an extreme case of the limited-passive participation.

- *Sam* was a developing contributor. He struggled to express himself in English at beginning, but he was consistently engaged and involved in the conversation. He showed ongoing improvement and voluntarily took on work, such as collecting materials for a certain paragraph. He was limited-passive in the first online discussion, but more of limited-active participant toward the end of the project.

Some students would present different type of participation in different discussions, such as Sam who transformed from the limited-passive to the limited-active type. It was not always easy to categorize individual learner's performance into one of the four types of participation mentioned earlier; however, the categorization is one perspective to examine the synchronous CSCW process. It is hoped that these profiles can help to present the great variety of involvement and engagement observed in this study, and to provide pedagogical suggestions for further CSCW design. In general, students who were more motivated and interacted more

actively usually had no problem communicating and collaborating with others, regardless of their actual English ability. Both advanced learners (e.g., Tina, Sharon) and limited learners (e.g., William, Brian) completed the collaborative tasks and learned something to a certain degree.

The most challenging obstacle for CSCW instructors would be those students of either advanced or limited passive type. Learners without the right (active) attitude can hardly fit in the group activity, no matter whether they are capable or not. For instance, Darren, the advanced-passive type, might actually have suffered from a sense of learned helplessness (Seligman, 1975) with little room for advancement. He might have thought that he could not learn much in the collaborative project and thus acted passively. It is important to emphasize the importance of collaboration to students, so they understand that they can all learn something from other students. In this way, students will gain the most out of the collaborative tasks.

Jimmy, the typical lurker, was not motived to learn nor interested in social interaction with others. Due to his very limited English proficiency, he seemed to totally give up learning cooperatively and did not even pretend to be attentive. If there is only one lurker in a group, others might just ignore him. However, the lurking behavior was contagious and more lurking would happen if the instructor did not take action to promote participation. For the instructors, lurkers are a real danger to the collaborative learning task. Without enough constructive contributions, the discussion soon becomes dry and the quality of instruction suffers.

In terms of the populations of each type of participation, it is difficult to determine the exact figures because the types were not fixed on individual students. Sometimes learners exhibited different types in different discussions, and sometime their actions were in a gray area between two types. Based on the two axes of active/passive attitude and advanced/limited English ability, the four-type categorization cannot differentiate the degrees of how active/passive the students were, but only provide a relative comparison. There were relatively fewer participants in the advanced/passive and limited/passive groups than in the other two types. The majority, roughly over 75%, of the learners possessed an active and positive attitude toward the collaborative task regardless of their English ability.

It seems that the most crucial characteristic of successful learners in collaborative environments is the active or at least cooperative--attitude, especially the willingness to learn and share. In the chat log, it was found that positive attitude is the key to

successful online collaboration, and it seems that the right attitude carries more weight more than does English language proficiency. In collaborative learning contexts, learners exchange, reflect, and articulate ideas with each other. If one or more learners refuse to collaborate or even act against the shared goal in the group, the process could be harmful and painful for all members. Instead of grouping student solely by their English proficiency, it is important to consider the learners' understanding, willingness, and mental readiness for online collaboration.

2. Learning activities (messages) in synchronous CSCW

In the three structured synchronous online discussions, participating students communicated and collaborated through text messages without seeing each other face-to-face. The three synchronous online discussions were designed to support the group collaborative writing projects, and participants generated intellectual works after each discussion, which were topics, outlines, and revision lists for their wiki-based collaborative writing projects. The first discussion was for the topic; the second discussion was for the outline, and the last one was for points of revision.

Participating students expressed and exchanged ideas, negotiated and compromised, and socially chatted with each other. In order to reach the shared goal of each discussion session, they exemplified various types of learning activities and strategies to reach agreement among peers. Various group dynamics resulted in different degrees of participation, assessed by the uniform rubric, different amounts of each type of learning activities, and the consensus building process. All online discussions were supported by a synchronous online chat room for each group. Textual messages in the log record of each discussion were coded into the three types of learning activities (messages): cognitive, affective and metacognitive (Appendix X). The data are presented in (1) message counts and (2) bar charts of each type of learning activities (messages).

Message counts

Some groups had more affective activities than other groups, while some groups' cognitive activities outnumbered the rested. This section describes the message counts of each type of learning activities of each group in the three online discussions. In terms of topic discussions, the total number of messages ranged from 75 to 200 among the eight groups of this study; yet, the proportion of each type of learning activity varied. As shown in Table 5.1, group 7 had the least productive discussion in which only 75 messages produced (15 cognitive activities, 38 affective activities, and

22 metacognitive activities). However, it is noted that the total message counts do not reflect the quality of the discussion but only present one perspective with which to examine the process. On the other hand, group 3 had 118 affective activities in their topic discussion, but only 26 metacognitive and 56 cognitive activities. Group 3, who had the most total message counts (200), seems to have a particularly large number of social interactions with little focus on the task itself.
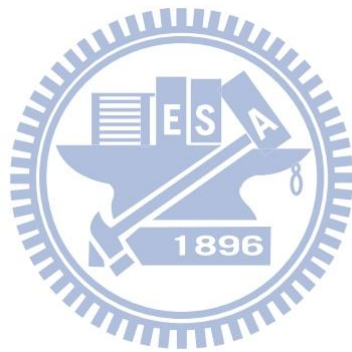
Table 5.1

Message counts of each activity code in topic discussions

Code/Group	1	2	3	4	5	6	7	8	Total
Cognitive									
CDIF (Ideas presented followed by a reason)	9	0	8	9	3	8	0	2	**39**
CDINF (Ideas presented not followed by a reason)	6	18	12	7	12	11	5	9	**80**
CDAF (Dis/agreement followed by a reason)	3	5	5	2	0	12	0	3	**30**
CDANF (Dis/agreement not followed by a reason)	30	12	10	8	8	26	10	25	**129**
CDAQ (A content-directed question)	1	9	14	5	3	5	0	2	**39**
CARI (Referring info/contribution in the discourse)	0	4	7	2	2	2	0	7	**24**
CASI (Summarizing/evaluation info)	0	0	0	0	0	0	0	0	**0**
CARE (Referring to earlier/personal experience)	0	3	0	2	3	2	0	0	**10**
CLI (Linking facts, remarks, and opinions)	0	0	0	0	2	10	0	0	**12**
CRI (Repeating info without interpretation)	0	0	0	0	0	2	0	0	**2**
	49	**51**	**56**	**35**	**33**	**78**	**15**	**48**	**365**
Affective									
AG (Emotional/general reaction)	47	28	49	56	29	44	2	24	**279**
AA (Asking for feedback or opinions)	0	0	0	0	3	3	0	0	**6**
AC (Chatting or social talks)	9	30	69	10	4	17	36	20	**195**
	56	**58**	**118**	**66**	**36**	**64**	**38**	**44**	**480**
Metacognitive									
MPP (Presenting approach of the task)	20	13	4	4	10	1	4	8	**64**
MPA (Asking for approach of the task)	7	4	8	4	8	6	8	4	**49**
MPE (Explaining/summarizing the approach)	1	0	0	0	0	1	0	9	**11**
MCS (Structuring the contribution, concluding)	4	7	7	6	4	8	5	1	**42**
MCA (Asking for clarification of a certain idea)	1	0	0	0	8	10	0	0	**19**
MCE (Explaining or answering questions)	0	0	0	0	1	0	0	0	**1**
MMM (Monitoring the planning of the task)	6	1	2	9	0	0	3	4	**25**
MMR (Reflecting on one's own actions)	1	0	5	1	4	2	2	0	**15**
	40	**25**	**26**	**24**	**35**	**28**	**22**	**26**	**226**
Total	145	134	200	125	104	170	75	118	**1071**

In the first discussion, participating students discussed what to write for their collaborative writing projects (e.g. a landmark or a building on campus), and after the discussion, they had to decide the specific target of their collaborative writing. In general, each student first proposed their preferences of places and buildings, and some backed up their ideas with reasons. Then, they gradually narrowed the

suggestions to two or three options, and they voted for the options. No obvious conflict was observed. Most groups completed the assigned task during designated time periods and the discussions were mainly focused, even though some off-task and floating messages did appear. Very few cognitive activities referred to information found outside of the discourse (Code: CARI and CALI), which means learners at this stage did not look for materials found in other sources (e.g. website) but simply brought up ideas and contributed knowledge of their own. The lack of external references might be a result of the nature of the task, which was to decide the topic of collaborative writing, and students were making decision based on their personal preference and pre-understanding of those subjects.

In terms of outline discussions, the total number of messages ranged from 161 to 546 among the eight groups. Total counts of each type of learning activities by code are presented in Table 5.2. In the second discussion, students brainstormed the exact contents they were about to write, including which aspects of the target building, and how to obtain the information and materials for the writing. They had to generate a specific outline for their collaborative writing project and post the outline online to share with the other groups. This was the second online discussion and participants seemed more familiar with the tool (chat room). A few students complained that the messages got delayed at the beginning of the discussion, but fortunately the discussions all moved on without technical difficulties.

Table 5.2

Message counts of each activity code in outline discussions

Code/Group	1	2	3	4	5	6	7	8	Total
Cognitive									
CDIF (Ideas presented followed by a reason)	42	68	23	27	35	15	14	16	**240**
CDINF (Ideas presented not followed by a reason)	10	2	22	0	2	0	16	2	**54**
CDAF (Dis/agreement followed by a reason)	11	6	6	0	1	3	5	2	**34**
CDANF (Dis/agreement not followed by a reason)	22	11	55	14	18	21	34	4	**179**
CDAQ (A content-directed question)	3	8	2	5	27	8	11	2	**66**
CARI (Referring info/contribution in the discourse)	9	18	5	2	7	0	8	10	**59**
CASI (Summarizing/evaluation info)	1	0	0	0	0	0	0	0	**1**
CARE (Referring to earlier/personal experience)	0	11	0	0	3	11	3	0	**28**
CLI (Linking facts, remarks, and opinions)	0	0	0	0	2	8	1	0	**11**
CRI (Repeating info without interpretation)	2	0	0	1	0	1	1	0	**5**
	100	**124**	**113**	**49**	**95**	**67**	**93**	**36**	**677**
Affective									
AG (Emotional/general reaction)	151	115	45	40	80	65	44	24	**564**
AA (Asking for feedback or opinions)	19	7	8	2	0	0	0	0	**36**
AC (Chatting or social talks)	77	152	24	16	27	36	86	50	**468**
	247	**274**	**77**	**58**	**107**	**101**	**130**	**74**	**1068**
Metacognitive									
MPP (Presenting approach of the task)	58	40	21	15	26	6	30	13	**209**
MPA (Asking for approach of the task)	52	17	13	17	27	3	26	7	**162**
MPE (Explaining/summarizing the approach)	22	8	1	10	21	4	5	1	**72**
MCS (Structuring the contribution, concluding)	11	17	8	0	0	12	12	15	**75**
MCA (Asking for clarification of a certain idea)	7	18	25	3	8	3	7	3	**74**
MCE (Explaining or answering questions)	20	12	21	3	35	12	12	10	**125**
MMM (Monitoring the planning of the task)	18	16	16	5	8	8	12	6	**89**
MMR (Reflecting on one's own actions)	11	3	3	1	18	14	7	2	**59**
	199	**131**	**108**	**54**	**143**	**62**	**111**	**57**	**865**
Total	546	529	298	161	345	230	334	167	**2610**

The outline discussion was more challenging than the topic discussion; not only did the total number of messages increase dramatically, but the proportions of each type of learning activity also changed. The least two rigorous group were group 4 and 8; which share a similar pattern for number of messages. Group 4, the most "silent" group, had a fairly equal proportion of learning activities with each type

representing about one third of the 161 messages (49 cognitive, 58 affective, and 54 metacognitive). Group 8 was almost equally silent, with slightly more affective messages (74 out of 167). Compared to group 4 and 8, group 2 presents a distinct distribution of learning activities, with more than a half affective messages (274 out of 529).

Other than affective messages, a great number of presenting ideas with (CDIF) or without a reason (CDINF) appeared in outline discussions. This type of cognitive activity includes expressing opinions, presenting ideas, and proposing solutions for a problem. Owing to the nature of this task (making decisions on the scope of their wiki collaborative writing), a lot of the discussion was about brainstorming what aspect of the subject to be included in the writing, such as its history or architecture. Thus, this type of cognitive activities (CDIF and CDINF) seemed to dominate the whole discussion. The second prominent type of learning activity is identified as presenting an approach to carry out the task (MPP). Using the same logic, learners discussed what to write about, how to do it (collect materials), and delegated responsibilities at the same. Other than ideas directly related to the English writing itself, messages regarding a method and the person who would carry out the method fall into this type.

As presented in Table 5.3, the total number of messages in the last synchronous online discussion about revision, ranged from 97 to 313, which were less than that for the outline discussion (161-546), but still much more than for the topic discussion (75-200). The most "silent" group (the one with the fewest messages)) was group 6, different from the two previous discussions, which were group 7 and group 4, respectively. Group 6 had a relatively small proportion of affective activities when compared with other groups, especially group 1. Group 1 offered the most rigorous discussion in this task (total message counts is 313), but almost half of those (140) represented affective activities, such as social talks and chats.

Table 5.3

Message counts of each activity code in revision discussions

Code/Group	1	2	3	4	5	6	7	8	Total
Cognitive									
CDIF (Ideas presented followed by a reason)	30	18	8	24	5	10	3	21	**119**
CDINF (Ideas presented not followed by a reason)	9	3	7	7	10	2	1	4	**43**
CDAF (Dis/agreement followed by a reason)	0	0	0	0	1	1	1	6	**9**
CDANF (Dis/agreement not followed by a reason)	8	13	15	27	14	13	5	13	**108**
CDAQ (A content-directed question)	3	2	5	3	3	3	3	2	**24**
CARI (Referring info/contribution in the discourse)	0	5	14	11	3	2	0	0	**35**
CASI (Summarizing/evaluation info)	0	2	0	0	0	0	1	0	**3**
CARE (Referring to earlier/personal experience)	0	2	3	3	2	0	0	0	**10**
CLI (Linking facts, remarks, and opinions)	2	2	0	0	0	0	0	0	**4**
CRI (Repeating info without interpretation)	0	1	0	2	0	0	0	0	**3**
	52	**48**	**52**	**77**	**38**	**31**	**14**	**46**	**358**
Affective									
AG (Emotional/general reaction)	68	42	38	31	71	18	54	59	**381**
AA (Asking for feedback or opinions)	5	0	7	1	7	1	6	5	**32**
AC (Chatting or social talks)	67	39	27	23	33	9	49	15	**262**
	140	**81**	**72**	**55**	**111**	**28**	**109**	**79**	**675**
Metacognitive									
MPP (Presenting approach of the task)	26	30	30	18	17	12	26	31	**190**
MPA (Asking for approach of the task)	15	12	4	7	21	3	14	15	**91**
MPE (Explaining/summarizing the approach)	24	8	14	8	12	2	17	8	**93**
MCS (Structuring the contribution, concluding)	1	0	0	6	2	6	2	7	**24**
MCA (Asking for clarification of a certain idea)	23	6	9	8	10	5	22	14	**97**
MCE (Explaining or answering questions)	16	10	20	11	12	2	32	10	**113**
MMM (Monitoring the planning of the task)	13	5	2	4	3	3	3	8	**41**
MMR (Reflecting on one's own actions)	3	7	15	9	8	5	2	8	**57**
	121	**78**	**94**	**71**	**85**	**38**	**118**	**101**	**706**
Total	313	207	218	203	234	97	241	226	1739

In the third discussion, students examined their first draft of the collaborative writing and proposed points to be revised. They were asked to generate a list of points to be revised, including the content arrangement, sentence structure, information to be added, grammar and phrases to be corrected. In terms of the types of learning activities, some groups obviously had more affective messages, and some groups had

more cognitive or metacognitive messages. Variation existed among the groups; however, of the total number of each type of learning activity, the message quantity decreased while the quality improved. Obviously, more metacognitive activities appeared in the revision discussion (706 out of 1739 messages). It could be a result of the nature of the task. Compared to the previous two discussions, in which learners had to brainstorm new ideas and propose interesting aspects to write about the topic, the revision task was more specific in which they focused on their own writing, rather than looking for more materials and external information. For the computer log, it was found that learners often reminded each other which parts need revisions, as coded as monitoring the original planning, aim or time schedule (MMM).

Bar charts of message counts and percentages

From a different perspective to examine the learning activities (messages), the following figures show the counts (Figures 5.3, 5.4, and 5.5) and percentages (Figures 5.6, 5.7., and 5.8) of each type (cognitive, affective, and metacognitive) in each online discussion regarding the wiki-based collaborative writing projects. Taking all three online discussions together, it cannot be simply concluded which tasks would normally generate more discussion (more messages) or which group was the most productive. More details of the real contexts are presented and discussed along with excerpts from online chats. It is believed that both the quantity and the quality of the discussion messages can provide insights into the group dynamics in synchronous CSCW. In this section, both the message counts and its percentages in a group are discussed.
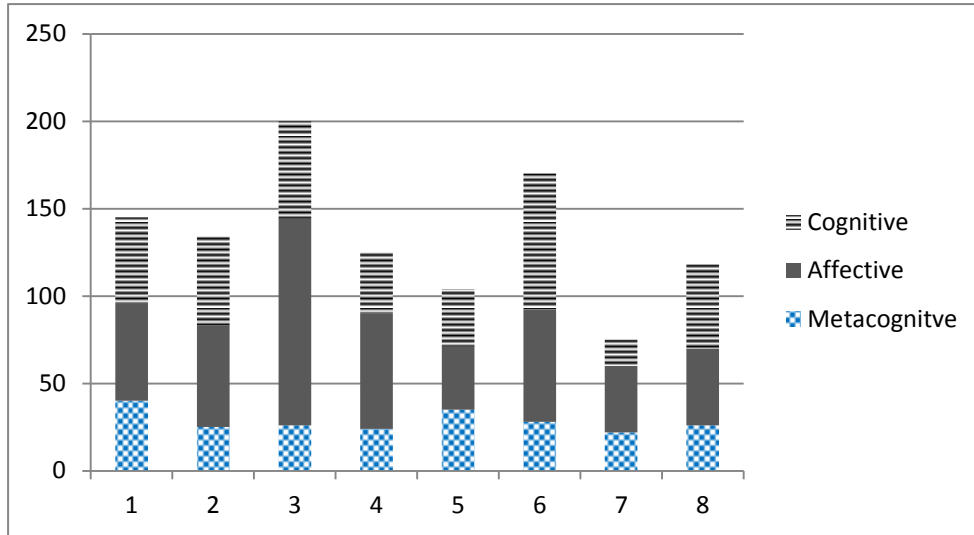
Figure 5.3: Counts of learning activities (messages) in *topic* discussion
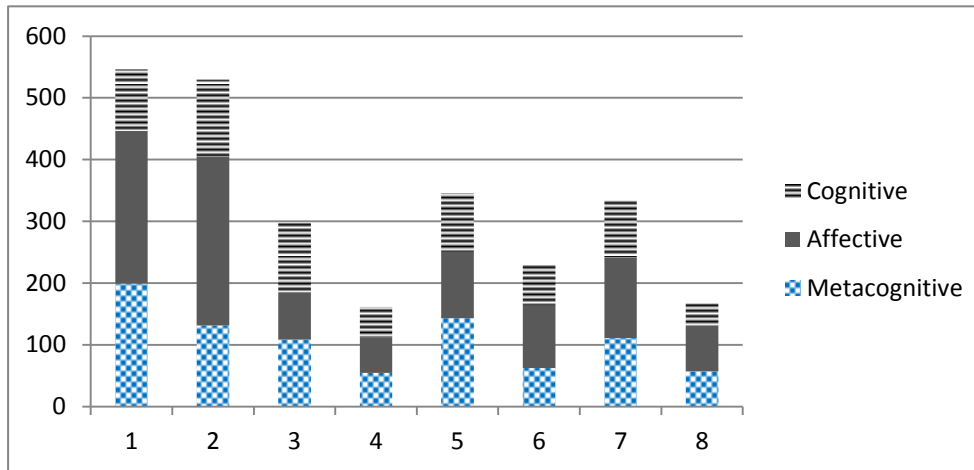

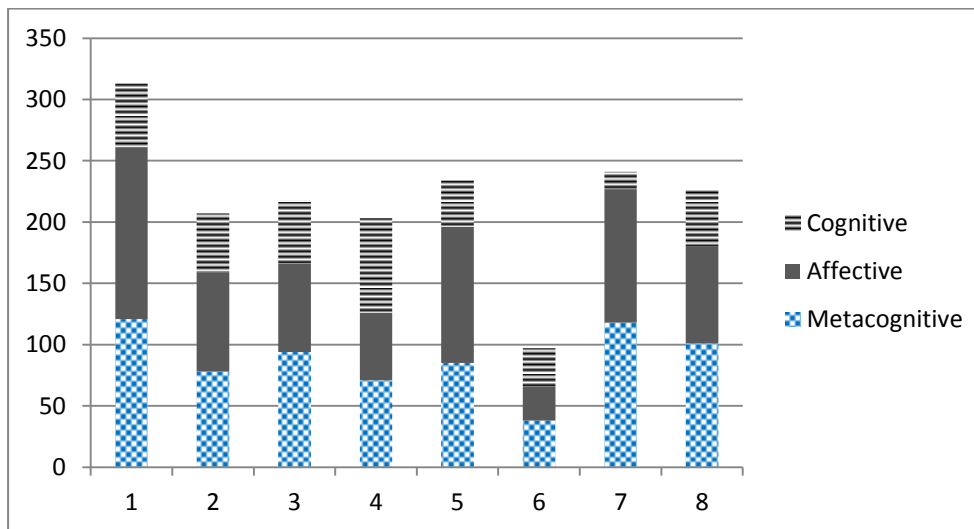Figure 5.4: Counts of learning activities (messages) in *outline* discussion

Figure 5.5: Counts of learning activities (messages) in *revision* discussion

Bar charts for message counts

In terms of message quantity, most groups (except group 4 and 8), presented a similar pattern. Compared with their own discussions, group 1, 2, 3, 5, 6, and 7 produced the least messages in the topic discussion, were most productive in the second outline discussion, and then dropped slightly in the last revision discussion (Figures 5.3, 5.4, and 5.5). A typical example is group 2, which produced 134 messages for topic selection, 529 for drafting the outline, and 207 for their revision. This pattern could be a result of the nature of the tasks. The second discussion on outlines may have required a greater amount of back-and-forth negotiation, and resulted in the most productive discussion in general. Learners may have had more to say because the outline was going to be the plan that every member agreed on and would have to follow.

While group 6 followed a similar pattern of message counts through the three online discussions, it had a dramatic drop in messages during the last revision discussion, with 97 messages, or less than a hundred messages in the one-hour online discussion. The textual chat log shows they were very task-driven and they went through revision suggestions provided by the instructors efficiently, one by one, after several simple greetings at the beginning. Also, no one brought up irrelevant opinions nor joked. Group 6 had 28 affective messages out of the total 97 messages (28.9 %), the second lowest percentage among the eight groups. They could be described as focused and effective; however, the chat log gives the reader (the researcher) a feeling that they did not enjoy the task and wanted to finish it as quickly as possible. It was like they rushed over revision suggestions and did not try to improve other parts of the writing. Group 6 only discussed minor errors of the writing and assigned the revision work to a certain member; they did not cover paragraph arrangement nor consider adding new content at all. At the end of the discussion, no one was willing to e-mail the discussion results to the instructor as required but simply logged out the chat room. Fortunately, one member waited and said, "Okay, fine. I'll do it."

Another possible explanation for the very few messages group 6 produced in the last revision discussion could be the high frequency of English language use. While learners were encouraged to use English as much as possible and reminded during the discussions from time to time, some groups were reluctant to apply English as much as desired, partly due to their limited English ability. Group 6 was one of the groups that really tried to use English in the online discussion, and the expressions were basically understandable and clear, regardless of minor grammar errors and

misspelling. It was definitely more challenging for the learners to use English in the online discussion and it may have limited their expressions of ideas, resulting in very few messages. Yet, using English cannot be the sole reason, particularly since there were other groups using English for the discussions and producing high quality content in the same task, such as group 8 described below.

Two exceptional groups, 4 and 8, steadily generated more and more discussion from the first to the last, and presented a different pattern from the other groups (Figures 5.3, 5.4, and 5.5). Group 4 had 125, 161, and 203 messages in three discussions; and group 8 had 118, 167, and 226 messages, respectively. These two groups presented a similar pattern regarding the number of messages in their online discussions. With a closer look at the chat logs of these two groups' online discussions, they also had similar group composition and interactions, especially in the last revision discussion. Levels of general English proficiency were both evenly distributed across these two groups; two or three advanced learners, two or three less able students, and the rest about average. It seems that this distribution of English ability was more likely to enhance collaboration among the learners and to contribute to the growing contents of online discussions.

Another notable feature positively influencing productive collaboration found in the chat log was the leadership role. Groups 4 and 8 each had a specific student leading the discussion, monitoring the process and encouraging different opinions. While the leader did not necessarily have advanced English ability or provide error-free revisions, he or she did help to create an encouraging environment for others to speak up and contribute to. For example, in group 4, the group's leader responded to every idea proposed by others and provided feedback. By simply responding, the leading student helped to make all members feel like a part of the team and to be willing to contribute more. In another incident, the student leader of group 4 expressed his appreciation to a student who had volunteered for revision work and said, "Thank you, Jerry." Then, every other student also typed in "Thank you, Jerry." The "Jerry" might be surprisingly overwhelmed and willing to put in more efforts in the collaborative task. The leading student of group 4 was actually not very competent in English but he did try using English for discussion; this action was influencing and somehow set the tone of the group dynamics. The leading student in group 4 did not contribute the highest number of revisions for the group, yet played a critical role in the synchronous CSCW.

While most groups only focused on revision suggestions from the instructor and simply went through the points one by one, groups 4 and 8 produced much more contents in the last revision discussions. Not only did they focus on the revision suggestions from the instructor, but they also tried to improve the overall writing in a broader sense. New opinions on paragraph arrangements and contents were still being added at this stage of writing, which resulted in the increased number of messages. It is inspiring for educators to see productive and high-quality collaboration like these two cases, and these successes may have resulted from the group composition and the presence of a leading role as described earlier.

Bar charts for message types: Cognitive, affective, and metacognitive

Other than message counts, the synchronous online discussion could be analyzed and interpreted in different aspects, such as the type of learning activity each message represents. In terms of message types, it may not be appropriate to determine any pattern, since each group seemed to present a unique case of asynchronous CSCW (Figures 5.6, 5.7, and 5.8). The proportions (percentages) of the three types of learning activities (cognitive, affective, and metacognitive) varied. Take the outline discussion for example, 25.8% of group 3's messages were affective: while 45.2% of group 1's messages were affective; both groups 1 and 3 had about 36% messages that were metacognitive activities. Taking another example from the revision discussion, the cognitive-oriented messages of group 1 accounted for 16.6% of the total messages, and affective learning activities accounted for 49.7%, while 37.9% of group 4's messages were cognitive and only 27.1% were affective.
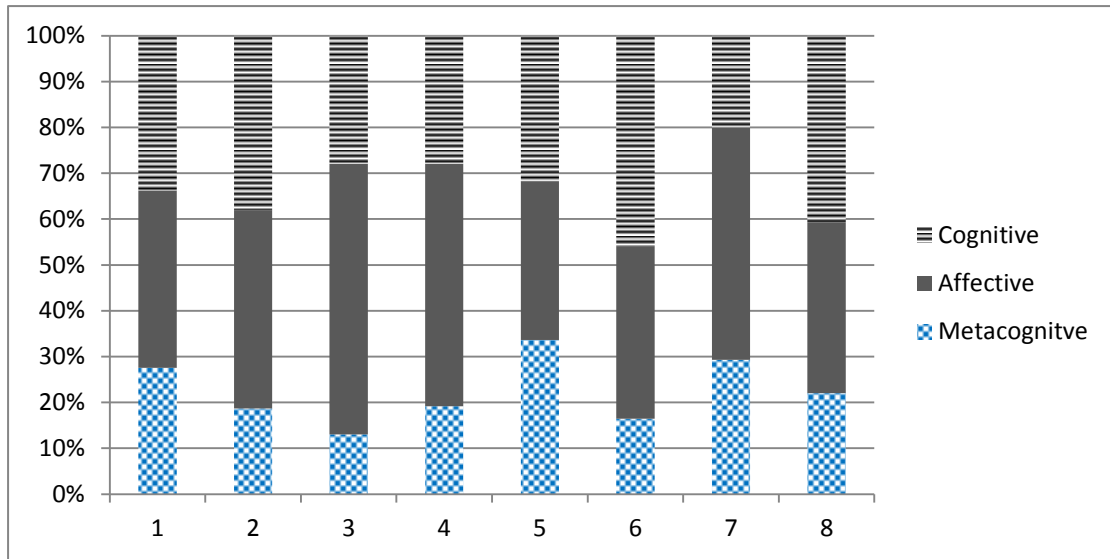
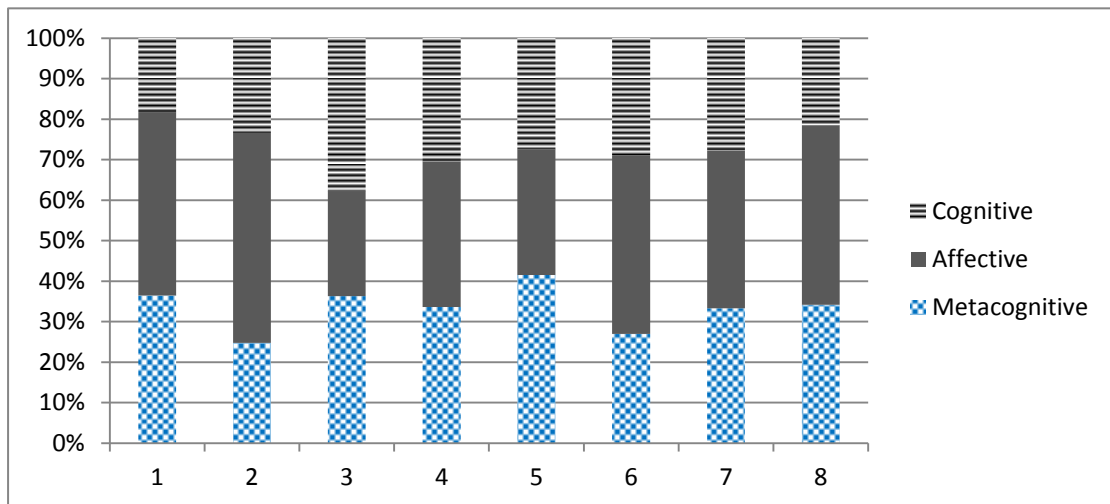Figure 5.6: Percentage of learning activities (messages) of *topic* discussion

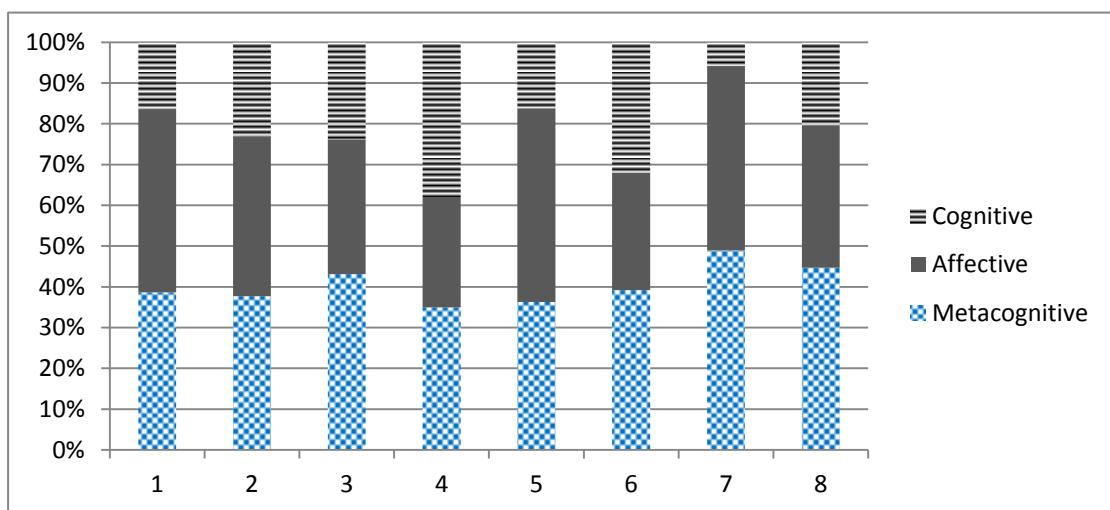Figure 5.7: Percentage of learning activities (messages) of *outline* discussion

Figure 5.8: Percentage of learning activities (messages) of *revision* discussion

However, there was a tendency to have more metacognitive activities in the last revision discussion. A possible explanation for this increase could be that the last discussion regarding revision is relatively specific and focused, compared to the previous topic and outline discussions. When brainstorming topics and negotiating outlines, learner tended to bring up new ideas and have more negotiation back and forth. Yet, in the last revision discussion, they focused on their own writing (e.g., its grammatical errors or paragraph arrangement) and tried to refine the English corrections and expressions. Typical examples of metacognitive learning activities (messages) found in this study were incidents of learners reminding each other which parts require revisions and responding to others' revisions, such as "so we just have to make a shorter revision and avoid repetition?" and "…this one done. Let's move to the next one."

Affective messages can be seen as the prominent social features of synchronous CSCW and its proportion in the three online discussions of all groups is more than 25%, and sometimes more than 40% out of the total messages. Affective messages served as social agents and helped creating friendly and encouraging environments. Many incidences of learners greeting each other and joking around were found.

It is acknowledged that the nature of the task would influence learning activities. For instance, the outline discussions involved more brainstorming messages (i.e. cognitive activities) and the revision discussions usually had more reflective thinking and critical judgments (i.e. metacognitive activities). Writing instructors should bear these considerations in mind and provide corresponding scaffolding and intervention to balance these three types of learning activities, to promote desired learning behaviors and outcomes.

3. Consensus-building process in synchronous CSCW

The collaborative writing tasks in this study required that learners work together, maintain a mutual understanding of the goals, and reach consensus on topics, outlines, and revision. The consensus-building process was well-represented in the textual data collected from the three synchronous online discussions. Some learners occasionally used Chinese phrases in the chats; quotes appear in this section are partly translated into English by the researcher for easy reading. In general, learners reached agreements on topics quickly and avoided conflicts by following a brainstorm-and-vote pattern. More integration-oriented consensus-building was

observed in the outline and revision discussions. Conflicts were rarely found in any of the discussions.

The analysis of the consensus-building process of synchronous CSCW was based on Weinberger and Fischer's (2006) framework of argumentative knowledge construction. The framework includes three types of consensus-building: quick consensus building, integration-oriented consensus building, and conflict-oriented consensus building. *Quick consensus-building* is "accepting the contributions of the learning partners in order to move on with the task." *Integration-oriented consensus-building* is "taking over, integrating and applying the perspectives of the learning partners." *Conflict-oriented consensus-building* refers to "disagreeing, modifying or replacing the perspectives of the learning partners." Each discussion might involve more than one type of consensus-building, yet the following discussion, limited by the space, can only showcase major features and provide several real scenarios of the most prominent type of each discussion.

Synchronous discussion on topics

According to the chat log, the topic discussions of most groups featured quick consensus-building. The common pattern was that learners proposed ideas by turns without further explanation, voted for the available options, and all accepted the result. The majority rules and the voting for final decision happened in the topic discussion of all eight groups. Here is an excerpt of typical quick consensus-building:

> *……………*
> William: *Hi, everyone.*
> Young: *Hello.*
> James: *Hi.*
> Oscar: *Good morning, everyone.*
> Ray: *Hi.*
> Yanick: *Hello.*
> William: *Come on. Let's start.*
> Lee: *Okay.*
> Katty: *Are we talking about the wiki topic?*
> James: *Yes, the wiki topic. We have to decide it today.*
> William: *One minute. Everyone proposes a subject. Share your ideas in a minute.*
> Young: *Ok.*
> James: *No problem.*

Oscar: *Ok.*

Lee: *Yep.*

Katty: *Alright.*

James: *How about Earth's God temple?*

Yanick: *Where is Earth's God temple?*

I don't know there's such a temple on campus.

Oscar: *Mai garden?*

Ray: *Mai garden sounds good.*

Young: *Dorm room B405. Come see our geek roommates.*

Oscar: *=_=*

Katty: *I don't get it.*

William: *No joking. Let's focus.*

Ray: *I like Mai garden. It's a good idea.*

Oscar: *What options do we have now?*

Katty: *Which one?*

Young: *How about Cheng-Gong Lake. We can all jump into it and write about how it feels.*

Ray: *You jump. I can write how you look then.*

Katty: *If so, I can take picture on the shore.*

William: *Ok, now. Everyone has one vote. No joking, please.*

William: *Let me see. …..okay, we have four possible subjects so far.*

William: *Casa De Socrates (the restaurant), Mai garden, Earth's God temple, and dorm B405.*

William: *Any other idea?*

Young: *Ray said Dorm Hsin (新齋).*

Katty: *I like Casa De Socrates.*

Yannick: *I think B405 is a good idea.*

Young: *Yeah, B405.*

Katty: *Casa De Socrates sounds good.*

William: *Can we vote for final decision now?*

James: *All right, let's vote.*

Ray: *Let's vote.*

William: *Casa De Socrates (the restaurant), Mai garden, Earth's God temple, and Dorm Hisn.*

Yanick: *Casa De Socrates!*

Katty: *Casa De Socrates.*

Ray: *Dorm Hsin.*

Young: *Whichever is okay for me.*

Oscar:	*Mai garden.*
William:	*Casa De Socrates.*
James:	*I'm fine anyway.*
William:	*Okay then. We'll write about Casa De Socrates.*
Katty:	*Yes, Casa De Socrates. Can we go eat at Casa De Socrates when collecting materials?*
Young:	*No. It's very expensive.*
Yanick:	*We'll have to pay for what we eat.*
Ray:	*Young will pay for us.*
James:	*Maybe we can eat for free if we say we'll help advertising.*
William:	*That's not possible.*
	……………

This quick consensus-building example on deciding topics lasted about 15 minutes, and then the group moved on discussing how to collect information about the restaurant and interview the owners. William was obviously leading the discussion; he made conclusions and proposed approaches to carry out the tasks. Young was the "player" type; he brought up many interesting ideas and joked around. Others were more like followers and did not have many personal opinions. Among them, James, who proposed Earth's God temple without receiving any positive feedback, said, "I'm fine anyway" instead of expressing his preference when voting for the final decision. From the context, James seemed quite prepared for the task. He fully understood the task and goal, and could answer Katty's question on the task mission immediately. He might have had thought about possible subjects in advance. It is not known whether he was annoyed that no one supported his idea. He might have even still liked his own idea, Earth's God temple. However, James did not try to convince others with further information of the subject, but only posed a neutral stand at the final voting.

In this quoted case, students tried to reach consensus on the topic as soon as possible without fully exploring others' ideas; they "minimized the problems by excluding alternative views" (Chan, 2001). They reached the consensus on the topic of the wiki writing project very effectively, and whenever the discussion was likely to go off track, the leader role took control and helped everybody to focus on the task. In terms of conceptual change, quick consensus-building is not the ideal type since learners do not ask for justification or elaboration and do not have a chance to articulate their ideas. However, quick consensus-building seems effective when the group tries to reach agreement on a certain aspect, or quickly check partners' opinions and move on to other aspects of the task (Gijlers et al., 2009). For the discussions on

topic selection, quick consensus-building seems to be the most effective and efficient strategy. Yet, it is felt more like the learners tried to avoid conflicts with others and did not try to convince others to accept individual "favorites."

Synchronous discussion on outlines

Unlike the discussions on topics, no single prominent consensus-building process was observed in the second discussions on the outlines of wiki-based collaborative writing. It would be arbitrary to categorize the eight groups into three types of consensus-building types. Each discussion might involve more than one type of consensus-building strategies at various stages of the discussion. While there is still a high frequency of quick consensus-building features, more integration-oriented consensus-building features were found. Rigorous brainstorming appeared in all groups; yet, the extent of collaboration varied from group to group. Some groups further explored each proposed aspect and produced a coherent outline at the end. Some other groups simply brought up one word or one phrase, scratching the surface of the idea and could barely come to a conclusion.

In the outline discussions, learners basically still avoided conflicts with others but were more likely to try to convince others of their opinions. A common pattern to form an outline was to include all ideas proposed in the discussion, meaning the aspect of the subject to write about. Here is a typical scenario of how learners formed an outline that all members agreed and accepted, but the collaboration was limited.

> Sharon: *Our topic is <u>two-one slope</u> (二一坡), and try to describe it.*
> Amy: *We should write the origin of it.*
> Jack: *Climbing up the slope is tiring!*
> Marcus: *Just describe it? That's all?*
> Amy: *Yes~*
> Jack: *Sometimes you can see several dogs lying on the slope.*
> Amy: *=_=*
> Sharon: *So let's throw out what we have now.*
> *First, we'll have to tell the origin of it.*
> Marcus: *It's a quiet and beautiful path with tree surrounding.*
> Louise: *Sometimes brave students try to ride a bike all the way up.*
> Amy: *The step length is inappropriate. Too wide for one step but too narrow for two steps.*
> Sharon: *And the gutter on the side is stinky.*
> Marcus: *Ha-ha. True.*

Eric:	*XD*
Amy:	*What are points we're going to mention in our writing?*
	Origin, how does it look….
	And what else?
Jack:	*How do you feel when climbing up the slope?*
Amy:	*Just three parts?*
Louise:	*Why doesn't the school build a cable car for that slope?*
Amy:	*Ha-ha.*
Eric:	*Meaning of two-one slope.*
Amy:	*Let's refer to the teacher's suggestions.*
Marcus:	*Do we have to cover all the suggestions?*
Jack:	*…..*
Marcus:	*I think we can skip suggestion #5.*
Sharon:	*Is there any story about the slope?*
Marcus:	*Or we just make up a story?*
James:	*Yes, I think we can skip suggestion #5.*
	Two-One Slope: 1. Location, 2. Appearance, 3. History, and 4.
	Stories behind it. How about this structure?
Amy:	*Can I ask a question? How detailed should the outline be?*
	What would the final work be like?
Sharon:	*I agree James' structure. Looks pretty okay.*
Amy:	*So do I.*
James:	*Do we have to come up with details for each part today?*
Amy:	*For the outline, I think it's enough.*
Marcus:	*Yeah, we're done.*
James:	*Wait. I have a revision. Two-One Slope:*

       1. Location

       2. Appearance

       - Measurement

       - Features

       3. History

       - When was it built

       - The reason why it was built

       - The origin of the name

       4. Stories behind it

Amy:	*Awesome. It's great!*
Eric:	*Nice structure.*
Louise:	*Good job.*

Jack:	*Thank you, James.*
	……………..

This is pretty much the end of their outline discussion. As the chat log showed, the outline was basically all James' idea and only a small amount of content (e.g., origin) was contributed by others. The group did generate an outline that all members agreed and accepted; however, the quantity and quality of collaboration were both limited. This is another example of quick consensus-building. Multiple learners jumped to the conclusion without elaborating and exploring opinions. Similarly, in other cases of outline discussion, it was often observed that a certain learner proposed a tentative outline, and other didn't have much to say and just accepted it. The quoted excerpt might be the extreme of this type of consensus-building; in other cases, the groups may have generated limited ideas, but it seemed they wanted to jump to conclusions without doing further exploration of other ideas.

Yet, among eight outline discussions, one highly collaborative case was found. In this chat log, learners integrated various ideas and opinions and formed an outline that every member agreed and accepted, in which learners highly collaborated with other. This discussion on their outline of "Where we first met in NTHU" continued and ended up as a truly productive and collaborative one. The quotation of this successful collaboration is divided into three sections by remarks to emphasize observed features in the process. Two highly collaborative features found in this example are that (1) the outline was co-constructed based on multiple learners' contributions and (2) the leading and monitoring of the discussion was shared by many.

	(Note: The topic is the Auditorium)
John:	*I think we can start discussing the main parts of our work.*
Vincent:	*Ok.*
Amanda:	*Okay, let's do it.*
Vince:	*YES. And decide who does which part.*
David:	*Yeah.*
Argus:	*Ok.*
Link:	*How about the architectural design?*
Argus:	*How about the materials?*
Link:	*And the functions of the auditorium.*
Vince:	*Of the shape of the auditorium building.*
David:	*Also the words on the wall!*
Link:	*The inscriptions? Good ideas.*

|	
Link:	*And we can talk about the purpose of auditorium.*
John:	*Let me sum up a little.*
	We have the shape, words on the wall, materials?
David:	*Functions?*
Argus:	*Yes.*
Vincent:	*Features.*
John:	*Anything else?*
Argus:	*Who design the building?*
David:	*Its history?*
Vince:	*When was it builded?*
Link:	*Yeah, its history.*
Amanda:	*The story? The meaning behind it?*
Vince:	**built =_=*
Link:	*Anything happened before? Like an important event held there?*
Vincent:	*I don't find much information about the auditorium on the Internet. @@*
John:	*So, function, history, the words on the wall, design. There are what we're going right about the auditorium. Anything else?*
John:	**write, misspelling.*
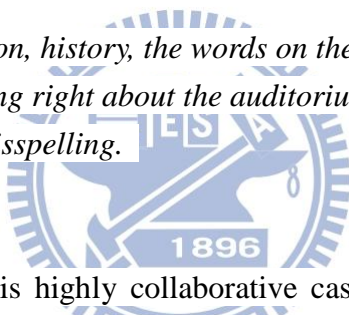
In the quoted episode of this highly collaborative case, John took the lead of the discussion. He first initiated the focus of the discussion by suggesting talking about the major parts of their writing. Later on, he helped to summarize different opinions brought up by others, and encouraged more ideas. In the following quotation of this outline discussion, Link proposed a new idea, elaborated and explained it, and tried to convince others, which is a feature of consensus-building process.

Argus:	*We can also take pictures of the auditorium ourselves.*
Link:	*But it seems many activities and performances were held there.*
David:	*So?*
Link:	*Maybe we could introduce these activities.*
	Or the importance of these activities.
Vince:	*Like making a list of these important activities, and performances?*
John:	*I don't understand.*
Amanda:	*That's a good idea.*
Vincent:	*?*

Link: *A list of important events.*

Amanda: *Are you saying we can imply introduce the performances?*
          Events since long time ago or recent ones?

Argus: *Like the freshman training? (Orientation)*

Link: *I like Vince's idea, making a list of events.*

Vince: *So?*

John: *Like what?*

Link: *For example, (URL link). Neo-classic dance company, land of*
          clouded leopard (新古典舞團歌舞劇: 雲豹之鄉)
          We can write what happened and what will happen at the
          auditorium.

David: *OK?*

Vince: *Yes, it's okay.*

Amanda: *Yes, it's OK.*

John: *I'm okay with this.*
          How many parts do we have now?

Link: *Five?*

Vince: *We can only indicate the auditorium's importance by introducing*
          its activities, but not the activities themselves?

Link: *That's right.*

John: *Alright, it's about time.*

David: *So? What's the first part?*

Vince: *History?*

Amanda: *Yes, history.*

Link: *OK.*

John: *Yes, I agree.*

Vince: *The second?*

Amanda: *Materials of the building maybe?*

Vince: *Its shape and material.*

John: *OK*

Link: *Good.*

John: *The third part is the words on the wall. OK....?*

David: *And then?*

Link: *The third part is the words.*

David: *Yeah, ok.*

Vince: *And next? Functions?*

Vincent: *Design concepts?*

Vince: *Both.*

Link: *Design concepts should be in the second part.*

David: *Oh~ right!*

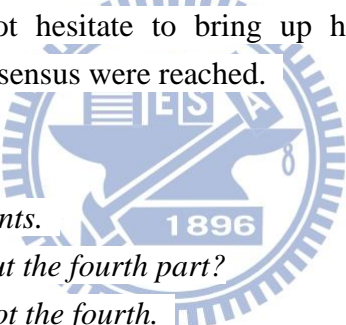Amanda: *What is the difference between functions and "shapes and materials?"*

Vincent: *Well……*

Link: *"Shape and material" is about how the building looks like. And what it's made of.*

Amanda: *Oh, I understand now.*

John: *The fifth part?*

As seen from the above excerpt, in addition to John and Link, other members, including David and Vince also contributed to monitor the discussion by asking "(s)o what's first part?" or "(a)nd next? Function?" It was not just one member who took total control of the discussion, but all members seemed to contribute and take turns monitoring the whole process. Amanda seemed to be one of the less active participants but still did not hesitate to bring up her doubts to ensure mutual understanding and group consensus were reached.

Link: *List of events.*

Amanda: *What about the fourth part?*

John: *Oh, I forgot the fourth.*

Vincent: *How about the functions?*

Vince: *Maybe*

Link: *Or the functions and its meanings to students.*

Vince: *Great.*

David: *1. History 2. Shape & materials 3. Words on the wall 4. Functions 5. List of events. Right?*

John: *Exactly!*

Argus: *OK*

Vince: *Yes, thank you.*

Amanda: *Ok.*

Vincent: *y*

David: *Great. And what do we do next?*

Link: *Wait. The fourth part is only about functions?*

John: *Let's think about a title for each part and a main title.*

Link: *The fourth part can be functions and meaning to us.*

Argus:	*Do we have to go there in person?*
David:	*Alright. The fourth part is functions and meanings to us.*
Vince:	*And take some pictures.*
Link:	*Pictures are good.*
Vincent:	*Hey, don't forget the titles.*
John:	*Yes, we need a funny (?) and "eye-catching" title.*
Link:	*Like "Where we met in NTHU?"*
	(Note: The auditorium is used for freshman orientation.)
Vince:	*I like where we met.*
Vincent:	*Nice!*
David:	*Or some exaggerations?*
Link:	*How about "don't' read this!" :P*
Vincent:	*Ha-ha.*
Vince:	*XD*
Argus:	*=_=*
Link:	*Ok, what's the conclusion?*
John:	*I like where we met.*
Vince:	*Where we met +1*
Amanda:	*OK*
Vincent:	*How about where we FIRST met?*
David:	*OK~ next one!*
Vince:	*OK*
Vince:	*What the subtitle for the first part?*
	……………..
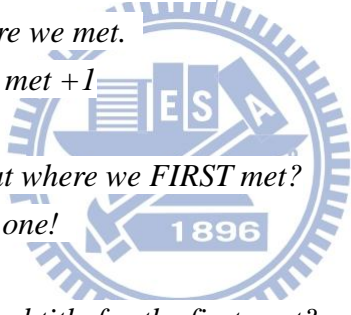
The above quotation as a whole presents the highly collaborative process. Compared to the earlier topic discussions, much more elaboration and exploration on ideas were found in outline discussion. In the quoted case, Amanda asked about differences between sections of the writing, and Link tried to convince others with his proposal on important performances held in the auditorium. It seems that they did not simply take others' opinion, combine them together and jump to a conclusion (quick consensus-building); on the contrary, they reflected on and evaluated the contributions instead. Also, when Link proposed the main title of the writing, Vincent suggested a better revision, where we FIRST met, which is a perfect example that "learners build on their reasoning of their partners, work with each other's idea and are willing to adjust their own ideas based on the sound arguments of their fellow students" (Gijlers e al., 2009, p.254). Another episode is that Link thought of introducing important performances held at the auditorium but Vince came up with the idea of making a list,

which is a good representation of integration-oriented consensus-building. Thus, many learners contributed and reflected on their own and others' ideas, co-constructing and refining the intellectual production, the outline of their collaborative writing.

Also, in this quoted case, no one student took charge of the process; instead, different learners took turn reminding each other of next points of discussion. At the beginning, John started the discussion by addressing the goal of the task (producing the outline). Then Vince followed and added more details about the goal (who does what). In the chat that followed, David, John, Vince, and Link took turns specifying the next points to be discussed, or summarizing the results at the point, such as saying, "What's next?" and "How many parts do we have now?" and "Anything else?" Also, by expressing doubts and confirming understanding, they also helped each other to elaborate and refine their ideas. The quantity and quality of collaboration was thus increased and improved.

As seen from the quoted excerpt on the previous page, the learners first brainstormed potential aspects of their topics for writing, and one member would summarize the information they had had so far. More new ideas might be proposed after someone summarizing or updating the current discussion. Through the co-construction of the outline, learners likely had more of a sense of ownership of the collaborative writing and a feeling of responsibility for it. Although quick consensus-building is considered effective in certain contexts, educators would like to see more integration-oriented consensus-building, in which leaners reflect, adjust, and negotiate ideas and are more likely to have conceptual change (Weinberg & Fishcher, 2006).

Synchronous discussion on revisions

In the previous discussion on learning activities in synchronous chat on revisions, groups 4 and 8 were identified as more productive and effective due to leaders who positively influenced the group dynamics by encouraging and appreciating contributions. In the revision discussions of the other six groups, there was a tendency to follow the instructor's revision suggestions one by one; once they went through all the points, the discussions finished. Instead of actively improving and spontaneously revising the writing, these relatively passive groups showed no interest in the collaborative task, and simply got the work done.

In terms of consensus-building types of revision discussion, many groups applied a combination of quick and integration-oriented consensus-building strategies to various extents. In general, most groups tended to quickly go through revision points provided by the instructor (quick consensus-building), but they did utilize a more integrated-oriented approach when deciding and refining certain English expressions at a micro level. The following except indicates how the learners used these two different consensus-building strategies in a broader and a more specific level in one single collaborative task:

(Note: The topic is <u>College of Humanities and Social Sciences</u>)

Ken:	*Well, let's start from the first suggestion about the first paragraph.*
Arthur:	*Yea, the first paragraph is about the location.*
Brian:	*I can show the work to my sister and see if she could understand our writing.*
Cindy:	*Can we add more details about the location?*
Arthur:	*Maybe we can describe a route from the main gate to the HSS building?*
Brian:	*How far is it from the gate to the building?*
Arthur	*Maybe describe the surroundings?*
Frank:	*Image if you were not a NTHU student, could you understand the description?*
Ken:	*I think we should focus on "how" to get there.*
Arthur:	*Yes, Ken's right. I agree with him.*
Brian:	*I don't know, but describing the route makes it easier to find the building.*
Cindy:	*So maybe we can teach the reader how to get there?*
Kenneth:	*I agree.*
Cindy:	*From the school gate.*
Jay:	*Yeah.*
Cindy:	*And we can put on a map!*
Ken:	*Okay, let's do it.*
Frank:	*Ok.*
Cindy:	*That's all for the first paragraph? Who will summarize the revision results and e-mail to the teacher then?*
	…………
Brian:	*I think we can move on to the second suggestion.*

Arthur: *Yes, what the next?*

Cindy: *Spelling?*

Arthur: *Okay, we can go through the wring again to check errors.*

Cindy: *For this suggestion, we can check the part we wrote individually again.*

Kenneth: *I think it's better to check others' parts, cause I don't usually see my own misspelling.*

Brian: *Yes, we can ask friends to read it and tell us if there's anything weird.*

Kenneth: *Right, that what I meant. Is it a better way to do it?*

Brian: *Everybody's so busy. Too many exams.*

Cindy: *This is not an excuse. We should try to improve the wiki writing as much as we can.*

……………

Arthur: *Ok, what's the next suggestion?*

Cindy: *The third one takes more time. We gotta make sentences shorter.*

Arthur: *Oh, =_=. It's difficult.*

Ken: *It sounds….difficult. How?*

Jay: *Does that mean we have to revise some sentences?*

Cindy: *Yes, I think so. Read the examples.*

…………

Frank: *What's the fourth suggestion?*

Arthur: *"If you're not sure which proposition to use, look it (the verb) up in the dictionary."*

Brian: *Wow, that's a lot of work.*

Kenneth: *I always have problem choosing among in, on, at ….etc.*

……………

Cindy *And, will we distribute the work like we did last time?*

Kenneth: *?*

Arthur: *I don't understand.*

Cindy: *I mean, should we revise the writing all together? Or do it separately?*

Jay: *Separately.*

Ken: *I will re-write the first paragraph. I'm familiar with that part.*

Brian: *Do we have to finish the revision soon?*

Frank: *I think we should do it separately. I can revise the part I wrote.*

Arthur: *So the discussion finished?*

Jay: *Is there anything else we have to decide now?*

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Kenneth: *I don't think so.*
    Frank: *OK, bye.*
        Jay: *Bye-bye.*

    ……………

In the case quoted above, the group tried to go through the each of the instructor's suggestion quickly and did not actively reflect on their writing regarding any possible revisions. In addition, someone always asked to move on to the next point before the current suggestion had not been fully understood and discussed. It seems that most of the group members were not interested in the quality of the collaborative work they shared, but were merely fulfilling the requirement of that moment's task. Fortunately, this group did represent some features of integrating multiple ideas when deciding how to revise the paragraph about the location. For example, the student, Ken, responsible for the revision of the location paragraph reflected on various ideas, and formed the final revision (e.g., adding a map, describing a route from the main gate to the building). It is noted Ken did not like the idea of describing the surroundings and expressed his concern on that one; he did not just combine all opinions but actually considered its appropriateness.

One possible explanation of the high number of quick consensus-building messages might be the value of socially-valued conformity among students. Chinese/Taiwanese culture values peace and harmony and the avoidance of conflict in daily life, seldom would people take it out (display personal disagreement) in public (Bond & Hwang, 1986). Social conformity is highly valued and Taiwanese teenagers are taught to obey orders and follow rules. Quick consensus-building might be the only applicable strategy for them working with others. Learners, in a Taiwanese context in particular, might need more structured guidance and training for online collaboration. Taiwanese students seem more likely to avoid conflict with peers and would choose not to bring up opposite ideas, representing quick consensus-building; however, integration-oriented and even conflict-oriented consensus-building can relatively lead to more effective co-construction of knowledge.

More integration-oriented and even conflict-oriented consensus-building should be encouraged particularly among Taiwanese students. A high number of short agreement and checking messages were found in the chat logs, which indicate quick consensus-building; however, educators would like to see the other way around. Both integration-oriented and conflict oriented consensus-building can be effective and lead to co-construction of knowledge.

Strengths and limitations of synchronous chat in CSCW

Ideally, writing instructors would like to see more integration-oriented consensus-building activities during the CSCW process, which enable learners to reflect on own and each other's opinion and collaborative construct knowledge (the writing). Yet, what kind and how much the teacher intervention should be provided to foster the most collaboration among learners? In CSCW, instructors would be challenged to pay special attention to create a more rigorous context and promote *meaningful learning* (Jonassen, Howland, Moore, & Marra, 2003). The analysis of synchronous CSCW (the chat log of online discussions) in the present study present three foci: learners' participation, learning activities, and consensus-building types. The findings from the analysis of the textual data indicate both the strengths and limitations of using synchronous chat rooms in support of computer-supported collaborative writing. The two strengths are providing synchronous collaboration and authenticity, and the two limitations are random grouping and inflexible teacher intervention.

Synchronous collaboration

It is encouraging to see some learners exhibited excellent cooperative and problem-solving skills in the collaborative tasks. Also, many of them presented a strong sense of teamwork and actively contribute to the mutual goal. The quality of the final wiki-based writing is obviously beyond any individual's capability and undoubtedly a product of collaboration. The collaboration process can be observed in wiki-based drafts and revisions as well, but more negotiation can be found in synchronous and timely interactions in online chats. In addition, positive learning outcomes might be attributed to the clear structure and evaluation criteria set at the beginning of the implementation, so that learners realized the nature of the tasks and were aware of what was considered important for their learning.

Authenticity

The integration of real-life subjects into English collaborative writing created opportunities for learners to take on ownership and responsibility of their English writing, as the ownership of L2 writing is promoted and identified a positive feature of collaborative writing (Storch, 2005). With the focus of authenticity, learners were able to link the target foreign language in authentic real-life contexts; for instance, they searched information in English online, and applied it in their own English writing to introduce the subjects with their own perceptive. Providing authenticity and

the link between the class and the real world is one of the educational advantages demonstrated in the pioneering ENFI project (Bruce & Rubin, 1993).

Random grouping

On the other hand, the CSCW instructional design of this study has its limitations: the random grouping, and the fixed teacher intervention. First, the grouping of learners for the CSCW instructions was not based on their online learning readiness (OLR) or on their English proficiency, but on students' choice. Participating students chose their own group members at the first class, so they probably formed the groups with those they were already familiar with or close friends. The original idea was to gain more mutual trust and familiarity among learners, so hopefully they could generate more effective communication. As expected, no conflicts among learners ever happened; the participating students seemed more interested in gossip and jokes rather than the task itself, particularly in the groups composed of close friends from the same department. The grouping indeed helped to create friendly and cheerful atmosphere among learners, but unfortunately, it also contributed to the ineffectiveness and infringed quality of the discussion. The high group cohesion promoted learning activities owing to the willingness to help each other; however, it seemed also contribute to "uncritical acceptance of solutions" (Mullen & Copper, 1994).

Rather than simply relying on the most proficient peers in their groups, learns can learn from the strengths of all group members. Thus, the group should not only based on learners' English proficiency but more on their motivation, willingness to collaborative and others. With appropriate and sufficient input from the instructor and other sources, group member do not necessarily rely on more-capable peers to perform the learning task, and learners' ability might not be the appropriate criterion. Learners' online learning readiness (CIS, MFL, and OCS) and active participation are more likely to contribute to positive CSCW perceptions and to more effective communication in online environments.

Inflexible teacher intervention

The other limitation of the CSCW instructional design was a lack of flexibility in teacher intervention. Since the group composition can hardly be uniform, the intervention should be adjusted to better fit each group's tone. For instance, some groups could complete the task and were highly collaborative; some groups kept going off track and required reminders from the instructor from time to time. Unfortunately, the instructor tried to stick to the rules and guideline, minimizing her

intervention, resulting in instances where she failed to provide the type and amount of assistance needed for the situation.

In the contexts of this study, specific guidelines, task goals, and possible discussion directions were provided in advance of online discussion. However, not all pedagogical and technical goals can be met automatically; some learners require more external guidance and encouragement and the instructor should step in and provide support when needed.
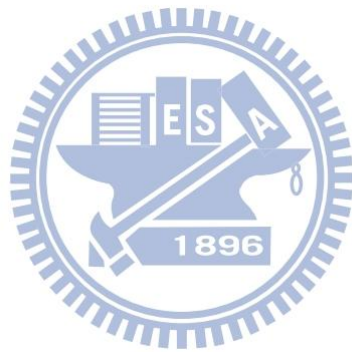
CHAPTER 6

Conclusion

This final chapter summarizes the major findings, provides possible implications, acknowledges the limitations, and suggests directions for future research regarding computer-supported collaborative writing (CSCW). This study examined various aspects of CSCW instructions and the group dynamics among learners, including learners' perceptions of CSCW, online learning readiness (OLR), writing performance, and synchronous and asynchronous interaction with special attention to learners' participation, learning activities, and consensus-building processes. This study is motivated by the teacher-researcher's curiosity to understand how the technology integration affected her students' learning and her wish to improve future instructional application of online tools. The analyses and interpretation of data may not cover all factors involved in the CSCW dynamics among learners; yet, by incorporating the teacher-researcher's perspectives, it is hoped to provide a unique and new angle to understand the online collaborative learning process.

1. Major Findings

From the quantitative and qualitative data detailed in Chapters 4 and 5, major findings include the influence of learners' online learning readiness (OLR) on CSCW perceptions, individual/group writing performance, their interrelationships, and types of learners' participation, learning activities, and consensus-building observed in synchronous chats. It may be difficult to generalize the findings due to the differences among educational settings; however, these findings have revealed further understanding of the complex nature of CSCW, especially in this case of college English education in Taiwan. These findings are summarized below:

(1) *Computer/Internet self-efficacy (CIS), motivation for learning (MFL), and online communication self-efficacy (OCS) positively influence CSCW perceptions.* These three dimensions, CIS, MFL, and OCS, of learners' online learning readiness (OLR) seem to contribute to positive CSCW experiences.

(2) *Computer/Internet self-efficacy (CIS) is associated with learners' perceptions regarding technical support, while motivation for learning (MFL) and online communication self-efficacy (OCE) are significantly correlated with those of*

communication and collaboration aspects of CSCW. Different dimensions of learners' online learning readiness (OLR) might affect different aspects of their CSCW experiences.

(3) *Synchronous chat is found preferable for interaction and negotiation, and asynchronous wiki is perceived giving a higher sense of satisfaction.* Online tools with different technical features seem to provide distinct support for the online collaborative writing process.

(4) *Group performance (wiki collaborative writing) is correlated with self-directed learning (SDL) but not with individual performance (revision count and writing assignment grade) of group members.* In other words, the group performance is not simply based on the combination of individuals' efforts and writing ability, but also relevant to learners' metacognitive monitor on their own learning.

(5) *Active participation seems more crucial than English proficiency for successful synchronous collaboration.* Groups with more active participants tended to be more effective and appeared to experience greater enjoyment during the process of online collaboration.

(6) *More cognitive and social activities are found in discussions on topics and outlines; more metacognitive messages are found in the last discussions about revisions.* It seems that learning activities vary in synchronous discussion of different tasks according to the nature of the shared goals.

(7) *A tendency of quick consensus-building is found in all synchronous online discussion.* In the synchronous CSCW discussions of this study, participating students seemed also present a tendency to avoid personal and group conflicts, which is a formidable obstacle to the collaboration and cognitive development of learners.

2. Pedagogical Implications

It may be difficult to generalize the findings due to the differences among educational setting; however, these findings have revealed further understanding of the complex nature of CSCW, especially in this case of college English education in Taiwan. Based on these findings and the teacher-researcher's interpretations, the following pedagogical implications are offered:

- Learners' computer/Internet self-efficacy, motivation for learning, and online communication self-efficacy should be assessed in advance, and according training to be provided to ensure the expected learning outcomes of computer-supported learning activities to be met.

- Online tools with different technical features should be used for different stages of a more extended and long-term writing process. Synchronous online tools are suggested to be applied in initial writing stages (brainstorming and planning), asynchronous online tools are suggested to be used in the middle and later writing stages, such as drafting, revising, and editing.

- The grouping of learners should be based on their relevant OLR dimensions (CIS, MFL, and OCE), their attitude toward collaboration, and willingness to actively participate, rather than solely on their ability or personal choice, so that a more productive and effective discussion among learners is more likely to happen.

- Teacher intervention in both synchronous and asynchronous computer-supported collaborative writing activities should be flexible and adapt to the group dynamics and unique conditions in order to provide more or less guidance when needed, and to promote all types of learning activities and integrated consensus-building as well.

- The values of collaboration should be emphasized and positive feedback to others should be encouraged in advance and throughout CSCW instructions so that Taiwanese students can feel more comfortable expressing different ideas and fully benefit from the interactive process of negotiation with others and reflection on different ideas.

These pedagogical implications, for both instructional designers and writing instructors, suggest further steps toward recognizing the connection between learners' readiness, perceptions, individual/collaborative writing, and interactions involved in computer-supported collaborative writing. The centrality of active teamwork and collective knowledge construction to collaborative writing tasks may require students to develop different literacies and skills than those tailored to more individual methods of teaching and learning. Collaborative writing in L2, as a new trend in composition pedagogy, may require alternative learning styles and readiness. It is suggested that both English writing instructors and learners become more educated

about and more aware of the nature of collaborative writing so that both stakeholders could benefit the most of this computer-supported approach to second language writing instruction.

It is hoped that writing instructors could have a better understanding of how to prepare learner for online collaboration and help those who need more guidance and scaffolding through the progress. Through effective and appropriate design and planning, computer-supported collaborative writing (CSCW) instruction could help learners better prepared for group collaboration through the Internet in the increasing interconnected world.

3.   Limitations and future directions

It is important to acknowledge the limitations of this study, and to provide suggestions for future studies regarding computer-supported collaborative writing (CSCW). First, the development and design of the CSCW perception survey could be more comprehensive and solid if it was grounded on field trials. Unfortunately, the survey items did not undergo a more systematic validation. In following future studies, a larger sample might be needed and hopefully three possible categories or dimensions (instructional design, technical, and communication and collaboration) could be developed. In addition, the survey items might need revision according to updated literature.

Second, the collaborative writing evaluation criteria could be more consistent with each other, so that the learners could have a clearer idea of objectives to follow throughout the CSCW instructions. Factors involved in how individuals write are complex enough, and when it comes to understanding how multiple writers collaboratively produce a written text, more issues should be taken into consideration, such as the responsibility for the final production, the shared ownership of the writing, and the consensus among authors. In terms of assessment of CSCW, it is suggested to consideration conditions other than individual writing, and to include aspects of communication, collaboration, and individual contribution to the writing task.

Third, other characteristics of learners, such as gender and learning style, may shed further light on the complex dynamics of online collaboration. More detailed background information about learners could help to clarify the interrelations among the various obvious and more obscure factors. It is suggested that other possible personal factors influencing learners' online collaborative writing to be surveyed both

before and after the CSCW instructions so that further understanding of these factors could be obtained and analyzed.

While the technology is capable of supporting audio-visual conferencing, online communication still largely relies on text. Writing, including any form of written communication, should be a major focus of L2 education. As emphasized in the first chapter of this volume, the demand for writing in electronic contexts has increased (Warschauer, 1999). The English literacy for communication and collaboration across national borders has been increasingly on demand. Thus, teaching English language, especially writing, in computer-supported collaborative environments, provides L2 writers a more real-life and authentic experiences. By understanding L2 writers' online learning readiness (OLR), and how learners actually participate and collaborate in online contexts, instructional designers and writing teachers could help L2 student writers develop relevant knowledge and skills demanded in the global workplace.

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Appendix I: Online Learning Readiness Scale (OLRS)

Online Learning Readiness Scale (OLRS)

Computer/Internet self-efficacy

I feel confident in performing the basic functions of Microsoft Office programs (MS Word, MS Excel, and MS PowerPoint).

I feel confident in my knowledge and skills of how to manage software for online learning.

I feel confident in using the Internet (Google, Yahoo) to find or gather information for online learning.

Self-directed learning

I carry out my own study plan.

I seek assistance when facing learning problems.

I mange time well.

I set up my learning goals.

I have higher expectations for my learning performance.

Learner control (in an online context)

I can direct my own learning progress.

I am not distracted by other online activities when learning online (instant message, Internet surfing).

I repeated the online instructional materials on the basis of my needs.

Motivation for learning (in an online context)

I am open to new ideas.

I have motivation to learn.

I improve from my mistakes.

I like to share my ideas with others.

Online communication self-efficacy

I feel confident in using online tools (email, discussion) to effectively communicate with others.

I feel confident in expressing myself (emotions and humor) through text.

I feel confident in posting questions in online discussions.

Note. Adapted from "Learner readiness for online learning: Scale development and student perceptions," by M.-L. Hung, C. Chou, C. –H Chen & Z. –Y Own, 2010, *Computers & Education, 55*, 1080-1090. Adapted with permission.

Appendix II: Questionnaire on CSCW perceptions

Questionnaire on CSCW perceptions

Instructional design

1. I think I like to learn in group this way.

2. I think the learning activity is interesting.

3. I think I do well in the activity.

4. I think everyone should be able to complete the learning activity.

5. I think completing the activity gives me a sense of satisfaction.

Technical support

6. I think the online tool provides means of social interaction.

7 I think the online tool provides sufficient means to communication.

8. I think the online tool is stable.

9. I think the online tool makes me nervous and stressed.

Communication and collaboration

10. I think I fully understand my team members in the learning process.

11. I think I clearly express myself to others in the learning process.

12. I think the collaboration of my team is very successful.

13. I think I like to collaborate with others in this way.

14. I think I and my team communicate effectively.

Note. Adapted from "Computer-Supported Collaborative Writing (CSCW): Learners' Perceptions of Synchronous and Asynchronous Tools," from Y.-Y. Huang and C. Chou, 2013, *American Educational Research Association (AERA) annual Meeting*, San Francisco. Adapted with permission.

English I Syllabus

Fall 2009

Course Info

Code: LANG 102029 (Credits: 4)

Time & Place: (Wed) 10:10- 12:00,

(Fri) 10:10-12:00 @ RD105

Instructor: Yun-yin Huang

Contact: paranoidrocker@gmail.com

Textbook: Summit 2 & Extension Reading
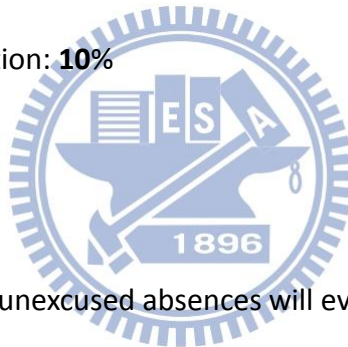
Grading

Attendance & participation: **10**%

Individual writing assignment: **10**%

Wiki Writing Project: **20**%

Extension Reading Presentation: **10**%

Midterm Exam: **25**%

Final Exam: **25**%

Requirements & Rules

* Attendance is mandatory; unexcused absences will eventually affect your final grade.

* Avoid coming in and out of class, or being late; especially, while other students are presenting.

* Collaborative (group) work requires everyone's participation. Do not rely on one or two students.

* Cell phones must be OFF during class unless there is a real emergency.

* Absence from a class is no excuse for not knowing the assignment and what has been discussed.

* No late assignments & no make-up quizzes/tests/in-class work would be accepted.

<<Course Syllabus>>

Week 1

9/16 (Wed) Orientation

9/18 (Fri)   Unit 1

Week 2

9/23 (Wed)   Unit 1

9/25 (Fri)   Unit 1

Week 3

9/30 (Wed)   Unit 1

10/2 (Fri)   Unit 1

Week 4

10/7 (Wed)   Extension Reading 1 & Meaning beyond the Melody 1

10/9 (Fri)   (Individual writing assignment I due) Unit 1 review and in-class exercise

　　　　Online discussion on wiki topics

Week 5

10/14 (Wed)   Unit 2

10/16 (Fri)   Unit 2

Week 6

10/21 (Wed)   Unit 2

10/23 (Fri)   Unit 2

Week 7

10/28 (Wed)   Unit 2

10/30 (Fri)   Unit 2

Week 8

11/4 (Wed)   Extension Reading 2 & Meaning beyond the Melody 2

11/6 (Fri)   (Individual writing assignment II due) Unit 2 review and in-class exercise

Week 9

11/11 (Wed)   Midterm Exam

11/13 (Fri)   **Online discussion on wiki outlines**

Week 10

11/18 (Wed)   (No Class) Sports Day

11/20 (Fri)   Unit 3

Week 11

11/25 (Wed)   Unit 3

11/27 (Fri)   Unit 3

Week 12

12/2 (Wed)   Unit 3

12/4 (Fri)   Unit 3
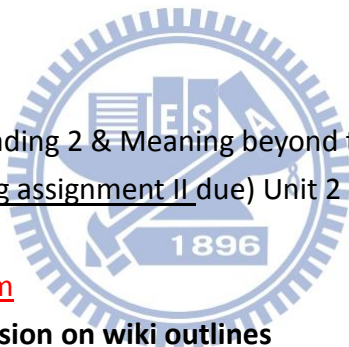
Week 13

12/9 (Wed)   Extension Reading 3 & Meaning beyond the Melody 3

12/11 (Fri)   (Wiki project draft due) **Online discussion on wiki drafts**

Week 14

12/16 (Wed) Unit 4

12/18 (Fri) Unit 4

Week 15

12/23 (Wed) Unit 4

12/25 (Fri)   Unit 4

Week 16

12/30 (Wed)   Unit 4

1/1(Fri)   (No Class) National Holiday

Week 17

1/6 (Wed)   Extension Reading 4 & Meaning beyond the Melody 4

1/8 (Fri)   (Wiki project final due) Unit 4 review and in-class exercise

Week 18

1/13 (Wed)   Final Exam

1/15 (Fri)   Wrap-up

Online Discussion Instruction (1)

The **first** online discussion on **(according date)**. We'll go the computer lab together and use the PCs there, so that if there is any technical issue, we shall be able to solve the problem right away. The discussion will be about **20-30** minutes.

Wiki TOPIC

- You will have to log-in to the chat room of your group and discuss your wiki project **topic** IN ENGLISH.
- The topic of your wiki collaborative writing project should be an introduction of a landmark of our school (e.g. a building, a monument, a location, a lake...etc.).
- Don't be shy and it's okay to make grammatical mistake or misspell some words. The most important is to express your ideas and to understand others.
- At the end of the discussion, the topic should be finalized. The finalized topic cannot be changed unless there's a real serious reason.
- The whole discussion process will be recorded and monitored.

Be prepared!

Online Discussion Instruction (2)

The **second** online discussion will be on **(according date)**, and you will have to use your own computer and log-in to the chat room of your group again. (No need to go to the classroom and you can log-in <u>anywhere</u> you like.) The discussion will be about **40-50** <u>minutes.</u>

(The log-in time is from 10:30-11:30 a.m.; being late will be considered absence and affect your final grade.)

Wiki **OUTLINE**
- Please log-in to your own group chat room and discuss the **structure** and **arrangement of content** of your wiki project. (e.g. Which aspect of the landmark are your going to cover? Its history? It appearance? Its story?)
- Don't be shy and it's okay to make grammatical mistake or misspell some words. The most important is to express your ideas and to understand others.
- All kinds of ideas are welcome.
- The structure/outline of your wiki writing project should be finalized at the end of the discussion and be handed to me by e-mail.
- The whole discussion process will be recorded and monitored.

Suggested questions to be covered in the discussion:
1. What is the history/origin of the subject?
2. How does the subject look like? (Or describe the design.)
3. What is so special of the chosen landmark?
4. Do you know any episode/story/event about the subject? (e.g. a ghost story)
5. Do you know any famous person related to the subject?
   Are there any tradition or regular activities about the subject?

## Appendix VI. Grading rubric for individual assignment and tests

	Beginning (0.5)	Developing (1)	Accomplished (1.5)	Exemplary (2)
Topic (Relevance)	Keywords near beginning	Main idea or topic in the first sentence	Good main idea or topic sentence	Interesting, well-stated main idea/topic sentence
Organization (Paragraphs)	Ideas not ordered; one paragraph or text divided but not by content	Some order of main idea + details or sequence; supporting details mostly grouped into appropriate paragraphs	Main idea + details or sequential, as appropriate; ideas appropriately divided into paragraphs with supporting details	Good flow of ideas from topic sentence + details or sequence; strong paragraphs ordered to develop story or exposition
Sentences (Grammar)	Mostly complete sentences; some fragments or run-on; many errors in agreement, number, tense	Complete sentences; few run-on sentences; some errors in agreement, number, tense	Complete sentences; no run-ons or fragments; some variety in length and type; few error in agreement, number, tense	No sentence errors; variety in length and type; sentence types related to style of writing; no errors in agreement, number, tense
Vocabulary	Related words or ideas mentioned; limited basic vocabulary	Attempts to use new key words in description; goes beyond basic vocabulary	Use new key/related words and ideas correctly; varies language	Use new key/related words/ideas easily; colorful, interesting words suitable for topic and audience
Punctuation/ Spelling	Several punctuation and case errors; many spelling errors	Few punctuation and case errors; some spelling errors	Minor errors in punctuation and case; variety used; few spelling errors	Correct punctuation and case; no spelling errors

Note. Adapted and revised from *The Reading Teacher's Book of Lists*
(Fry, Kress, & Fountoukidis, 2000, p.307)
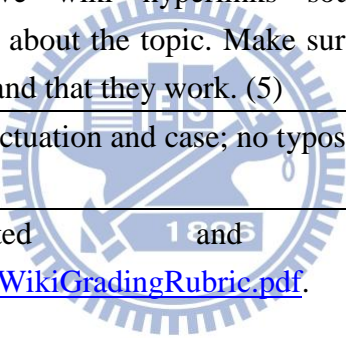
Appendix VII. Individual wiki revision criteria

	Descriptors (total points)
Format	Add graphics, hyperlinks to sources and other non-textual materials, including adjusting font, text size, or graphics. (0.5)
Content	• Add content to the writing. (2)
	• Add substantial amount of content to the writing. (4)
Language	• Correct punctuation, case, spelling errors, or any grammatical errors (tense, agreement…) . (1)
	• Revise sentences or change vocabulary for better expression. (2)

Note. Adopted and adapted from http://k12online.wm.edu/WikiGradingRubric.pdf.
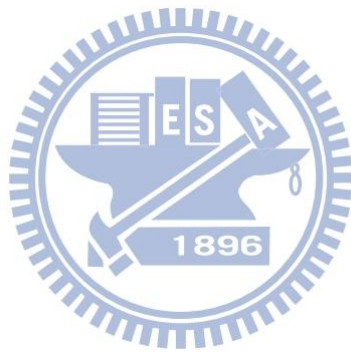
Appendix VIII. Final wiki writing evaluation criteria (Total points: 100)

	Descriptors (total points)
Collaborative effort	(as seen in the history) Several participants have contributed. Wikis are collaborative. Each person brings their strengths and contributes things that they are good at to the project. (20)
Visual appeal	Graphics are used appropriately as needed. Non-textual content is not distracting and used where needed to further explain a topic. (10)
Organization	Paragraphs start with interesting, well-stated main ideas or topic sentences. Good flow of ideas from topic sentence, supported by details; strong paragraphs ordered to develop story or exposition. (25)
Language	Use appropriate vocabulary, suitable for topic and audience . Vocabulary and sentences have a variety in length and types. No errors in agreements, numbers, tenses. (25)
Hyperlinks to sources	An effective wiki hyperlinks sources and gives additional information about the topic. Make sure that you have checked your hyperlinks and that they work. (5)
Grammar	Correct punctuation and case; no typos, spelling errors. -1 each up to max. (15)

Note. Adopted and adapted from http://k12online.wm.edu/WikiGradingRubric.pdf.

Appendix IX. Assessment rubric for synchronous online discussion

Category	Outstanding (3)	Good (2)	Developing (1)	Beginning (0)
Engagement	A true team member who contributes a lot of effort, and encourages and supports the efforts of others in the group.	A strong group member who tries hard.	Sometimes a satisfactory group member who does what is required	Sometimes chooses not to participate and does not complete assigned tasks.
Contribution	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done sometimes. Others must sometimes remind this person to keep on task.	Rarely focuses on the task and what needs to be done. Let others do the work. .
Communication	Respectfully listens, interacts, discusses and poses questions to all members of the team and helps direct the group in reaching consensus.	Respectfully listens, interacts, discusses and poses questions to others during discussions.	Has some difficulty respectfully listening and discussing, and tends to dominate discussions.	Has great difficulty listening, argues with teammates, and is unwilling to consider other opinions. Impedes group from reaching consensus.
Problem-solving	Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.	Does not suggest or refine solutions, but is willing to try out solutions suggested by others	Does not try to solve problems or help others solve problems.
Collaboration	Consistently makes necessary compromises to accomplish a common goal.	Usually makes necessary compromises to accomplish a common goal.	Occasionally makes compromises, and sometimes helps keep the group working well together.	Rarely makes compromises to a common goal and has difficulty getting along with other group members.

Note. Adopted and adapted from

http://www2.uwstout.edu/content/profdev/rubrics/secondaryteamworkrubric.html.

Appendix X. Coding scheme of learning activities (messages)

Code	Descriptor	Quoted example
Cognitive		
CDIF	An idea (e.g., an English expression) is presented with a reason/an argument, such as a solution to a problem, or direct revision/modification of an English sentence.	- "I think u can make that story more relevant to the 2-1 slope, because the previous story you wrote could happen at anywhere." - …..the first sentence is not clear. How about "in the first three months, the business wasn't going well and the revenue was balanced."
CDINF	An idea/English sentence is presented without a reason/an argument	- "I think intentionally dividing the check points to different people is not efficient." - "Maybe we could put more description of the scenery in the writing." - …. The last sentence should be re-written, but I don't how to make it better.
CDAF	A student does (not) agree with the idea contributed by another with a backing, refutation, or restriction.	- "I don't think so. The narrations will be unclear." - "No, 7-11 (the convenience store) is not a good subject. It's too limited, nothing much to write about."
CDANF	A student does (not) agree with the idea contributed by another without a backing, refutation, or restriction.	- "Agree." - "I don't think so." - "Good idea. Let's do it." - "Okay. It sounds good to me."
CDAQ	Asking a content-directed question.	- Any special event was held here? - Do you know the history or any ghost stories of 人社院 building?
CARI	Referring to or contributing information found in other information sources than the discourse.	- "Group 3 will write about 風雲樓." (In group 4's discussion, they referred to the decision of another group.) - We can refer to the teachers' suggestions on e-learning system. Have you all read them?
CASI	Summarizing or evaluating the information found in other information sources than the discourse.	- My roommate said you can only get on the top of the tower on New Year eve. - I think teachers' first and second

		-	suggestions are about the same thing.
CARE	Referring to earlier or personal experiences	-	"I have nerve been to the lake. I don't know what I can write about it."
CLI	Linking facts or ideas presented or referring explicitly to a contribution in the discourse.	- -	Ghost story is a good idea and we can put it in the history part. "So we describe the scenery and its location, and tell the history of it."
CRI	Repeating information without drawing a conclusion or interpreting that information.	- -	"Are you saying we can simply write about what we already know about it?" "Yeah, some special events like a music concert."

<div align="center">Affective</div>

AG	Reacting emotionally/generally to messages of peers, without directly reacting to the content of that message. This reaction can be positive, negative, or neutral.	- - -	No, I don't want to go the Humanity and Social Science building at night! QQ. Jim, you go wake up Kai! He's next door. Sorry, I'm late. I went to the classroom!! I forgot the online discussion's schedule today.
AA	Asking for feedback, responses or opinions by peers.	- -	How about an interview with the owner? Maybe we can take some photons on our own?
AC	Chatting or social talks; contributions that are not relevant to accomplish the task	- -	You are SO late. Are you going to the physics class later?

<div align="center">Metacognitive</div>

MPP	Presenting an approach to carry out the task	- - - -	"….before the meeting, each of us read through the article and make your own revision points" "Just re-write it and make sure there's no repetition." "So we will make a to-solve-list at last as the checking rules." "We can write the titles on wiki first, and then we finish it together."
MPA	Asking for an approach to carry out the task	- -	"Do we write about the history?" "How many aspects do we have now?"
MPE	Explaining/summarizing the approach already adopted	-	"I think in the introduction part we have several things that are overlapping. That's

			the problem to assign a part to different people."
MCS	Structuring the contribution, or making conclusions	-	"Okay, we have 4 parts now. 1. The history. 2. The owner. 3. The cats. 4. The activities."
		-	"Any other idea? Let's vote for the options we have so far."
MCA	Asking for an explanation, clarification or illustration as a reaction to a certain message.	-	"so we just have to make a shorter revision and avoid repetition?"
		-	"What's wrong with the first paragraph?"
MCE	Explaining unclear information in messages, answering a question asked by another participant	-"…the title doesn't seem match the content. - We should revise the title and re-arrange the content." -"Yes, we'll take some pictures ourselves."	
MMM	Monitoring the original planning, aim or time schedule	-"…this one done. Let's move to the next one." -"We have to finalize the outline before noon and send it to the teacher!"	
MMR	Reflecting on one's own actions or certain messages, such as self-correcting English usage.	-	"I think there're many more redundant sentences like this one."
		-	"and when it was builded…." – when it was *built.