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同步與非同步線上交談：文本特色與對寫作的影響

Synchronous and Asynchronous CMC:

Textual Features and Effects on Writing

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中文摘要

以電腦為媒介的溝通方式(CMC)近年來使用於語言學習的課堂討論之用。先前的研究指出文本媒介(text mediation)是這種溝通方式的特色，並且可做為思考工具(thinking device)，幫助學習者思考、反思並修改他們的意見。CMC 有兩種模式: 同步和非同步的線上交談。這兩個模式的差別主要在於時間的延宕(time delay)與否，進而造成不同的文本特色。大體而言，同步線上交談較近於口語，而非同步線上交談較近於書寫的語言。

雖然先前有許多關於 CMC 的研究，它們大部分都著重在 CMC 和面對面的溝通之間的不同，或是 CMC 對於語言學習的影響。較少有研究比較同步和非同步線上交談文本特色之異同。此外，也少有研究線上溝通的過程，例如：輪流說話(turn-taking)、語意協商(meaning negotiation)和主題發展(topic development)。因此，本研究旨在比較同步和非同步線上交談的文本特色以及這兩種線上交談模式對之後的論說文寫作(essay writing)的影響。此外，本研究亦探討學生對於使用 CMC 的態度。

共有四十七名大一英文閱讀班的學生參與本研究。他們每兩人為一組，先以電子郵件(email)再以線上即時交談(MSN)為媒介進行討論。討論完後，學生填寫一份問卷，之後再寫一篇主題與討論問題相關之論說文。本研究所收集的資料包括這兩種討論模式下的對話記錄(text-based conversations)的文字檔、問卷、論說文。此部分的資料以量化分析的方式，檢視電子郵件和線上即時交談的文本

特色，包括：文字量、字彙範圍、句法的複雜度、口語表達(conversational expressions)、副語言特徵(paralinguistic cues)、有聲化的使用(vocalization)、表情符號(emoticons)的使用等。此外，也分析線上討論的過程中想法的管理(idea management)，包括輪流說話、語意協商、指涉之前所提過的訊息的言談策略(the discourse strategy of referring to previous messages)、主題發展、和立場表達(stance expressions)。學生的作文用於分析線上討論產生的想法是否有助於產生寫作題材。本研究所使用的問卷包含八個李克式量表(Likert scale)的問題和五個開放式(open-ended)問題，作為研究學生對於線上討論的態度。

研究結果顯示非同步線上交談所使用的字彙比同步線上交談略為正式，前者的句法結構也比後者複雜。但是，同步線上交談中所使用的口語化表達方式、有聲化的使用、副語言特徵、表情符號的使用都比非同步線上交談多。這顯示同步線上交談比非同步線上交談更口語化。對於想法的管理，非同步線上交談較同步線上交談少使用到輪流說話和語意協商。相反的，非同步線上交談卻比同步線上交談常使用到指涉之前所提過的訊息的言談策略，參與者在非同步線上交談中也有較多的機會發展主題。在這兩種模式中，學生多表達謹慎和謙遜的立場並且積極說服他人以接受自身的觀點。

研究並發現 CMC 對於學生的論說文寫作有正面的影響，因為寫作中所使用的想法有超過百分之六十來自同步與非同步的線上交談。至於學生對於使用線上交談的看法，大部分的學生都覺得用英文做深度討論有困難，這顯示教師如欲使用 CMC 作為課堂討論的媒介時，要注意學生的語言程度並適時提供足夠的指引。其他教學上的啟發包括 CMC 可以是一個好的課堂討論工具，因為與面對面的討論比較起來，學生在 CMC 的環境之下能較自在的表達己見。CMC 也可以作為寫作前的暖身階段，協助學生產生寫作想法。此外，同步線上交談可以有助於學生透過頻繁的交談和語意協商來發展言談能力。

ABSTRACT

Computer-mediated communication (CMC) has been used for classroom discussion in language learning. Previous studies have indicated that the feature of text mediation of CMC can function as a "thinking device," helping learners think, reflect, and revise their ideas. CMC has two modes: synchronous CMC and asynchronous CMC. The feature of time delay distinguishes these two modes, resulting in different textual features. In general, synchronous CMC is similar to oral language, but asynchronous CMC is akin to written language.

Although many studies have explored CMC, most of them focus on differences between CMC and face-to-face communication or the effects of CMC on language learning. Few of them compare the textual differences between synchronous and asynchronous CMC. In addition, little research has examined the process of electronic discussion such as turn-taking, meaning negotiation, and topic development. This study, therefore, aims to compare synchronous and asynchronous CMC in terms of their textual features and effects on subsequent essay writing. It further analyzes the process of the two electronic discussion modes. Students' attitudes towards CMC are also accessed.

Participants are 47 freshmen taking an English reading course. They are paired into dyads and engage in email discussion and MSN discussion. After the electronic discussions, students fill out an attitude questionnaire and write an essay. After data are collected, including the text-based conversations of both discussion modes, questionnaires, and essays, quantitative analysis is first conducted. The textual features of MSN and email discussions in terms of word production, vocabulary use, syntactic complexity, conversational expressions, paralinguistic cues, vocalization, and emoticons are examined. Then, the process of the electronic discussions is

analyzed with respect to idea management, including turn-taking, meaning negotiation, the discourse strategy of referring to previous messages, topic development, and stance expressions. Students' essays are used to examine the effects of the discussions on idea generation for writing. A questionnaire, consisting of eight 7-point Likert scale questions and five open-ended questions, is used to investigate students' attitudes towards electronic discussions.

The results show that vocabulary used in asynchronous CMC is slightly more formal than that in synchronous CMC and that the former is syntactically more complex than the latter. There are more occurrences of conversational expressions, vocalization, paralinguistic cues, and emoticons in synchronous CMC than in asynchronous CMC. This suggests that synchronous CMC is more like oral language than asynchronous CMC. For idea management, asynchronous CMC shows few occurrences of turn-taking and meaning negotiation while synchronous CMC has a lot of them. In contrast, in asynchronous CMC students use more frequently the discourse strategy of referring to the previous messages and have more opportunities to develop topics. The stance expressions in both modes are mainly used to show students' caution and modesty; in addition, students mainly tend to persuade others to accept their ideas when they use stance expressions.

It is also found that CMC can have a positive effect on students' essay writing because more than 60 % of the ideas used in essays are originated from the discussions. As for students' attitudes toward CMC, it is found that most students feel it difficult to discuss an issue in English and in depth through CMC, which suggests that language teachers have to take into account students' language proficiency and provide sufficient guidance when tending to use CMC as classroom discussion. Other pedagogical implications include that CMC can be a good medium for class discussion because students feel more comfortable to express their ideas in that

environment than in face-to-face situation and that CMC may be used as a pre-writing activity to facilitate idea generation for writing. In addition, synchronous CMC can be used to develop students' discourse competence through frequent turn-taking and meaning negotiation in English.

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CHAPTER ONE

INTRODUCTION

The development of computer technology is changing the world. It plays an important role in education. For example, teachers in the past used pictures and chalkboards in the classrooms, but nowadays they can use computers to present textual, visual, and aural information, making learning more interesting. With computer revolution, the rapid and wide spread of the Internet has shifted teacher-centered learning to student-centered learning (Berge &Collins, 1995) because the Internet can facilitate learner autonomy (Egbert, *et al*., 1999).

Although computers have some advantages in language learning, language teachers have to notice that it is not technology itself but the theories underlying the use of technology and the instructional design that facilitate learning and acquisition (Salaberry, 1996). In this chapter, I first discuss the theory and practice of computer-assisted language learning (CALL) in second language learning. Then how CMC, the major concern of this study, emerged as an influencing medium for language learning and its two modes, synchronous and asynchronous CMC, are presented, focusing on their different features. The application of CMC to language learning and its potential effects are also examined, particularly collaborative learning provided by CMC. Finally, the purpose of the study and the research questions are proposed.

Theory and Practice of CALL in Second Language Learning

The application of computers to language learning is called computer-assisted language learning, or CALL. The development of CALL was in line with the history

of language education; namely, structural / behavioral approach, cognitive approach, and sociocognitive approach (Warschauer & Kern, 2000).

For the structural / behavioral approach, language is viewed as structural units, and learners have to learn linguistic structures through memorization and repetition. In addition, the learning goal of students is mainly error-free language production. From this perspective, CALL programs are designed to provide enormous drills, to correct errors, and to give explanations or answers, just like teachers in traditional classrooms. However, the structural perspective on L2 learning is challenged by cognitive approach because cognitive linguists believe that Universal Grammar underlies all languages, and learners can acquire linguistic knowledge through the innate cognitive mechanism rather than reinforcement (Chomsky, 1957). Furthermore, the cognitive approach distinguishes competence from performance and focuses more on competence. Competence can be acquired through comprehensible input (Krashen, 1985). Students exposed to comprehensible input are more able to construct knowledge in linguistic environments. The role of the computer in cognitive approach is a helper or facilitator because the CALL tasks are used to encourage students to solve problems by themselves or establish new knowledge based on their old knowledge. However, such CALL programs still cannot provide genuine negotiation of meaning. Genuine negotiation of meaning occurs between human interactions in social contexts. Vygotsky (1978) maintained that language is the most important medium to convey thoughts for social interactions and learners are able to internalize language use into their own cognition by thought conveyance. This is the sociocognitive approach. Language learning should occur in social contexts and CALL tasks should be designed to provide learners with opportunities for interactions in context and facilitate negotiation of meaning.

The sociocognitive approach also emphasizes the importance of collaboration

through social interaction, which is crucial to language learning (Vygotsky, 1978). According to Gay and Grosz-Ngate (1994), collaborative learning can cultivate critical thinking, social skills, and the acquisition of knowledge. Collaborative learning in social contexts can be constructed through computer-mediated communication (CMC).

CMC has recently emerged and evolved to be the focus of CALL. With the development of the Internet, this new medium offers a channel for learners in different places to communicate with each other beyond space limitation, promoting interaction and collaboration among learners and increasing their exposure to authentic language use. Through CMC, learners have more chances to interact with native speakers and engage in real communication practice rather than predetermined and mechanical drills. The contextual information provided by authentic language use facilitates long-term memory that is also conducive to language acquisition. Furthermore, interactions through CMC can help the acquisition of general discourse competence. In general, CMC emphasizes the significance of social contexts to language learning (Chomsky, 1980, Hymes, 1972, & Crook, 1991). On the other hand, learners communicating through CMC are also given the opportunities to practice the functional use of language, leading to the acquisition of pragmatic competence. Noticeably, previous CALL programs based on the structural approach or cognitive approach did not offer social contexts and authentic language environments for learners. In contrast, - CMC-based tasks in the sociocognitive approach integrate language learning into real language use contexts.

Synchronous and Asynchronous Modes of CMC

There are two modes of CMC: synchronous and asynchronous CMC. Synchronous CMC refers to simultaneous communication online and interaction in

real time. Synchronous online environments include Internet Relay Chat (IRC), Multi-user Object Oriented text-based virtual reality site (MOO), Local Area Network (LAN), and other types. Asynchronous CMC refers to time-delayed communication using email, Bulletin Board System (BBS), electronic forums, and others. In other words, participants do not have to get online to communicate with each other at the same time. These two modes provide four types of electronic interaction; namely, one-way retrieval, one-to-one communication, one-to-many communication, and many-to-many conferencing (Salaberry, 1996). Both synchronous and asynchronous CMC share the features of text-based input, space-independence, and accessibility to previous entries (Black, *et al.*, 1983). In general, these shared features facilitate interaction, collaboration, and reflection. However, time delay is a salient feature to distinguish between synchronous and asynchronous CMC. It leads to inherent differences of the two modes of CMC in the nature of communication as well as textual features.

Communicative and Textual Features of the Two Modes of CMC

Time delay differentiates communication of synchronous and asynchronous CMC, making synchronous CMC similar to oral communication and asynchronous CMC similar to written communication. In synchronous CMC discussion, students tend to be more involved in the discussion by asking questions and giving feedback to their peers (Chun, 1994). The discussion in asynchronous CMC, in contrast, is similar to traditional classroom discussion because the discourse functions that occur in asynchronous CMC are akin to the sequence of communication in traditional classrooms (Sotillo, 2000). Moreover, the discourse threads of communication in asynchronous CMC are usually multiple because the time spent in turn-taking can be saved by carrying much information in one entry. However, the discourse threads of

communication in synchronous CMC can be either multiple-threaded or single-threaded according to the number of discussants.

The textual features of synchronous and asynchronous CMC are also different. The vocabulary used in synchronous CMC, in light of the similarity to speech, is usually informal and colloquial. The sentence structures are simple. On the contrary, the vocabulary used in asynchronous CMC, similar to writing, is more formal and the sentence structures are more syntactically complex. In synchronous CMC, discussants tend to emulate facial expressions and prosodic features of face-to-face communication in order to convey their feelings (Werry, 1996), but these non-verbal cues are seldom observed in asynchronous CMC.

Effects of CMC on Language Learning

The interactivity of CMC draws many ESL / EFL teachers' attention to its possible applications. Interaction through CMC, providing authentic contexts and real language use, not only helps students to negotiate meaning and obtain comprehensible input (Krashen, 1985) but allows teachers to design and implement a variety of collaborative learning tasks (Warschauer, 1997). The rationale of collaborative learning is based on Vygotsky's (1978) concept of zone of proximal development (ZPD), which holds that learners can improve their abilities by cooperating with teachers or other advanced learners.

Collaborative learning through CMC has been used in classroom discussions, which is referred to as computer-assisted class discussion (CACD) (Chun, 1994). Studies on the effects of CACD on language learning have been productive. Kroonenberg (1995) found that students' argumentation skills were improved after they had discussed the topics through emails. Warschauer (1996) indicated that collaborative learning through synchronous CMC helps students produce lexically

and syntactically more complex language, compared with face-to-face communication. Chun (1994) found that CACD can enhance collaborative learning in classrooms, improving students' interactive competence. Despite these strengths of CMC for collaborative learning, this online discussion mode is criticized for its inefficiency with respect to discussion aiming at consensus since it is harder for students to reach an agreement via electronic discussion in comparison to what they do in face-to-face communication (Sproull & Kiesler, 1991). Another disadvantage of CMC is the use of hostile language, or "flaming," when participants are more unrestrained to express their opinions (Warschauer, 1997). Moreover, online communication may sometimes become monologues (Moran, 1991) because some students may feel confused with the rapid interaction online. They may also be overwhelmed by the great amount of information so that their comprehension is hindered by information-processing difficulties, especially in a foreign / second language use setting.

Another application of collaborative learning provided by CMC is in the field of writing revisions. In writing classrooms, writing conferences are important for L2 students to improve their composition because through the discussion of a topic and topic-related ideas, students can more clearly understand their own weaknesses and reflect on the ways of revision (Zamel, 1985). However, the effect of face-to-face writing conferences on writing is not always positive because students' cultural background may affect collaboration in traditional classrooms. Carson and Nelson (1996) indicated that Chinese students are social-oriented, so they tend to maintain harmony within a discussion group. As a result, students in face-to-face writing conferences seldom criticize their peers' writing drafts. The relationship of peer collaboration is hard to be established under such circumstances.

Unlike face-to-face discussion, CMC can help students avoid embarrassing face-to-face criticism or expression of disagreement; thus, students tend to be more

open-minded and willing to reveal their innermost feelings since they feel that they do not criticize their peers in face (Bump, 1990). However, Liu and Sadler (2003) discovered that classroom discussions through MOO led to fewer revisions than face-to-face discussions. The possible reason might be that electronic discussions tended to derail the original topics, resulting in the inefficacy of writing revisions. More research is needed to explore this topic, particularly the relationship between idea generation in online writing conference and subsequent writing performance.

Purpose of the Study and Research Questions

Although many studies have investigated the effects of CMC on language learning, little research has focused on the differences between synchronous and asynchronous CMC in textual features and interaction process. This study, therefore, aims to compare synchronous and asynchronous CMC in terms of these two aspects. With respect to textual features, word production, vocabulary use, syntactic complexity, conversational expressions, paralinguistic cues, and emoticons are analyzed. Examination of the process of the two electronic discussion modes concentrates on turn-taking, meaning negotiation, topic development, stance expressions, and the discourse strategy of referring to previous messages. The effect of CMC on writing is also analyzed by calculating the CMC-generated ideas used in subsequent essay writing. Students' attitudes towards electronic discussions are investigated by administering a questionnaire survey. By comparing these aspects, we can understand how synchronous and asynchronous CMC are linguistically different, how students perform their collaborative tasks, how they interact during the electronic discussions, how they perceive the electronic discussions, and whether CMC can help essay writing. The research questions are proposed as follows:

(1) What are the textual features of synchronous and asynchronous CMC?

(2) How are these two modes of CMC different from each other in idea management, including turn-taking and meaning negotiation topic development, stance expressions, and reference to previous messages?

(3) Does CMC-based discussion have an effect on subsequent essay writing?

(4) What are students' attitudes towards the use of CMC for classroom discussion?

This thesis is organized as follows. In Chapter 2, I review in detail related literature. First, I discuss the theoretical premises of CALL, focusing on the importance of CMC. Then, I compare the textual features of synchronous and asynchronous CMC. The last part of the literature review centers on the applications of CMC to language learning, particularly collaborative learning. Chapter 3 describes the methods employed in this study, including the research design and procedure, participants, instruments, treatments, data collection, and data analysis. Data analysis focuses on comparing the textual features of synchronous and asynchronous CMC as well as accessing the students' attitudes towards the electronic discussions. Both quantitative and qualitative analysis are performed. Chapter 4 presents the results in response to the research questions, interpretation of the results, and pedagogical implications. Chapter 5 concludes the study and indicates the significance and limitations of the study.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews studies on CMC in detail. Five related topics are discussed and relevant literature is examined. The first section presents the theoretical premises of CALL. The second section then focuses on CMC, which is an important branch of CALL and the major concern of the present study. In the third section, synchronous and asynchronous CMC, particularly their textual features, are discussed, based on results from related studies. The next section emphasizes the applications of CMC in various areas of language learning, especially collaborative learning. Finally, the impact of CMC on writing is reviewed.

Theoretical Premises

As mentioned in Chapter 1, there are three stages in the development of CALL. The constructs of applying computers to learning evolve from structural perspectives, cognitive perspectives, to sociocognitive perspectives (Warschauer & Kern, 2000). At the first stage, that is, in the 1960s, structuralism was very popular and influenced greatly the practice of language teaching and learning. Language learning emphasized correctness of text. Teachers were convinced to teach linguistic categories and sentence structures. They also focused on comparing the structural differences between first language (L1) and second language (L2), believing that the comparison between two different languages could predict and prevent errors, which is known as contrastive analysis. In addition, behaviorism, accompanying structuralism, deeply affected language education; thus, students were asked to practice repetitively in order to achieve language accuracy. CALL programs at this stage were designed to provide

drills for students because teachers believed in the effect of habit formation on language achievements. Such primitive programs led to criticism and revolution as the cognitive approach got the momentum.

At the second stage of CALL development, the theoretical background was based on Chomsky's cognitive theory. Chomsky (1959) criticized the language instruction based on structuralism and behaviorism. He argued against habit formation and imitation; on the other hand, language acquisition is largely determined by innate cognitive structures. In other words, language learners are able to actively create and internalize linguistic knowledge. In the past, the computer controlled the learning content and the learning process, while learners merely passively received what was provided by the computer. The new CALL programs, based on the cognitive premises, were designed to facilitate meaningful and creative learning rather than memorize knowledge by repetition. These CALL programs were characterized by problem solving and hypothesis testing (Papert, 1980). For example, the invention of multimedia videodisc program exploited a new way for combining CALL with language instruction. One program, called *la rencontre de Philippe*, assembled video, sound, graphics, texts, transcriptions, glossary, and a video album. Multimedia is characterized by computerized systems which can create, store, transmit, and retrieve texts, pictures, and audio data. Murray (1991) indicated that the use of multimedia for language learning should emphasize discourse structure and functional use of language. However, the advocacy of the use of multimedia is disputable because it is still questionable whether the mere presentation of knowledge can lead to knowledge construction and whether students can develop metacognition during the interaction with computers. Therefore, linguists turned to develop Intelligent CALL (Underwood, 1989). The computers of Intelligent CALL featured artificial intelligence, which was derived from Gardner's multiple intelligences (1983). In other words, the computers

became sophisticated systems which were able to teach complex problem-solving skills.

According to Salaberry (1996), intelligent computers should be able to present subject knowledge, understand learners' learning models and language systems, and adjust the instruction, like what the "real" teachers do. Although the computer systems in the 90s have been much elaborated, they still failed to meet the three criteria mentioned above except for the provision of subject knowledge. By providing subject knowledge, intelligent computer systems can be considered a database, or thesaurus, beneficial to grammar teaching (Weizenbaum, 1976; Anderson, 1990). However, inability of computers to assess learner needs may impede the development of individual learning strategies and interactive teaching and learning (Garrett, 1995). Until this stage, linguists had been trying to replace real teachers with artificial tutors, but failed finally. It is because the interaction between the computer and the learner cannot simulate the intricate situation of real learning process and real language use.

While Chomsky's transformational-generative grammar was widely acknowledged by language teachers, Hymes (1971) proposed the important notion of social construction for language learning. The focus of language learning shifted from the development of individual cognition to meaning negotiation and knowledge co-construction. These two characteristics facilitated the development of communicative competence, a term created by Hymes (1971), which emphasizes the ability to produce suitable language in appropriate social contexts, such as address forms, the topics of different speech events, and the time for opening and closing. The major components of communicative competence, including grammatical competence, sociolinguistic competence, discourse competence, and strategic competence, were afterwards discussed and elaborated (Canale & Swain, 1980; Canale, 1983). From a sociocognitive perspective, the goal of language learning in classrooms is to train

students' abilities to extend what they have learned in the class to what they may encounter outside the class. Therefore, interaction with peers in real language use environments can help students acquire the various components of communicative competence. The goal of writing instruction, influenced by the trend, was transformed from individual development to collaboration, which is altruistic and heuristic. For example, students are encouraged to help each other in the learning process and explore knowledge through interaction with peers.

The third stage of CALL development was thus based on the theoretical premises of the sociocognitive approach to language learning. The main role of the computer is no longer an artificial tutor or peer to interact with the learner but a medium linking learners in different places to communicate in the cyberspace. Therefore, it is called computer-mediated communication (CMC). CMC has two modes. One is synchronous and the other is asynchronous. Synchronous CMC (SCMC) includes many types, such as MOO, IRC, ICQ, and LAN. Asynchronous CMC (ACMC) comprises email, BBS, and news groups. The remarkable feature of CMC is to promote interaction and collaboration between learners because it allows more than one student to communicate with each other simultaneously without the limitation of time or space and without immediate interruption, which frequently occurs in face-to-face communication.

In traditional language classrooms, some learners, especially low-level or shy, are usually unwilling to participate in classroom discussions or contribute much less to the discussions than their counterparts who are high-level or aggressive. However, this unpleasing situation is avoided when learners discuss through computer networks because the equality of participation between or among students is elevated (Sproull & Kiesler, 1991). Moreover, the interaction between L1 and L2 writers via asynchronous CMC may influence L2 writers' language output, leading to native-like

language (Davis and Thiede, 2000). To conclude, the advantages of CMC can be illustrated by Warschauer and Kern (2000: 12):

> Computer-mediated communication provides an ideal medium for students to benefit from interaction because the written nature of the discussion allows greater opportunity to attend to and reflect on the form and content of the communication.

According to what has been discussed, CALL theories and practice can be summarized in Table 2.1 (see the next page).

Table 2.1 *CALL Theories and Practice (Adapted from Warschauer and Kern, 2000)*

	Structural	Cognitive	Sociocognitive

What is language?	Language is a structural system, consisting of lexicons, clauses, and sentences.	Language is a mentally constructed system.	Language is a social semiotic.
How is language learned?	Language structures are internalized through memorization and imitation.	Language is learned through the operation of innate cognitive mechanism.	Language is learned through social interaction and can be assimilated to the styles of others' language.
What is / are the goal(s) of instruction?	Students should produce well-formed language.	Instruction should develop students' cognition and facilitate students to generate individual learning strategies.	Teachers have to provide a speech community for students to negotiate meaning by interacting with peers.
How to achieve the meaning of language?	Meaning is understood by listeners and readers.	Students can activate existing knowledge to achieve meaning.	Meaning is achieved when students are interacting with their interlocutors in specific discourse contexts.
What is the role of computers?	Computers should provide endless practice and correct answers. Therefore, computers serve as artificial tutors.	Computers have to provide comprehensible language input.	Computers should offer authentic communicative environments.

CMC

Computer-assisted language learning has become a popular concept in the field of language teaching and learning. The purpose of integrating CALL into language instruction is to help language teachers teach various language skills more effectively,

providing the benefits that traditional language classrooms cannot offer. For instance, many web sites offer animation to graphically explain grammar (e.g. http://www.grammarfree.com.tw/TW/index_2.asp), pronunciation, and other language rules. In addition, the interactive software on computers allows students to learn language based on their own interest and pace, and provides immediate feedback. Good interactive software gives comprehensible input (Krashen, 1985) to students. However, language learning without interaction is not sufficient. Nowadays, the computer, transcending its previous roles, can not only provide comprehensible input, but also create authentic environments for interaction and collaboration between or among students. Therefore, students can cooperate to complete their tasks, discuss to exchange ideas, and even learn from each other. Collaborative learning, or cooperative learning, can increase students' academic achievement and affective development (Slavin, 1980). Hyland (2003) further maintained that writing via computers was the most instrumental model to achieve collaboration. There are many ways to integrate the use of computers into writing; namely, using computers to facilitate drafting, proofreading, and formatting, combining written texts with visual and audio media, or providing exposure to online discourse communities. In this study, I will focus on classroom discussions using computer-mediated communication as pre-writing activities.

What Is CMC?

CMC represents computer-mediated communication. In other words, the computer acts as a medium to bridge interaction between humans. Nowadays, when we discuss the importance of CMC, we refer to the enhancement of interaction between human beings via computers because the nature of interaction has been greatly emphasized by second language learning (Pica, 1994).

The definition of CMC varies according to the viewpoints of different

researchers. Hiltz and Turoff (1978) created the term CMC, a mode of electronic communication including email, bulletin board, Internet Relay Chat (IRC), email discussion list, chat room, and the World Wide Web (WWW). These modes focus on mutual communication between humans through computers. Santoro (1995) broadened the term CMC to encompass not only the transfer of information but also the storage and retrieval of electronic resources from computers among human beings. Nonetheless, Warschauer (1999) constrained the meaning of CMC by emphasizing messages sent to either one receiver or a number of receivers, thus focusing more on single-way communication. Murray (1997) (as cited in Murray, 2000) centered on the interactivity of CMC by indicating that the most interactive mode was instant electronic messages, and the least, billboards. Murray (1988) also regarded the electronic mode of discussion as a means of communication because participants were able to interact with each other by shifting from one mode to another (e.g. from synchronous to asynchronous), or from one medium to another (e.g. from synchronous CMC to asynchronous CMC) since human beings can alternate between spoken or written modes based on speaker / hearer, field, and setting. Howard (1997) did not use the term CMC to describe this type of electronic communication. On the contrary, he named the new technology "networked texts." Murray (2000) also redefined Herring's (1996a) opinion of CMC by saying that communication of CMC was based on text. The text-based communication of CMC has been highlighted as one of the important features and this crucial characteristic of CMC enables students to record their thinking as well as discussing process.

Features of CMC as Communication

CMC shares some features with oral and written language, respectively, so CMC is regarded as a new variety of language (Collot & Belmore, 1996; Crystal, 2001). For the purpose of understanding the features of CMC as communication, it is necessary

to understand the features of oral and written language as communication.

According to Thorne (1997), the three important components to analyze a spoken or written text are mode, manner, and field. Mode refers to written or oral language. Manner refers to the relationship between the speaker and the listener or the writer and the reader. Field refers to the subject matter. Although most types of text could be identified in terms of mode, manner, and field, it is difficult to categorize "genres" by dichotomy (Murray, 1988; Collot & Belmore, 1996). For example, public speeches, although in the form of oral language, are much more like written language in terms of textual features (e.g. less personal involvement). Email, which is presented in the form of written language, can be formal or conversational depending upon the purposes and relationship between the sender and the receiver (for example, commercial email vs. academic email) (Gains, 1999). Simply put, we speak and write in a variety of ways due to different audience, purposes, and contexts.

Thorne (1997) analyzed the features of spoken and written language in terms of nature, audience, style, and function. The salient differences between speech and writing lie in their nature of transience or permanency. Speech is considered spontaneous and transient, but writing is permanent and allows to be re-read for several times. As for CMC, it obscures the distinction between these two modes because the users of CMC "write down" what they talk, but it has the nature of "talk" that makes CMC differ from written language. In addition, except for telephone communication, the speakers/listeners in a spoken context are usually face-to-face, but in a written context, a particular reader may be present (e.g. a personal letter) or absent (e.g. an academic essay). In CMC, physically present audience is not available, and the participants may or may not know their interlocutor. It depends on whether the participants know whom the pseudonym represents. The maintenance of communication in spoken context relies on the paralinguistic features and words;

however, in written context, due to the physically absent audience as well as postponed feedback, the writers have to cautiously organize the texts to avoid ambiguity. In CMC, participants are unable to communicate face-to-face, but some of them create specific emoticons that imitate the paralinguistic features in face-to-face communication (Werry, 1996).

To analyze the turn-taking behavior in CMC communication, it is beneficial to use the framework provided by the analysis of face-to-face conversation. Thorne (1997) analyzed turn-taking in conversations and classified the process into five speaker moves:

(1) Framing: to create an overall structure, such as openings and closings

(2) Initiating: to build a topic

(3) Focusing: to specify the direction of a topic

(4) Supporting: to maintain the discussion of a topic

(5) Challenging: to interrupt a topic or start a new one without mutual agreement.

The speaker moves in conversations are applied to the data analysis in the present study for analyzing topic development in both synchronous and asynchronous CMC.

Spoken language is replete with deictic expressions (e.g. *this one*, and *just now*), reflecting the moment; however, in written text, constrained by the distancing of the writer and reader, all references are retained in order to make the meaning explicit to the reader. For CMC, Collot and Belmore (1996) held that it was not particularly situation-dependent or explicitness-oriented. The participants in a spoken context are able to interrupt an ongoing conversation, especially in informal conversations, but interruptions and overlaps do not occur in written communication. In CMC; however, the situations are a little complex due to the synchronicity or asynchronicity of CMC. Computer-assisted class discussion which is synchronous CMC seldom has overlaps because the turns flow rapidly, and in asynchronous CMC it is even more unlikely to

have overlaps because of the feature of time delay (Black, Levin, Mehan, & Quinn, 1983). With respect to style, spoken language is usually unplanned and full of slips, while written language is often planned and accurate. In CMC communication, because of time constraint, the language produced in synchronous CMC is similar to that in spontaneous conversations; in contrast, the participants in asynchronous CMC have more time to compose their text and thus make fewer errors (Sotillo, 2000). Furthermore, vocabulary is usually informal in oral communication, but more formal in written communication. The sentence structures of oral communication are replete with multiple coordination, while the sentence structures of written communication are often full of multiple subordination (Thorne, 1997). Vocabulary use and grammatical structures can reflect the degree of language complexity.

People in oral communication can make good use of the prosodic features and facial expressions to negotiate meaning; however, people in written communication use writing conventions like paragraphing, capitalization, and question marks to convey thoughts. In CMC, people are able to use the writing conventions to emulate spoken language (Werry, 1996; Gains, 1999). Spoken language is considered a powerful social tool seeing that it helps develop social relationships and facilitates idea expressions. Written language is conducive to recording ideas. CMC possesses both the advantages of spoken and written language because its synchronous features benefit rapid idea conveyance and the computer itself serves as an archive to store and retrieve the ideas.

Collot and Belmore (1996) established an electronic language corpus (ELC) and analyzed the corpus based on Biber's multidimensional-multifeature model. This model examines different genres in terms of six dimensions. First, language of different genres can be information-oriented (written language) or involvement-oriented (speech). Second, some genres can be narrative, like romantic

fiction and general fiction, while other genres are non-narrative, like broadcasts and official documents. Third, language in different genres can be situation-dependent or explicit. The use of WH-relative clauses makes the meaning more explicit; however, references to time, places and events, in light of the background adequately understood by the reader, are more situation-dependent; thus, the meanings of these references can only be realized when participants are highly involved in the discourse context. Fourth, some genres are greatly persuasive, like personal letters and editorials, using numerous conditional subordinations and infinitives, but other genres use more factual statements, like broadcasts and press reviews. Fifth, some genres are filled with abstract information, using past participial clauses (e.g. academic prose). On the other hand, language of other genres is much more non-abstract (e.g. telephone conversations). Last, unplanned language, like spontaneous speeches and interviews, elaborates on information by using demonstratives and THAT-clauses as adjective complements or verb complements. Other genres, such as mystery fiction and adventure fiction, which are much more planned by the writers, use few markers of unplanned types of informational elaboration.

Collot and Belmore (1996) found electronic language had the features of more involvement in the shared context, non-narrative statements, overt expression of persuasion, abstract information and unplanned types of informational elaboration; however, it was in the middle of the two ends: situation-dependent and explicit. The results showed that “speakers” and “listeners,” when discussing via computers, are greatly involved in their common interests and share the same knowledge. Since people intend to communicate using CMC, electronic language tends to be non-narrative and overtly persuasive. The most important characteristic of Biber’s model is that the researcher did not regard oral language and written language as two separated systems. On the contrary, the linguistic features and communicative

functions of the two systems overlapped in terms of the six dimensions.

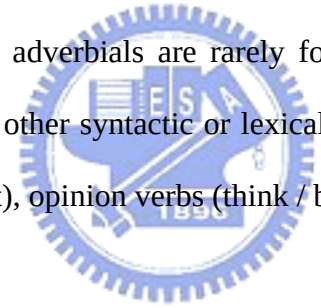
Yates (1996) compared the linguistic characteristics among oral, written language and CMC discourse in terms of type / token ratios, lexical density, personal reference, and the use of modal auxiliaries. Type / token ratio is used to examine the range of different words in all the words produced, and lexical density refers to the proportion of content words in all the words produced. He found electronic language and written language showed similarity in terms of type / token ratios and lexical density, but had greater percentages compared with speech. One of the values of this study is that the author explicitly indicated the differences between CMC, written language and speech. Participants in CMC used more first and second-person pronouns than in speech and writing. The result agrees with that by Collot and Belmore (1996). In this study, third-person pronouns occurred scarcely in CMC than in the other two modes; this is also consistent with Collot and Belmore's study, showing the non-narrative feature of CMC. Furthermore, it was revealed that CMC had more occurrences of modal auxiliary than speech and writing. Among the five categories of modal auxiliary, hypothetical, volition, possibility, ability and obligation, it was the frequencies of modals of abilities and possibilities that differed CMC from speech and writing. Despite the discrepancy, the contextual use of modal auxiliary showed resemblance between CMC and speech. This is probably a reflection of what Spitzer (1986) noted, " …. use language as if they were having conversation, yet their message must be written (p19)."

In order to further explicate the differences between oral and written language, we have to refer to Biber and Finegan (1988)'s study. They investigated the adverbial stance types in different genres and identified eight categories. The purpose of analyzing adverbials was that they show stance in English lexically. The eight categories are as follows: (1) secluded from dispute (the *surely* adverbials seems to

show the speaker's emphatic conviction, but indeed solicit the listener's empathy and agreement over the speaker's assertions) , (2) face-to-face conversation (the *actually* adverbials emphasize the speaker's strong feelings of certain accretions and encourage a sense of solidarity between discussants), (3) emphatic shared familiarity (the *actually* adverbials, especially in highly interactive speech, aim to maintain the dialogues), (4) faceless (the texts do not explicitly show attitudes or commitment towards the messages), (5) emphasis of individual position (the *actually* adverbials serve the function of emphasizing one's own idea), (6) generalized content (the *generally* adverbials show a claim as a general case), (7) cautious (the *maybe* adverbials present careful evaluation of specific assertions or conclusions), and (8) concession to reader or listener (the *surely* adverbials pretend that the speaker / writer accept others' ideas but indeed persuade others to accept his own idea). Of these eight categories, some adverbials reoccur while others do not. *Surely* adverbials occur in category (1), (5), and (8) with the varied frequencies. For example, *actually* adverbials occur in category (2), (3), and (5) with the varied frequencies of occurrence. However, category (6) is marked by the frequent occurrence of *generally* adverbials, category (7) is marked by the frequent occurrence of *maybe* adverbials, while category (4) is absent from any specific adverbial markers. According to Biber and Finegan (1988), highly interactive discourse, such as face-to-face conversation and telephone calls, is replete with *actually* and its variations (actually adverbials), such as *really (in fact)* and *you know*, to show familiarity and solidarity between the speaker and the listener. However, *actually* adverbials in category (5), across spoken and written genres, are aimed to enforce the speakers' or writers' position against other possible arguments. Less interactive discourse, such as public speech and editorials, is filled with *surely* and its variations (*surely* adverbials), *of course*, *obviously*, *undoubtedly*, *no doubt*, and *certainly*. By using these adverbials, the speakers assume that the listeners have

acknowledged the information and expect to solicit affirmation from their listeners. However, the use of *surely* adverbials in category (8), across spoken and written genres, shows that the speakers or writers concede to their listeners or readers superficially, but want to persuade their arguments, as a matter of fact. In this case, *surely* adverbials are usually followed by *but*. Chafe (1982), in particular, indicated that the texts of highly interactive and less interactive discourse both require the participants' great involvement in the spoken situations.

For written genres or the least interactive discourse; namely academic prose and official documents, *generally* and *in general* are frequently used, showing impersonality. In addition, *maybe* and its variations, *about, presumably, it may be assumed*, *perhaps*, and *probable*, are explicitly used to show the writers' caution for their claims. However, these adverbials are rarely found in spoken genres. This is because speakers tend to use other syntactic or lexical forms to express their doubts; namely modals (could / might), opinion verbs (think / believe), and negation.



Synchronous and Asynchronous Modes of CMC

CMC emphasizes interaction between people through either synchronous or asynchronous modes. Synchronous modes require learners to be online simultaneously in order to communicate. On the other hand, asynchronous modes allow learners to log in the Internet anytime. Communication occurs in non-real time, so the degree of interactivity is lower than that in synchronous modes. The feature of time delay distinguishes the two modes and influences their discourse structure (Black, Levin, Mehan, & Quinn). The feature of asynchronicity allows students to read the messages, conceive their ideas, and respond to the messages at their own pace, which are what students in synchronous CMC can hardly achieve. Another difference is that the flow of turn-taking in asynchronous communication is slower than that in

synchronous communication due to the lack of immediate interlocutors (Abrams, 2003). The time spent in turn-taking in asynchronous modes is longer than that in synchronous modes, leading to possible textual differences in syntactic complexity, lexical richness, lexical density, and other textual features. Nonetheless, the two modes can both provide extensive practice for negotiation of meaning either between learners or between learners and the teacher (Chun, 1994).

The similarities and differences of synchronous and asynchronous modes are shown in Table 2.2.

Table 2.2 *Similarities and Differences of Synchronous and Asynchronous CMC (adapted from Abrams, 2003; Black, Levin, Mehan & Quinn, 1983)*

	Synchronous modes	Asynchronous modes
Similarities	1. Both are in the form of written text. 2. The communication can be recorded. 3. Students do not have to communicate at the same place. 4. Students have more opportunities to interact with peers or the teacher. 5. The amount of participation in class discussions is increased. 6. Language is lexically richer and more diverse. 7. Textual features are characteristic of both written and oral language.	
Differences	1. Students have to respond immediately. 2. Real time.	1. Students have enough time to plan their responses.

	3. More like single-threaded.	2. Non-real time. 3. More like multi-threaded.

Synchronous CMC

There are various types of synchronous CMC. Here I will focus on some popular and well-known modes. One of the widely used types for class discussion is Local Area Network (LAN), such as *CommonSpace* and *InterChange* (Hyland, 2000). Much previous research on computer-assisted class discussion (CACD) was conducted on the use of LAN. Many teachers have indicated that LAN can promote students to talk more than they do in traditional classroom discussions, helping students create more writing than before on the basis of peer brainstorming. In other words, discussion by LAN contributes to collaborative learning. However, the disadvantage of this mode is that less proficient students may lose important information while discussing with others since the flow of chat is more rapid than the flow of asynchronous CMC. The advantages and disadvantages of LAN are shown in Table 2.3.

Table 2.3 *Advantages and Disadvantages of LAN (Adapted from Hyland, 2000)*

Possible advantages	Possible disadvantages
1. Students are allowed equal status, reducing social cues, such as gender, race, and others. 2. Low-level and shy students are encouraged to discuss. 3. Teacher dominance is reduced. 4. Language output is increased.	1. It is still questionable whether CACD can improve writing quality. 2. The rapid flow of discussion may lead to disconnected discourse and impede low-level students to keep up with the flow. 3. Overt teacher decentralization may

5. Teacher-student interaction can be enhanced because the teacher is able to hold small-group conferences. 6. The retrieved texts of discussion facilitate students to develop ideas and give comments. 7. The recorded transcripts help the teacher to track and evaluate students' performance.	lead to arbitrary and ineffective discussion. 4. Hostile language may occur and deteriorates the atmosphere of collaborative learning. 5. Peer feedback, if - training is not provided, will not help students to reflect and revise their drafts. 6. Discussion is restricted to labs, abridging extensive practice out of class. 7. Students' negative attitudes towards CACD may affect their performance.

Most of the advantages and disadvantages of LAN also occur in other synchronous modes, reflecting the strengths and limitations of CMC for collaborative learning. Unlike LAN, which assembles students to discuss at the same place, such as a lab, other modes, like ICQ (ICQ. com), Yahoo! Groups (http://groups. yahoo.com), and MOO (Multi-user Object Oriented text-based virtual reality site), are more flexible, allowing students to communicate at a distance. ICQ, like LAN, allows students to discuss in various modes, such as one-to-one, one-to-many, and many-to-many, simultaneously. Yahoo! Groups is a kind of chat rooms. One of the differences between these two modes is that participants in ICQ can retrieve their conversation, but participants in Yahoo! Groups cannot. However, Yahoo! Groups allows the teacher to control who can join the group and who can post messages, facilitating the teacher to guide classroom discussions. This advantage is what LAN

lacks. MOO differs from previous modes because it provides virtual environments, in which the real world contexts are constructed, such as schools, banks, coffee shops, and others, and participants interact with others in simulated situations. The construction of virtual environments can also facilitate collaborative learning through interaction with authentic audience (Hyland, 2003).

Textual Features of Synchronous CMC

Computer-mediated communication shows similarities to oral and written communication, so its textual features are also affected by both oral and written language. However, there are differences between synchronous CMC and asynchronous CMC. The textual features of these two modes have been examined in a number of studies (Abrams, 2003; Black, Levin, & Quinn,; Gains, 1999; Sotillo, 2000, & Werry, 1996).

The discourse structure of language consists of sequences and forms a linear organization (Grimes, 1975). Take face-to-face classroom conversations for example, the discourse structure of a two-participant conversation is a single thread, involving many adjacency pairs. Even if more than two persons participate in the conversation and the discourse structure becomes more complex, it still shows a single thread. This is because face-to-face interaction rarely has gaps or overlaps. If the single thread is ruined, participants would spontaneously recover the sequence of conversation. In other words, the overlaps of speaking are unlikely to occur (Mann, Moore, Levin, 1977; Crystal, 2001). Mann, Moore, Levin, and Quinn (1977) analyzed the discourse features of a synchronous mode, USC TENEX, revealing that the real-time conversation between two students was similar to single-threaded face-to-face conversation. Although one of the participants asked two questions within an entry, the interlocutor replied to them one at a time. However, we have to notice that when there are more than two persons in synchronous CMC, one of the participants is able

to initiate topics to a group of people at the same time. As a result, more than one topic can be discussed simultaneously, intertwining multiple threads in terms of the overall conversations (Sotillo, 2000). Participants in synchronous CMC are not physically constrained because the participants are typing rather than speaking, so message senders and message receivers are able to create multiple threads in each entry, but most of the message receivers tend to follow the discourse structure of face-to-face interaction by replying one question at a time (Black, Levin, Mehan, & Quinn, 1983).

Crystal (2001) indicated that in synchronous CMC the distinctive feature of overlapping in speaking makes new participants more circumspect when they decide to join in the ongoing conversation. In addition, new participants have to adopt specific conversational strategies or conform to the expectations of the group, or they may be excluded. In response to the rapid flow of information exchange, participants tend to produce simple sentences or sentence fragments. A sentence is usually simplified by the use of abbreviations (e.g. msg = message) and colloquial elisions (e.g. r = are) as well as the omission of internal sentence punctuations, final periods, apostrophes from contracted forms, and auxiliary verbs. Moreover, typographical errors, ignorance of capitalization, and nonstandard grammar, such as the discord between subject and verb, are frequent and allowable. The text in synchronous CMC is replete with creativity because the participants are good at fusing running words together (e.g. what a unifreakinversitynerd), joining several words by hyphens (e.g. dead-slow-and-stop computer), and even inventing new jargons (e.g. bamf, which is from a comic book).

Werry (1996) investigated the textual features of Internet relay chat (IRC), a type of online chat rooms, discovering that the electronic language was similar to oral language in terms of abbreviations, paralinguistic and prosodic cues, and gestures.

The participants tended to shorten their sentences in response to the rapid flow of communication, so the maximum of six words was appropriate in an entry to express meaning and attract others' attention. Syntactically reduced forms were extensively used, including subject pronoun deletion, auxiliary omission, acronyms and symbols (e.g. <ariadnne> ← is fine…. The arrow referred back to the speaker "ariadnne"), and reduction in phonology (e.g. cya=see you). The use of capitalization, spelling, and punctuation was sometimes purposeful to imitate the voice and tone in oral language. Asterisks enclosing a string of words and graphical icons were used to illustrate the nonverbal signals that were absent in CMC. These features indicate that synchronous CMC reflects many similar communicative features to informal speeches.

From the discussion above, we know that synchronous CMC is relatively colloquial and full of nonstandard usage. Although these distinctive features vary to a certain extent in different communities, they are considered the marks of group identity (Crystal, 2001).

Asynchronous CMC

The other type of electronic communication is asynchronous CMC. This mode of CMC is generally considered to be similar to traditional writing because even if electronic communication is ended, the text-based communication can be stored. Take asynchronous chat rooms for example, the messages can be saved and sorted based on different topics, dates, or authors. This is like an electronic archive. Asynchronous communication includes emails, newsgroups, bulletin boards, and others. Emails allow students to compose what they want to talk before sending the messages to people worldwide. This kind of writing creates an appropriate environment for students to practice writing with real audience, so the experience of writing emails can be transferred to other writing tasks (Pennington, 2003). Crystal (2001) indicated that email is a medium between writing and talking. For writing, the fixed header structure

of email is similar to memo and the use of greetings and farewells as well as some informal written features in the message body are like an informal letter. Because of the features of spontaneity, speed, privacy, and leisure, the degree of informality in email is more capricious than that in traditional writing. Compared with traditional written genres, emails can get a quicker response than letters. For talking, emails seem to represent a dialogic style that can be constructed asynchronously. However, emails, as a medium of communication, are limited in that emails have not been used as conventional letters, like contractual letters, and that in emails, degraded language, such as e-bullying (Crystal, 2001), sexual harassment, and libelous language, may spread without control. Despite the limitations, the discourse of emails features more emotions, feelings, and attitudes of the discussants and a greater variety of styles, from formal to informal. Crystal (2001) maintained that email is a useful medium for children to develop their ability to keep their stylistic expressions consistent in interesting and motivating ways.

In addition to the benefits of emails in writing practice, other types of asynchronous CMC also benefit students in language learning in different ways. For example, a bulletin board provides many topics, and students can choose which one to read and which one to respond. Therefore, students are very autonomous in the learning process, enhancing their participation in discussions. The bulletin established for the class can create a sense of community, which is very important for second language learning because students can learn through collaboration. A newsgroup allows students to send email, discussing specific topics through Usenet, a service. A newsgroup is like a site of chat rooms. However, the communication in a newsgroup is asynchronous, but the communication in chat rooms is synchronous. The participants in a newsgroup come from different countries, so students have many opportunities to communicate with people from different cultural backgrounds,

enhancing their cultural awareness (Hyland, 2003, Warschauer, 1997).

Textual Features of Asynchronous CMC

Unlike the variation in the discourse structure of synchronous communication, the sequence of communication in asynchronous modes is multi-threaded (Grimes, 1975). The texts of multiple threads have more than one topic in each entry. This difference from synchronous communication is mainly due to the feature of time delay. In asynchronous modes, students are unable to immediately receive the electronic messages after they send messages to their peers; thus, they tend to ask more than one question each time in order to save the time of turn-taking. Black, Levin, and Quinn (1983) discovered that students used more conditionals and connectives in texts because these two features facilitated more information to be carried for each entry. Norman & Bobrow (1975) indicated that the complexity of discourse structure, either in real time or non-real time, may be affected by our cognitive resources that are used to process information. People are unable to manage huge information (e.g. many topics) within limited time, so the discourse structure of real time communication tends to be single-threaded. It is also noteworthy that asynchronous CMC is filled with explicit reference to previous messages, usually by means of quotations or paraphrases (Crystal, 2001). According to Davis and Brewer (1997), the extensive lexical repetition was a salient feature in their students' electronic conference and the trace of this repetition was crucial to observing topic shifts. Herring (1996) found that electronic writing generally involves an introduction, a message body, and a close. Crystal (2001) indicated that the message body in emails is dialogic because the respondents are able to insert their response under the specific message that they want to reply, sometimes with a trimmed original message as the new message. This direct reference to the previous message in email writing is similar to the recapitulation of others' points in face-to-face communication.

Gains (1999) compared the textual features of commercial emails and academic emails, finding that participants communicating through commercial emails tended to follow the conventions of formal business letters while academic emails were more similar to informal speech. However, both genres showed conformity to written language with regard to the use of compression, word omission, and the use of discourse functions. Compression and word omission are two features of oral language, but did not often occur in emails. In commercial emails, three discourse functions were found: informative functions, requests, and directives. In academic emails, there were only informatives and requests. The less versatility of discourse functions, compared with synchronous CMC, is an important feature of asynchronous CMC, resulting in less interactivity. Analysis of commercial emails further revealed features similar to written language in terms of register. Through these asynchronous modes, participants showed consistency and semi-formality in their communicative styles. The fewer types of discourse functions of asynchronous CMC, in comparison with the diverse register styles of synchronous CMC, showed consistency in discussants' communicative styles. In addition, participants pursued grammatical correctness in communication and showed no conversational discourse features. Take imagined echo questions for example:

A: Do you think it's a good idea? For me, I don't think so.

Although this kind of imagined echo questions occurred frequently in face-to-face communication, it is seldom used in written communication.

Vocabulary in spoken language is usually informal, but in many written contexts, informal vocabulary is inappropriate (e.g. an essay). Multiple coordination is frequently used in oral communication, while multiple subordination occurs frequently in writing. The use of vocabulary and grammatical structures reflects the degree of language complexity. The electronic language appears to be a more complex

language than spoken language (Warschauer, 1996) because in oral communication people make use of prosodic features when negotiating meaning, while written communication usually conforms to standard writing conventions, such as paragraphing, capitalization, and punctuation marks. In electronic communication, however, participants usually make good use of writing conventions to emulate spoken language (Werry, 1996; & Gains, 1999). For example:

A: nooooooo, you CAN'T do it!!!

The participant capitalized "can't" and used exclamation mark to emphasize his attitude in electronic communication.

Spoken language is considered a powerful social tool because it can spontaneously develop social relationships among the participants. On the other hand, written language is conducive to recording ideas. CMC involves both the advantages of spoken and written language.

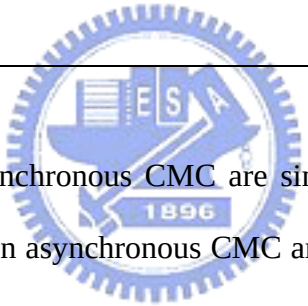
Comparison of Synchronous CMC and Asynchronous Modes of CMC

Time delay in asynchronous CMC distinguishes it from synchronous CMC. This feature also leads to their differences in communicative features and textual features. One of the most salient differences between these two electronic modes is the amount and range of discourse functions used by the participants-. Chun (1994) argued that students in synchronous CMC used a variety of discourse functions, impressively showing the ability of discourse management. Another study also supported the argument by identifying 14 discourse functions in synchronous CMC, whereas asynchronous CMC only contained four discourse functions (Sotillo, 2000). The discourse functions in these two electronic modes are shown in Table 2.4, taken from Sotillo (2000).

Table 2.4 *Discourse Functions of Synchronous and Asynchronous CMC (Sotillo,*

2000)

Synchronous CMC	Asynchronous CMC
1. Greetings 2. Topic initiation 3. Assertions / Imperatives 4. Requests 5. Responses 6. Adversarial moves 7. Reprimands 8. Off topic comments 9. Topic shift moves 10. Humor 11. Information requests 12. Floor holding moves 13. Corrective moves 14. Closing moves	1. Topic initiation moves 2. Student responses 3. Teacher responses / comments 4. Student comments or responses to other students



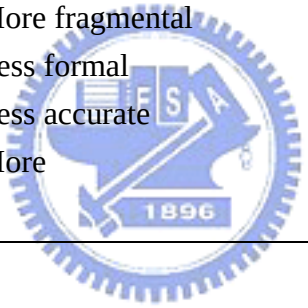
The discourse functions in synchronous CMC are similar to those in conversations while the discourse functions in asynchronous CMC are similar to those in traditional classrooms discussions. The results reveal that synchronous CMC is more able to offer the opportunity for social interaction, or negotiation, and collaborative learning, which are crucial to language learning (Swain, 1985).

Another salient difference is linguistic complexity. Sotillo (2000) held that the text of asynchronous CMC was lengthy and syntactically complex. In addition, students in this mode produced more grammatically correct clauses. This is because participants in this mode have more time to compose and revise their writing, thus producing more complex structures and focusing more on form. On the other hand, students in synchronous mode are more constrained in time; therefore, they -produce shorter and syntactically more simple structures. They emphasize more on expression of ideas. In addition to discourse management and linguistic complexity, research has

also revealed differences in the degree of interaction, discourse structure, consistency of style, quantity of word production, degree of formality, accuracy of grammar, and use of paralinguistic cues. The differences of these two electronic modes are shown in Table 2.5 below**:**

Table2. 5 *Differences of Synchronous CMC and Asynchronous CMC*

Features	Synchronous CMC	Asynchronous CMC
Interactivity	More interactive	Less interactive
Discourse structure	Single threaded or multiple threaded	Multiple threaded
Discourse functions	More diversified	Less diversified
Consistency	Less consistent	More consistent
Word production	Less	More
Syntactic complexity	More fragmental	Less fragmental
Formality	Less formal	More formal
Grammar	Less accurate	More accurate
Prosodic features and nonverbal cues	More	Less



CMC in Language Learning

Egbert and Hanson-smith (1999) summarized eight principles qualifying language learning environments: (a) learners have opportunities to interact and negotiate meaning; (b) learners interact in the target language with an authentic audience; (c) learners are involved in authentic tasks; (d) learners are exposed to and encouraged to produce varied and creative language; (e) learners have enough time and feedback; (f) learners are guided to attend to the learning process; (g) learners work in an atmosphere with ideal stress / anxiety level, and (h) learner autonomy is supported.

In the 1980s, writing teachers in America were the pioneers to apply CMC to

instruction. Those writing teachers were attracted by the interactivity of CMC. Besides, students were given more opportunities to practice writing and low-level students could be helped as they cooperated with teachers or advanced peers. Moreover, computer networks could create authentic environments for students to learn and practice their target language.

CMC for Collaborative Learning

The activities that students engaged in through CMC are considered to be authentic tasks with meaningful purposes. Vygotsky (1978) underscored the power of authentic tasks because these tasks require students to interact with others in order to complete the tasks. They simulate real-world language use tasks. Because of interaction with authentic audience for meaningful purposes, students are involved in negotiation of meaning. According to Krashen (1985), students interacting with authentic audience through computers have to negotiate meaning and then obtain comprehensible input.

In traditional classrooms, time limitation is a harmful factor that may impede interaction because students do not have enough time to think and perform a task. Fortunately, the feature of time-and-space independence (Warschauer, 1997) of computers provides flexibility for language instruction because students can collaboratively complete their tasks inside or outside the class, or discuss issues synchronously or asynchronously. Through collaboration, students can help their partners learn as well as reflect over their own ideas. In other words, students are encouraged to monitor and evaluate their own learning process, which helps develop their cognition (Vygotsky, 1978; Zellermayer, Salomon, Globerson, & Givon, 1991).

A learning environment with facilitative apprehension, a kind of apprehension that can push students to learn better, (Brown, 1987; Krashen & Terrell, 1983; Lozanov, 1978) and learner autonomy (Egbert, 1999) is apparently important for

language learners. CMC can provide collaborative environments, in which a learning community is formed. The environments of CMC also encourage the participation of shy foreign language students and allow students to discuss by their pace and according to their interests without explicit teacher interference.

What Is Collaborative Learning?

Collaborative learning is a process of student empowerment (Freire, 1970) because knowledge learned through social interaction can be internalized and learners are able to control or master knowledge. Pilkington (2004) argued that CMC offers opportunities for collaboration, influencing the results of learning. In order to comprehend the relationship of collaboration and learning outcome, we can examine the two theories first: input and output hypothesis and sociocultural theory.

Krashen (1985) proposed Input Hypothesis, which emphasizes the importance of comprehensible input to language acquisition. When we focus on collaborative learning, it means language learners will use or invent their own conversational strategies to negotiate meaning with others in order to make input comprehensible. On the other hand, Swain (1985) indicated that comprehensible output is as crucial as comprehensible input in language learning. Successful communication requires students to understand others and to be understood. Therefore, students are expected to undergo a process of negotiation. Comprehensible input and comprehensible output are two indispensable elements for classroom interaction, either in traditional settings or in cyberspace (Warschauer, 1997). However, it seems these two theories do not clearly illustrate several problems involved; for example, how collaborative learning helps students to develop literacy skills or critical thinking skills (Heath, 1983; Wells & Chang-wells, 1992).

Vygotsky's (1978) zone of proximal development (ZPD) provided the basis for many researchers to discuss collaborative learning. Wertsh and Biven (1992) proposed

the constructs of modeling and text mediation to further explicate Vygotsky's theory. The former indicated that the teacher played a role model for students to follow. The latter considered text to be a "thinking device" (Lotman, 1988; Wertsh and Biven, 1992). Wells and Chang-wells (1992) maintained that learners' thinking is developed through collaborative learning.

Students, communicating by means of texts, negotiate meaning in order to understand their interlocutors' opinions. Therefore, text mediation facilitates students to express their ideas, develop critical thinking by reflection, and resolve problems by collaboration.

Applying CMC to Collaborative Learning

Collaboration is considered to be an important element in learning because it provides students a sense of community, so students are more willing to devote themselves to knowledge co-construction and feel they are equal within the community (Palmer, 1990).

Computer networks have been used to facilitate classroom discussions; this model is called CACD. The application of this model alternates the traditional teacher-student and student-student relationships. The teacher is more a facilitator than a dominator in CACD. The decentralization of teachers' control promotes students' collaboration, helping students attach new information to old knowledge through text mediation. Batson (1988) described this kind of interaction as "new pedagogical dynamics." Online communication collapses the far-reaching IRF sequence in traditional classrooms. The so-called IRF sequence represents that the teacher initiates students' learning, students then respond to the teacher's elicitation, and the teacher "follows up" to evaluate responses (Mehan, 1985). Electronic discussion; on the other hand, reduces teachers' interference and enhances students' collaboration. The text-based communication serves as a "thinking device" (Lotman,

1988; Wertsh and Biven, 1992) and helps students reflect over the text of their communication after they collaboratively interweave the electronic discourse. In addition, students are allowed more autonomy to control their language learning process, deciding what topics to discuss and when to discuss a certain topic (Garrison & Baynton, 1978), leading to the development of critical thinking and more language production. The sense of freedom derived from learner autonomy by CACD is meaningful to marginalized students (Faigley, 1990). Additionally, more amount of self-expression through CMC is essential to language learning. Abrams (2003) reported on one of his studies in which students participated in WebCT chat room, a synchronous mode; students produced more language output than those in the non-CMC environment and those in the asynchronous CMC environment.

Chun (1994) investigated the functions of sentences produced by 15 students in 14 sessions of CACD. The results showed that questions raised by students to the entire group or to specific individuals were almost nine times as many as those to the teacher. The author also found a great proportional use of statements, creating a new topic or elaborating on an existing topic which hardly occurred in traditional classrooms. However, in traditional classrooms, it is usually the teacher to make statements. The high frequencies of manipulating statements by students revealed that learners discussed via CMC had more opportunities to manage discourse, compared with students in traditional classrooms. These significant findings indicate that CACD can enhance collaborative learning in classrooms, contributing to the improvement of students' interactive competence.

Emails, one type of asynchronous modes, are regarded as a useful mode to facilitate complex writing and problem-solving. Kroonenberg (1995) maintained that students' argumentation skills were improved after they had discussed the topics through emails. Kern (1995) also glorified the effect of CMC on argumentation and

writing.

Warschauer, Turbee, and Roberts (1996) indicated that although collaboration could be achieved through many different forms of learning, online communication was a more beneficial form. For example, students can interact with each other without time and space restraints, so the possibility of collaboration is increased via CMC. The written text of CMC allows students to organize their ideas without haste and develop critical thinking.

Strengths and Limitations

The application of CMC to collaborative learning, as discussed above, benefits language learners because the increased amount of interaction between students makes the classroom more learner-centered, helping students produce more language and improve their language skills.

Leeson (1975) and Kelm (1992) indicated that electronic discussion could improve linguistic fluency and accuracy. In synchronous CMC, students have to manage a great amount of language within limited time, so they have to cultivate fluency in order to maintain the rapid flow of conversation. Additionally, students have to communicate in appropriate forms and vocabulary in order to negotiate meaning. Warschauer (1996a) expressed that collaborative learning through synchronous CMC helps students to produce lexically and syntactically more complex language than they did in face-to-face communication. Students discussing via computers produce more complex subordination and more formal language than - in the face-to-face environment. The production of complex language and formal language reflects the nature of written texts of CMC. Warschauer (1997) proposed five features of CMC, including time and place-independent communication, long distance exchanges, one-to-one distant exchanges, many-to-many distant exchanges and hypermedia links. These features, if used properly, can powerfully improve

language learning as well as cross-cultural understanding. Kern (1995) conducted an exchange between his French-class students in the United States and history-class students in France, observing that many students were satisfied to discuss via CMC because they learned more about the history of that country and even learned what they originally studied in other classes, such as sociology and anthropology. This kind of cross-cultural collaborative learning through electronic discussion can help students develop more general skills, which are very important in the future society (Cummins & Sayers, 1990, 1995).

Moreover, CMC can help the development of speaking ability because it is similar to face-to-face communication in containing extensive social and language functions (Abrams, 2003). Fraser (1999) even described CMC as “semispeech.” CMC can also improve students’ thinking and writing skills. The relationship of these two skills indicates that when students are writing, they develop and organize their ideas simultaneously. Therefore, writing via computers facilitates thinking (Kroonenberg, 1995).

Although there are many strengths of using CMC for collaborative learning, it may be regarded as an inefficient tool to reach consensus. In a large group discussion, when the participants who took part in the discussion late are expressing their opinions, other group members might have almost made a conclusion, which can be far from the viewpoints of the latter participants. In this situation, CMC seems to diminish conformity and convergence (Sproull & Kiesler, 1991). Another disadvantage of CMC is the occurrence of hostile language, or “flaming” (Warschauer, 1997). Students do not see each other face-to-face when discussing via CMC, and they communicate with pseudonym most of the time. As a result, some students may attempt to challenge the conventions and manners established in this speech community.

Certain students are confused with the rapid interaction online because they are overwhelmed by the great amount of information and their comprehension is hindered by language difficulties. Consequently, online communication may become monologues (Moran, 1991). Teachers' access to students' text-based discussion may destroy learner-centered or autonomous environments offered by CMC because students' online performance may be influenced and changed by predicting and catering for teachers' preferences. In addition, students' cultural background usually affects the degree of their acceptance of CMC environments because students in a more hierarchical society tend to believe in their teachers' instruction rather than their peers' comments or evaluation.

The Impact of CMC on Writing

CMC emerged as a new kind of medium for communication because people talk to each other by "writing down" their utterances. People can communicate through synchronous and asynchronous CMC, and the difference in time-delay between these two modes causes the differences in textual features. Regardless of all of the discrepancies, CMC, synchronous or asynchronous CMC, facilitates learners to think, write, interact, and reflect over their own ideas (Warschauer, 1997).

According to Zamel (1985), writing conferences were important for L2 students to improve their composition because through the discussion of related topics and ideas, students could understand more clearly weaknesses of their own writing and ways of revision. Furthermore, Goldstein and Conrad (1990) maintained that in face-to-face writing conferences between the teacher and students, students who participated actively in discussions were more able to revise their drafts in depth than those who did not participate actively. In other words, the greater participation of students in writing discussions contributed to better revisions. CMC can encourage

students to participate more actively in discussions and enable them to negotiate meaning within social contexts; thus, students are more able to revise their drafts at the level of language strategies and organization strategies. In general, online writing conferences can maintain the advantages of face-to-face writing conferences. Pennington (2003) held that CMC-based discussion could encourage L2 students to write and revise in response to a real audience in order to obtain more input as their writing materials. In addition to searching for the resources to cultivate their own ideas, students also learn to practice writing. Computer-based writing is sharply contradictory to pen-and paper writing. In pen-and-paper writing, students, as a rule, plan before writing; however, in computer-based writing, students can plan while they are writing. In this way, writing is not based on an abstract plan; instead, it is based on some concrete text that has already been produced. Planning, writing, and revising comprise the writing cycle of computer-based writing, but do not take place in a fixed order. This writing cycle of computer-based writing benefit L2 writers.

In addition, CMC-based discussion has a competitive edge compared with face-to-face discussion. The effect of face-to-face writing conferences on the improvement of writing is not always uplifting because students' cultural background may affect collaboration in traditional classrooms for several reasons. Carson and Nelson (1996) indicated that Chinese students were social-oriented, so they tended to maintain harmony within a group. As a result, when they made comments on their peers' writing face-to-face, these Chinese students seldom criticized the drafts or disagreed with their peers. On the contrary, they were more enthusiastic to reach consensus and to agree with others' opinions. All of these features showed that Chinese students avoided being authoritative or offensive; therefore, students hardly have the opportunity to revise their drafts on the basis of constructive peer feedback.

Unlike face-to-face discussion, CMC can encourage students to be honest to

reveal their innermost feelings (Bump, 1990). Students are able to generate more ideas by electronically discussing with their peers than by face-to-face discussions (Gallupe, Bastianutti, & Cooper, 1991). Kroonenberg (1995) found that online discussion could improve students' thinking as well as writing skills. In addition to idea generation, the feature of long-distance exchanges and the use of hypermedia for CMC can encourage collaborative writing by publishing learners' work through the Internet and getting feedback from their peers (Warschauer, 1997; Hyland, 2003). Students also benefit from reflecting over their own writing and developing evaluation- in the process of interaction (Mendonca & Johnson, 1994). This is the advantage of peer editing, and through CMC, students are allowed to perform the task without time and space limitation. Warshcauer (1996a) also found that CMC showed language formality and syntactic complexity, compared with face-to-face communication. These two features are important to the improvement of writing.

The text-based communication enables students to record their discussions with peers, providing them the materials to reflect and revise their writing. Revising is very important to the development of writing ability. However, Liu and Sadler (2003) discovered that classroom discussions through MOO led to fewer revisions than through face-to-face communication; the possible reason was that electronic discussions tended to derail the original topics, resulting in the inefficacy of writing revisions. This disadvantage of CMC should be taken into account when teachers want to apply CMC to writing collaboration.

To summarize, electronic discussion can increase negotiation of meaning, participation in learning activities, and collaborative learning, improve the quality in form and content, and facilitate writing revisions. On the other hand, teachers should be mindful in the use of computers because CACD may not reach the expected goals at the end of instruction. In addition to the pedagogical implications, the literature in

related fields have focused on the comparison of textual features of CMC with oral and written language or interaction through CMC between genders, cross-cultural students, peers, teachers and students, and others. However, there are limitations of research on CMC. First, the development of CMC is a new branch of CALL; therefore, the rigidity of its methodology should be established. Second, little research has been done on the features of CMC in English as second language (ESL) environments / English as foreign language (EFL) environments. Last, technologies change rapidly, so it is likely that when we are introduced the functions of these technologies, they are already obsolete. Therefore, the pace of research has to keep up with the shift of technologies (Murray, 2000). These limitations can provide suggestions for further research on CMC in the hope of providing a better understanding of CMC in the future.

CHAPTER THREE

METHODS

The present study aims to compare students' performance in synchronous and asynchronous CMC. As revealed from the literature review in the previous chapter, these two discussion modes are characteristic of different registers, particularly along the various features of written and spoken language. This study, therefore, intends to investigate such differences in terms of textual features, idea management, effects on subsequent essay writing, and students' attitudes towards CMC.

Methodologically, the study uses both quantitative and qualitative analysis. For example, analysis of textual features is primarily quantitative, but analysis of idea management involves various moves in the discussion process; thus, qualitative content analysis of the text-based conversation is required. The effects of CMC on essay writing are analyzed by comparing the number of CMC-based ideas (GE ideas) and the non-CMC based ideas (NE ideas) used in essay writing. Finally, the students' attitudes are elicited by means of a questionnaire.

This chapter describes the pilot study, participants, instruments, procedure and tasks, data collection, and data analysis.

The Pilot Study

A pilot study was conducted before the main study to ensure the feasibility of the present study. This was also partly because an online discussion program was developed and its reliability needed a test. The participants were twelve non-English majors in a freshmen English reading class. The reading textbook was at the intermediate-high level chosen by the instructor. The participants were paired into six

dyads and discussed questions via a self-designed synchronous online system, *Online Discussion*. The questions were derived from one of the articles that had been taught before the pilot study. *Online Discussion* is composed of three frames. The upper left frame presents the article selected for online discussion; below this frame is the input frame where the participant keys in his/her ideas; and the right frame shows the complete conversation of the dyad. The presentation of the selected article can help participants to refer back to the article more easily in the process of discussion and the presentation of the conversation provides participants the opportunity to reflect over what has been talked about in order to facilitate discussion. The text-based discussion was saved automatically in the data bank of the system for analysis. However, the system was unstable when a number of dyads were online for discussion at the same time. Considering the drawback and the time pressure for my thesis study, the medium used for synchronous CMC in the present study was changed to MSN, the popular chatting software.

Participants

The participants were 47 freshmen in a university in northern Taiwan. They were all science-major undergraduates, taking an English reading class aiming to improve their English skills as required by the university. The undergraduates' English proficiency ranged from the intermediate to high-intermediate level based on the instructor's observation although English proficiency might vary individually. The reading textbook was an high-intermediate English magazine and the article chosen for discussion was taught before the electronic discussions. The topic of the chosen article was about a new video game developed by *Nintendo*, a Japanese company, called *wii*. Seeing that the new video game was very popular among young people, the reading-based CMC discussion was expected to attract students' attention and

encouraged them to actively take part in the discussions. Moreover, the participants had been using email and MSN for communication; however, they used Chinese to communicate, rather than English, and the purpose was for casual talks, instead of learning.

Instruments

The medium used for asynchronous CMC was email and the medium for synchronous CMC was MSN. Both media are widely used by most Taiwanese undergraduates. They allowed students to communicate either one-to-one, one-to-many, or many-to-many. The additional functions of MSN, such as the use of pre-designed facial expressions, animations, and calling signal, provide more choices for students to express their emotions in electronic communication. Unlike MSN, email provides less additional design, but both email and MSN permit the participants to store and retrieve messages. This function of CMC makes it significantly different from face-to-face interaction in that communication through CMC is not as transient as the latter.

Procedure and Tasks

The 47 participants were randomly paired into 23 dyads (one of the dyads had three students) and engaged in two tasks, email discussion and MSN discussion. After the electronic discussions, students filled in the attitude questionnaire on the spot and wrote the essays about the topics they discussed as the assignment.

Electronic discussions

The students participated in email discussion, asynchronous CMC, followed by MSN discussion, synchronous CMC. Each discussion session was limited to 30 minutes and conducted in a computer lab. During the discussions, students were

allowed to refer to the chosen article in order to facilitate their discussions. In addition, the students were given two questions based on the chosen article in each discussion session as a prompt for discussions. The questions used in email discussion were different from those used in MSN discussion (Appendix C). The use of different questions, rather than same ones, in the two discussion sessions was to ensure that the content of MSN discussion would not be affected by email discussion. The purpose of using questions related to the reading article was that the participants had some knowledge or information about the topics in concern prior to the electronic discussions. In this way, unfamiliarity with or misunderstanding of the topics could be diminished.

In email discussion, each participant in the same dyad was suggested to express his / her opinions about the questions raised by the article at first and emailed his / her partner. After reading his / her partner's email, each participant gave comments and provided answers based on his / her partner's email. The participants were also advised to complete each entry within 10 minutes because it was expected that more interactions through emails between participants could be elicited, or they might be confused whether they should take the initiative or wait for the other's email. However, the greater interactivity of MSN was unlikely to cause such a problem, so no suggestions were given to the participants in the synchronous discussion session. The content of email and MSN discussion was saved respectively in the form of text for data analysis.

Questionnaire

After the electronic discussions, the students were given a questionnaire to reveal their perceptions of using electronic discussions for learning. The questionnaire consists of two parts. Part A contains eight 7-point Likert scale questions. This part was adapted from the questionnaire by Gallupe *et.al.* (1991), originally used to

investigate students' attitudes towards electronic brainstorming. However, in the present study, this part focused on four issues; namely, how easy and comfortable students feel when discussing through computers, how many opportunities students feel they have to express their own ideas, and how difficult it is to express ideas in English through computers. Part B contains five open-ended questions for the purpose of understanding students' prior experience of using electronic discussions, their like and dislike of the electronic discussions in the present study, and their opinions about face-to-face discussion and electronic discussion. The statements in the questionnaire were written in Chinese to avoid any possible misunderstanding of the statements.

Essay writing was required as an assignment to be handed in by emailing to the researcher. In essay writing, students had to write down their thoughts in response to the questions they discussed via computers.

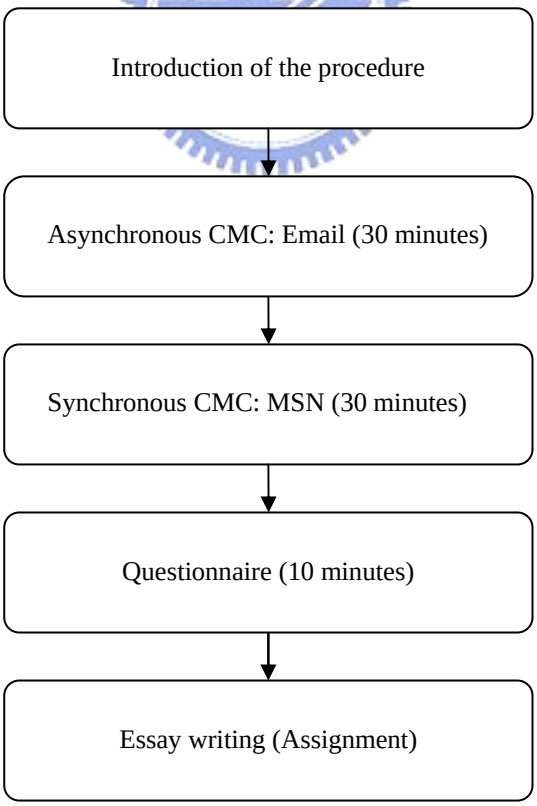


Fig. 3.1 *The procedure of the research design*

Data Collection

Data collected in this study included transcripts of the text-based conversation of synchronous and asynchronous CMC, questionnaires, and essays. The conversations in synchronous and asynchronous CMC were saved as text files and analyzed quantitatively and qualitatively, as described in the section of data analysis. The questionnaire aimed at exploring students' attitudes towards electronic discussions regarding their feelings of the process of electronic discussions, and the opportunities for idea expression and idea generation. Essays were written and emailed to the researcher later. The essay writing task was used to examine the effect of CMC on writing by comparing the number of ideas used in essay writing which were generated from electronic discussions and that not generated from electronic discussions.

Data Analysis

Data analysis consisted of four parts, namely, textual features, idea management, effects of CMC on essay writing, and students' attitudes towards CMC. Textual features included students' performance in synchronous and asynchronous CMC in terms of word production, vocabulary use, syntactic complexity, conversational expressions, vocalization, paralinguistic cues, and emoticons. These features were analyzed quantitatively by comparing the frequencies in both electronic modes. *t-test* was used to examine whether significant difference existed between the frequencies of the two modes. Idea management was analyzed qualitatively and quantitatively with regards to turn-taking, meaning negotiation, topic development, and the discourse strategy of referring to previous messages, and stance expressions. The differences in the approaches to idea management and the frequencies of these approaches in both discussion modes were compared. The average inter-rater reliability was 0.86 with regard to syntactic complexity, conversational expressions, paralinguistic cues,

emoticons, vocalization, turn-taking, meaning negotiation, discourse strategy of referring to previous messages, topic development, stance expressions, and GE as well as NE ideas. Agreement was reached after further discussions for places where the two raters coded differently. For the questionnaire, in Part A, the mean of each question was calculated in order to understand how students perceived each question. Moreover, students' opinions stated in the open-ended questions were analyzed qualitatively, so their attitudes towards CMC could be elicited in depth. In the following section, the textual features and idea management are further explained. Analysis of textual features consists of type / token ratio, lexical density, vocabulary use, and syntactic complexity.

Type- token ratio

According to Chafe and Danielewicz (1987), type / token ratio is the number of different words (types) divided by the total number of running words (tokens). In the present study, the analysis of type/token ratio could reveal students' ability to produce different words, or students' vocabulary repertoire, in synchronous and asynchronous CMC, respectively. For instance,

> But experts say the problems are more widespread and are likely to get worse. A handful of companies create, print and score most of the tests in the U.S. and they're struggling with a workload that has exploded since President Bush signed the education reform package in 2002 (CNN. com).

The number of different words in the above short passage is 40 while the total number of running words is 50, so the type / token ratio is 0.8.

Lexical density

Although a lot of corpus-based studies use type / token ratio as a measure of lexical density, the study adopted Halliday's definition of the term (1985). Halliday

(1985) distinguished content words from grammatical (or functional) words. Grammatical words include determiners, pronouns, most prepositions, conjunctions, some classes of adverbs, and finite verbs. Lexical density can be derived by dividing the number of lexical items (content words) by the total number of running words. Two examples from Halliday (1985) are provided in the following to compare the lexical density of spoken language and written language:

(1) If you invest in a rail facility, this implies that you are going to be committed for a long time.

(2) Investment in a rail facility implies a long term commitment.

In the first example, the lexical density is 0. 35 (7 divided by 20), but in the second one, the lexical density is 0. 7 (7 divided by 10). Halliday indicated that the first example, having a lower lexical density, was akin to oral language while the second one, having a higher lexical density, was akin to written language. From lexical density, we could understand students' ability to produce content words in synchronous and asynchronous CMC.

Vocabulary use

The vocabulary levels used in the study include K1 words, K2 words, and academic vocabulary. K1 words refer to the first 1000 high-frequency words and K2 words refers to the 1000th to 2000th high-frequency words. Academic vocabulary refers to the words in the Academic Word List (Coxhead, 2000). The present study compared the vocabulary levels in synchronous and asynchronous CMC in order to investigate the nature of students' vocabulary use in CMC.

Syntactic complexity

The measurement of syntactic complexity varies a lot. Some researchers used

T-units (Sotillo, 2000), while others used C-units (Abrams, 2003). In this study, the degree of syntactic complexity of students' language production was analyzed in terms of simple sentence, compound sentence, complex sentence, and compound-complex sentence, which were used by Chun (1994) to analyze the complexity of students' language production via synchronous CMC. The definitions and examples of these four terms are given below：

(1) Simple sentence: a sentence with an independent clause.
Ex: I like swimming.

(2) Compound sentence: a sentence with two or more than two independent clauses joined by coordinating conjunctions, such as *and*, *or*, and *but*.
Ex: The Japanese discipline their children severely *and* the crime rate is low.

(3) Complex sentence：a sentence with a combination of an independent clause and at least one dependent clause. The main clause is connected to the subordinate clause by a subordinating conjunction, such as *after, although, because*, *before*, *if*, *since,* etc.
Ex：I agree that teachers can corporally punish students *because* children should be disciplined.

(4) Compound-complex sentence：a sentence with a combination of two or more independent clauses and one or more dependent clauses.
Ex: The package arrived in the morning, *but* the courier left *before* I could check the contents.

Another type of compound sentence is a sentence that uses a semicolon instead of a coordinating conjunction to join two independent clauses.

Ex: I agree on corporal punishment; some people strongly oppose it.

Conversational expressions, paralinguistic cues, and vocalization

Spoken genres are usually less formal and full of conversational expressions, paralinguistic cues, and vocalization. Conversational expressions include

conversational lexis and colloquial expressions (Thorne, 1997), such as *yeah*, *cos*, *the thing is*, *in a minute*, and the like. Paralinguistic cues refer to the non-verbal cues such as intonation and stress. Vocalization is used to express speakers' feelings, such as exhilaration, hesitation, anger, etc.

Emoticons

Emoticons are the icons that the users of CMC create to mimic facial expressions. They are the outstanding features in CMC in comparison with written genres. Therefore, the present study investigated what emoticons students generated and what role the emoticons played in the process of electronic discussions.

Idea management

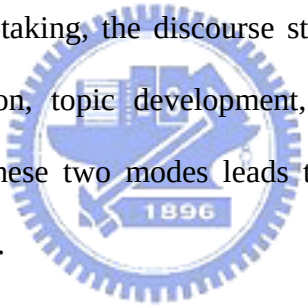
Idea management consists of turn-taking, meaning negotiation, topic development, the discourse strategy of referring to previous messages, and stance expressions. Turn-taking and meaning negotiation was analyzed by means of conversational analysis (Coulthard, 1977), including how students take turns and how they negotiate meanings when confusion or misconception took place during electronic discussions. Topic development was analyzed by using the framework for conversation analysis, including framing, initiating, expanding, and challenging, which was modified from the framework in Thorne (1997), for the purpose of understanding how students started and closed a conversation, whether they collaborated to maintain the conversation or not, and how they maintained the conversation. The framework used in this present study consists of opening and closing, initiating (the establishment of a topic); expanding (the focusing and supporting of a topic), and challenging (the interruption of the current topic or the introduction of a new one). The use of the discourse strategy of referring to previous messages has a connection with the use of turn-taking. In the less interactive communications, this discourse strategy is highly used. Moreover, stance expressions

were analyzed to understand how students expressed opinions and showed attitudes.

CHAPTER FOUR

RESULTS AND DISCUSSION

The present study compares science-major undergraduate students' textual performance and idea management in synchronous and asynchronous CMC. Moreover, the study also investigates the effect of CMC on essay writing and students' attitudes towards CMC by using a questionnaire. Textual performance in the two discussion modes is compared in terms of seven textual features; namely, word production, vocabulary use, syntactic complexity, conversational expressions, paralinguistic cues, vocalization, and emoticons. Idea management in the two modes is compared in terms of turn-taking, the discourse strategy of referring to previous messages, meaning negotiation, topic development, and stance expressions. The difference in turn-taking in these two modes leads to the different occurrences of referring to previous messages.



Textual Features

Word production and vocabulary use

The analysis of word production and vocabulary use is aimed to reveal the amount and the kind of words our target learners used in synchronous and asynchronous discussions. Table 4.1 shows the results of word production and vocabulary use in email and MSN. No significant difference is found in average student's word production, type-token ratio, and lexical density in the two modes. The very small difference of word production per person may be caused by students' incapability of using English for in-depth discussion because it was observed that the students frequently resorted to online resources like electronic dictionaries to help

them express their meaning. Since the students spent much time searching for appropriate words and expressions, the discussion time was greatly reduced and hence the amount of word production was small in both synchronous and asynchronous CMC. Moreover, Yates (1996) found that the type/token ratio and lexical density are both higher in writing than in speech. Based on the feature of time delay, synchronous CMC is similar to speech while asynchronous CMC is similar to writing, so the type/token ratio and lexical density of email should be higher than those of MSN. Nevertheless, the results in this study are different from Yates (1996). It is again probably due to students' incapability of using English for in-depth discussion. Since the vocabulary use might be restrained by their low language proficiency, the vocabulary use in email and MSN discussion shows little difference.

Table 4.1 *Word Production and Vocabulary Use in Email and MSN*

	Email	MSN	*p-value*
Tokens	3599	3568	
Types	665	723	
Entries	79	591	0.813
Word production per person	105.85	104.94	0.315
Type-token ratio	0.18	0.20	0.324
Lexical density	0.51	0.51	

N = 34, Significant at $p<.05$

Further analysis of students' vocabulary use is shown in Table 4.2. Slight difference is revealed in the level of vocabulary use in the two modes. MSN discussion involves more K1 words, or the first 1000 high-frequency words in the General Service List (GSL), and K2 words, or the second 1000 high-frequency words in GSL, than email discussion; however, email discussion contains more words in the Academic Word List (AWL) than MSN discussion. The results suggest that in emails,

students tended to use more academic words than in MSN.

Table 4.2 *Level of Vocabulary Use in Email and MSN*

	Email (%)	MSN (%)
K1 (1-1000)	83.58	83.77
K2 (1001-2000)	3.39	3.50
AWL	2.75	2.63

Syntactic Complexity

The present study measured syntactic complexity by means of the use of simple sentences, compound sentences, complex sentences, and compound-complex sentences. As shown in Table 4.3, MSN discussion contains more sentences than email discussion. However, among the sentences produced in MSN discussion, simple sentences constitute a very high percentage (65%) which is even much higher than the total of the other three types (35%). On the other hand, it is found that both compound and complex sentences have a higher percentage in email discussion than in MSN discussion. This shows that the text produced in the former is syntactically more complex that that in the latter. The result also corresponds to a previous study that indicated that students tended to use more conditionals, which make up complex sentences, and connectives, which make up compound sentences, in the texts of asynchronous CMC because the two textual features help more information to be carried in each email and reduce the time spent in turn-taking (Black, *et al.*, 1983).

Table 4.3 *Use of Four Sentence Types in Email and MSN*

Type	Email		MSN	
Simple sentence	133	(46%)	220	(65%)
Compound sentence	44	(15%)	33	(10%)
Complex sentence	89	(31%)	56	(17%)

Compound-complex sentence	23	(8%)	27	(8%)
Total	289	(100%)	336	(100%)

As students produced similar amounts of different words, content words, and words in total in email and MSN discussion, which might result from their language deficiency, language teachers have to heed students' language proficiency when applying CMC to language learning. It is suggested that low-level learners require more teacher guidance before and during the online discussion. Further, the vocabulary use and sentence types, shown in Table 4.2 and Table 4.3, imply that students used more informal words and simple sentences in MSN discussion, while using more formal words and syntactically complex sentences in email discussion. The features of language formality and syntactic complexity in email discussion probably make it suitable for writing practice since the two features are important to writing improvement (Warschauer, 1996a).

Conversational expressions

Thorne (1997) held that the lexis occurring in speech is usually more informal compared with the lexis in writing because people tend to use many conversational words (e.g. *yeah, cos, and all right*), colloquial idioms (e.g. i*n a minute and as far as I can see*), clichés (e.g. *that's life*), and exaggerations (e.g. *really stupid and thousands*) during speaking. In the present study, the four features are called conversational expressions and examined in the two discussion modes in order to understand students' use of lexis.

Table 4.4 shows the conversational expressions in the two modes. MSN discussion contains five times more conversational expressions than email discussion. The reason may be that MSN discussion is stylistically similar to oral communication, so the participants naturally used many conversational expressions. The most

frequently used expression is the lower case *i* in MSN discussion. The lower case *i* resembles *cos* because they both mimic the sounds of *I* and *cause*. The frequent use of the first-person pronoun can be interpreted from two perspectives. One is that the participants in MSN discussion are more involved in the shared contexts by enthusiastically expressing their own ideas such as *i (I) think, i (I) try, i (I) agree*, and others. According to Yates (1996), the first and second-person pronouns are used more frequently in spoken contexts than in writing. The other is that the use of *i*, instead of *I*, indicates that students tended to pursue meaning expression rather than the writing convention in the very interactive MSN discussion. A similar case is the use of the Arabic numerical *88* to replace *bye-bye* since the Chinese pronunciation of 88 is similar to that of *bye-bye*. The focus on meaning expression in MSN discussion facilitates participants to take turns in a more rapid and convenient way. The result suggests that MSN might be a good medium for meaning-focused task in language learning.

Moreover, more than half of the conversational expressions are fixed phrases and occur in MSN discussion, such as *give it a try*, *hurry up*, *let me think*, etc. It is possible that constraint of time is characteristic of real-time communication and fixed phrases are one of the ways to facilitate rapid processing (Leech, 2000). Among the fixed phrases, *it's gonna be*, the sound variation of *it's going to be*, only occurred in MSN discussion and for one time. The sound variation usually occurs in oral communication. For example, *want to* may be voiced like *wanna*. Lacking the knowledge of sound variation may pose a threat to students' listening. The instruction of sound variation can help not only students' listening proficiency but also their speaking towards native-like speech.

Table 4.4 *Conversational Expressions in Email and MSN*

Type	Email	MSN
Just like	8	3
Quite right	1	0
give it (Wii) a try	1	1
As you say	1	1
As I said	1	0
I think so	0	1
Let me think	0	2
HURRY UP	0	3
ya know	0	1
By the way	0	1
well…	1	7
That's right	1	0
Ok	1	20
It's ok	1	0
ya	1	11
Yep	0	6
right	1	8
what?	0	4
that's all	0	1
very good	0	2
u	1	3
i	2	35
it's gonna be	0	1
Total	21	111

Paralinguistic cues, emoticons, and vocalization

The major difference between MSN discussion and face-to-face discussion is that participants discussing by means of synchronous CMC have no access to each other's facial expressions and intonation. Therefore, many strategies are created in synchronous CMC to facilitate meaning expression and comprehension, such as paralinguistic cues and emoticons. The paralinguistic cues, or non-verbal cues, were created in this study by utilizing the upper case, punctuations, and repetition of letters to emphasize meaning and show emotions and intonation.

[Stress the point by using the upper case]
Stay in the house would make me **FAT**.

[Stress the point by using the quotation mark]
Because we usually play games in static ways, it enables us to do some exercise when playing **”**unhealthy**”** games.

[Stress the point by repeating the same words]
bad, **bad**…

[Show exclamation by using the exclamation mark]
It’s different**!**

[Use many dots as the filler]
So**….**to make a conclusion, Wii is a good machine to play.

In addition to using paralinguistic cues, participants in MSN discussion also developed emoticons to vividly mimic their facial expressions, so that their interlocutors could easily understand their attitudes towards issues. Table 4.5 shows the emoticons used in MSN and email discussion.

Table 4.5 *Emoticons in Email and MSN*

Emoticon	Emotion	Email frequency	MSN frequency
= =||||	Embarrassment	0	1
囧	To have no choice	0	1
XD / XDD	Laughing	0	3
> <	Angry	1	1
= =	Not in a good mood	0	3
="=	Frown	0	1
= =+	Rage	0	1
=.=	To have no choice	0	1
:'(	Frustration	0	1
QQ	Watch	0	1

(U)	(unknown)	0	1
Total		1	15

The emoticons were used much more frequently in MSN discussion than in email discussion, where emoticons in fact occurred only once. The reason may be that participants considered MSN discussion similar to face-to-face communication, so they produced many icons to show their facial expressions in order to compensate for physical absence. By contrast, email discussion may be considered similar to written communication, and hence formal. The emoticons created also show that the students are very creative because the emoticons cover a wide range of emotion. In particular, negative emotions were expressed with a variety of emoticons like = =||||, 囧 , > <, = =, =”=, = =+, =.=, and :’(. With the help of subtle differences between these emoticons, the participants can express their attitudes and feelings with more accuracy.

However, when the knowledge of certain emoticons is not shared by both parties, misunderstanding may occur and meaning negotiation is needed. For instance,

A: 囧
B: you use a very difficult word
A: which one? I thought that i used very basic words = =||||
B: is it a word in virtual world
B: no no. i mean 囧, haha.
A: XD
B: XDXDXD

In this case, both parties did not understand their interlocutors’ emoticons, so they both explicitly asked for clarification such as *which one* and *is it a word in (the) virtual world.*

The students were able to express the non-verbal cues, like intonation, tones, and

emotion, by means of not only paralinguistic cues and emoticons but also vocalization. Table 4.6 presents the expressions of vocalization in both modes. The result shows that MSN discussion contains a lot more vocalization than email discussion. The use of vocalization is a symbol of oral communication. Most of the time, vocalization in MSN discussion was used to mimic the laughing sounds, like *haha*, expressing happiness. Further, vocalization was usually used as a filler. The example is as follows:

A: but if you play sport on Wii, it will lose the reality, i do not like that way
B: *hmm*... I think you're right.

A: true game == something that happen in real life and the game involves it
B: *oh*...I see.

A: So let's end up a conclusion.
B: *Um*.....so computer games just don't play too much

Table 4.6 *Frequency of Vocalization*

Type	Email	MSN
wow	1	1
um	0	11
ah	0	1
oh	0	18
Haha / ha	0	23
Hmm / m…	0	3
Uh	1	1
Total	2	58

Conversational expressions, vocalization, paralinguistic cues, and emoticons occurred much more frequently in MSN discussion than in email discussion. The

results clearly show that email discussion is similar to written communication while MSN discussion resembles oral communication. Therefore, when students had to negotiate meaning in MSN discussion, they tended to employ the strategies which are often used in face-to-face meaning negotiation.

Thus, it was found that conversational expressions, vocalization, paralinguistic cues, and emoticons, are features characterizing MSN discussion. In other words, the MSN environment is akin to face-to-face communication. Therefore, language teachers can make use of MSN discussion to proliferate students' idea expression in a less threatening environment (Gallupe, Bastianutti, & Cooper, 1991) or when it is inconvenient to implement face-to-face discussion, probably because of limitation in time and location.

Idea Management

Turn-taking and meaning negotiation

Previous studies have indicated that CMC can facilitate learners' interactive competence and pragmatic competence through genuine negotiation in social contexts (Chun, 1994). Therefore, the present study aims to investigate how college students take turns and negotiate meaning in synchronous and asynchronous CMC.

Turn-taking was analyzed by following the method of conversational analysis (Coulthard, 1977), including the ways that the current speaker and the potential next speaker used to achieve speaker change, the ways that the current speaker used to maintain the floor, and the occurrences of unintentional overlaps. It was found that MSN discussion contains many speaker changes and unintentional overlaps in comparison with email discussion. The current speaker often yielded the floor by creating an adjacency pair, such as question, imperative, greeting, and closing. The examples in the following are taken from the MSN discussion.

[Question] A: do you think there is any negative influence on children or adult?
B: Maybe, but not very agree.

[Imperative] A: Hey, let's start.
B: OK, GO!

[Greeting] A: Hi
B: Hello.

[Closing] A: See you.
B: Bye.

On the other hand, the potential next speaker usually found the point of speaker change by means of grammatical completion; that is, subject-predicate completion, in the current speaker's utterance.

A: I think that's because they only look at some games, which had too much blood, fighting *or something*.
B: right.

A: I'm handsome, *ya know*.
B: I know.

Or something and *ya know* are the turn signals that suggest the possible point of completion of the utterance and the point for the potential next speaker to obtain the floor. In addition to finding the point of speaker change, the potential next speaker also obtained the floor by completing the current speaker's utterance.

A: But not every games like this
B: *Such as* DiabloII

A: They won't keep away from the game to do their work and children's grades are affected.
B: *because* the world of games is so wonderful....= =

In certain cases, the current speaker did not want to yield the floor, so s / he used some strategies like using connectives and subordinators to signal the incompletion of the utterance. However, many connectives and subordinators were shown in the beginning of the second entry in the MSN discussion, thus failing to maintain the floor; only a few of them, put alone in the second entry, seemed to achieve the goal.

A: Some criminals commit a crime because they had play some kind of horrible game before
B: *However*
A: ?
B: Children can learn a lot of things by playing computer

When the current speaker failed to maintain the floor, unintentional overlaps occurred. Moreover, the rapid flow of MSN interaction also resulted in unintentional overlaps. Because a potential next speaker usually regards a complete simple sentence as the point of turn-taking, if the current speaker does not signal the incompletion of the utterance at the end of the first entry, the potential next speaker rapidly takes the turn. Face-to-face discussion contains few overlaps (Black, *et al.*, 1983), but MSN discussion has many unintentional overlaps. The reason may be that synchronous CMC, unlike face-to-face discussion, is physically absent; thus, it is difficult for the potential next speaker to detect the exact point of turn-taking and the overlaps are unavoidable. Unintentional overlaps may also lead to the dominance of one party.

[1] A: some people say that video games may has negative influence on

children and adults
A: but I think the question is not the machine.
B: i don't agree with it. Playing games is a relaxation for everyone.
B: yes. it's a strange question
B: so, wii is not important any more. we can discuss what game we have played before

[2] A: I disagree with the statement
B: I agree the statement that playing computer games have bad influence on children.
A: because
A: take me for instance
A: no no no
B: Because we usually use the same mode of thinking.
A: take my roommate for instance
B: It is not beneficial to our IQ development.
A: he plays computer games more than ten hours a day

Example 1 shows that speaker A failed to provide a signal showing the intention to maintain the floor, leading to an overlap. However, after speaker B saw speaker A's second entry, s / he responded to it and then initiated another topic. Example 2 shows that the two speakers rarely gave feedback to each other's opinion, so the conversation seemed to be non-interactive. The reason may be that the students lacked the skills to judge the possible point of speaker change in the non-face-to-face discussion.

The use of fillers by the current speaker also caused overlaps. The use of fillers can give the current speaker more time to organize her / his utterance; however, it also creates a possible point of speaker change; the potential next speaker may grasp the floor to express opinions. For instance,

A: *well*….
B: I think the workers who are good at computing and developing are all

regarded as great genius!

However, fillers do not always cause interruption because if the interlocutor does not want the floor, s / he may just keep silent or use pre-closing markers like *um, ya, that's right*.

A: video games can advance our brain
B: um…
B: ya…
B: Computer games can release our stress, too
A: ya
A: that's right
B: So let's end up a conclusion. Um…

The frequency of meaning negotiation occurred a lot in MSN discussion but rarely in email discussion. In addition to explicitly asking for clarification, other strategies for meaning negotiation in MSN discussion included repeating the confusing part of the texts, asking the interlocutor to explain more or give examples, and using vocalization to show puzzlement.

[Repeat the confusing part]
A: now many people love playing CARs or bowbowking but i think we should play some really "true" game cause now many things related to violence
B: "*true" game* ??
A: true game == something that happens in real life and the game involves it
B: oh...I see.

[Request explanation]
A: I mean, AT a fast speed
B: *what is "AT"*

B: *Could you tell me what "AT" is??*

[Request an example]
A: do you think there is any negative influence on children or adult?
B: maybe but not very agree because it also has its advantages
A: *for example?*
B: perhaps it can prove our thinking in the daily life

[Using vocalization]
A: But there are still a lot of classmates don't control well.
B: *ah....*
A: playing games all day instead of going to classes or sleep

From the last example, although speaker B did not explicitly ask for explanation, the use of vocalization implicitly showed her / his puzzlement, so speaker A spontaneously explained her / his previous opinion. Thus it shows that vocalization has a number of functions, as revealed from the analysis. It can be used to "fill" in silence in the midst of discussion, to give speakers more time to organize their words, to show puzzlement for meaning negotiation, and to mimic the non-verbal sounds produced in oral communication.

Discourse strategy of referring to previous messages

In addition to meaning negotiation, the occurrences of which can be affected by the occurrences of turn-taking, the use of the discourse strategy of referring to the previous messages can also be affected by the occurrences of turn-taking. This discourse strategy was analyzed in order to understand students' discourse competence.

The discourse strategy explored included the forms of explicit reference, paraphrase, and expansion. The definition and example of each form is given below.

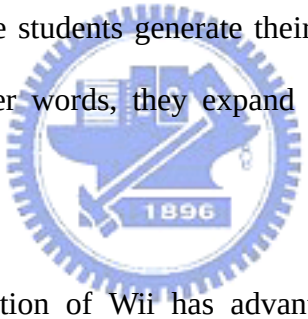
Explicit reference indicates that the respondent directly quotes what has been expressed previously. For example:

A: I consider that Wii not only gives us fun but also *makes our life more interesting…..*
B: I support your view at looking this thing. It really *makes our life more interesting.*

Paraphrase means that the respondent reformulates the other speaker's previous message without changing its meaning. For example:

A: I like it. It is *a big break in the world*. It brings more fun to our life....
B: I think it doesn't make people exercise enough. But it is indeed *a very new and unique idea of the game world.*

Expansion means that the students generate their own ideas on the basis of the other speaker's ideas. In other words, they expand the discussion by adding new thoughts. For example:



A: I think the creation of Wii has advantages and disadvantages…The disadvantages are like that first, *it makes us can't contact with other people*, etc…
B: I agree with you that there are both advantages and disadvantages about Wii…But I think *I would like to go outside and play the real tennis rather than sitting in front of the TV set.*

Student A mentioned that the disadvantage of the new video game was that "*it makes us can't contact with other people*", and this idea was like a stimulus helping Student B to create his own idea by saying that "*I would like to go outside and play the real tennis rather than sitting in front of the TV set.*" "*Sitting in front of the TV set"* implies no contact with other people.

The discourse strategy of referring to previous messages was used often in email

discussion, but was rarely used in MSN discussion. This is probably due to the interactive and immediate nature of MSN discussion. Since the students were responding to each other's preceding message most of the time during the discussion, they did not have to refer to previous messages explicitly. As a matter of fact, they directly gave short feedback based on a shared understanding that the feedback was a response to each other's previous message. For example:

> [1] A: most people accustomed to the environment they lived. Only people who have the courage to attempt new thing could bring advancement to the world. Like people who invent Wii, Wii are very popular now. It is just a video game, but it changes the type that we can play it as sports, and has courage to realize. Now they succeed.
> B: Actually, *I agree the statement*.
>
> [2] A: But Bill Gates and Miyamoto both have the great genius and hard works! No wonder they did a great achievement!
> B: *You can say that again. I can't agree anymore.*.haha

In the two examples above, Student B did not quote, paraphrase, or expand Student A's words; instead, s / he gave short feedback by saying *I agree the statement*, *You can say that again*, *I can't agree anymore*.

Topic development

With respect to topic development, frequencies of the various stages of topic development in email and MSN discussion are shown in Table 4.7. Opening and closing are the beginning and ending moves of conversations. Initiating is the move to build up a topic and expanding is used to focus and support the topic. Challenging serves to change the topic or introduce a new topic. There are more total occurrences of these stages of topic development in MSN discussion than in email discussion. This is probably related to the more turn-taking in MSN discussion. Students did not use

any opening and closing in email discussion and used few in MSN discussion. The lack of opening and closing in email discussion in the present study is very different from Gains' study (1999), in which more than half of the students used different forms of opening and closing in academic emails. The difference may result from the fact that the email discussion in the present study was a classroom situation, the students tended to skip social interactions and focus on the discussion of topics. Furthermore, expanding and challenging are the two moves that occurred most frequently in both discussion modes. The high frequency of expanding suggests that students tended to cooperate with their peers either in email or MSN discussion. The frequency of challenging in email discussion is twice as many as the frequency in MSN discussion. The result suggests that students were more cooperative in MSN discussion than they were in email discussion. On the other hand, students in email discussion tended to express their own ideas but did not respond to the partner's ideas. The difference in peer collaboration in these two discussion modes may be a result of the participants' different degree of involvement during the discussion. As mentioned in the previous section, *i* has a high frequency. This suggests that students were more involved in MSN discussion than in email discussion by continuing expressing their own ideas. Therefore, similar to face-to-face communication, students were apt to keep up with the current discourse thread in MSN while in email discussion, as a result of time delay, they were not as involved and might develop their own ideas.

Except for opening and closing, initiating, expanding, and challenging comprise the main body of the discussion. The total amount of initiating, expanding, and challenging in email discussion is higher than that in MSN discussion. The result suggests that students had more opportunities to develop a topic in more details in email discussion than in MSN discussion because the slower turn-taking in email discussion makes them more able to start, expand, and change the topic.

Table 4.7 *Frequency of Topic Development*

	Email		MSN	
Opening	0	(0%)	8	(3%)
Initiating	27	(16%)	18	(6%)
Expanding	80	(50%)	193	(71%)
Challenging	54	(34%)	48	(18%)
Closing	0	(0%)	5	(2%)
Total	161	(100%)	272	(100%)

To sum up, turn-taking and meaning negotiation occur quite often in MSN discussion, but the discourse strategy of referring to previous messages occur much in email discussion. The high frequencies of turn-taking and meaning negotiation in MSN discussion probably result from the rapid interactions between discussants so that they failed to give complete response to their interlocutors, and their ideas sometimes led to confusion or misconception. MSN discussion can be used in the language classroom to facilitate students to learn how to clearly respond to their interlocutors within limited time and how to negotiate meaning when necessary. Moreover, because of asynchronosity of email discussion, students used the strategy of referring to previous messages in various forms. Those various forms can help students practice how to clearly connect the message in the current mail to previously mentioned messages. The forms of referring to previous messages were identified, namely, explicit reference, paraphrase, and expansion. The use of expansion means that students create a new idea based on an old idea. The use of explicit reference means that students simply recapitulate an old idea. The use of paraphrase refers to recapitulating an idea in one's own words. In brief, the use of discourse strategy of referring to previous messages in email discussion can be used to improve students' thinking and writing skills, which corresponds to Kroonenberg's study (1995).

The results of topic development indicate that students had more opportunities to develop the topic on their own in email discussion than in MSN discussion. In MSN discussion, students can learn how to interact with each other within limited time and how to maintain a conversation, which bolsters collaborative learning. In this sense, MSN discussion can be used to develop students' collaborative learning. By comparison, in email discussion, they can learn how to organize their ideas and express them as clearly as possible. On top of that, the feature of communication at one's own pace benefits "slow thinkers," namely, people who do not respond quickly. Therefore, low-proficiency learners can have sufficient response time to express their opinions; otherwise, they may express little or cause a lot of confusion and misunderstanding. The asynchronous feature of email discussion enables them to be independent during the process of discussion rather than affected and subservient to their interlocutors. Thus, email discussion can help idea organization in practice.

Stance expressions

The main goal of the two tasks, email and MSN discussion, is to allow students express their ideas and stances over the topics, so the present study also investigates what lexical stance types they used and the communicative functions of the lexical stance types in both discussion modes. Table 4.8 shows the lexical stance types and communicative functions, adapted from Biber and Finegan (1988), in email and MSN discussions. Seven communicative functions were found when students expressed their ideas. Students sought their interlocutors' agreement by inviting affirmation, emphasizing their own opinions, and making a concession to others superficially but actually persuading others to accept their opinions. Students showed their sympathy to their interlocutors by showing agreement. In addition, they also used a variety of lexical stance types to express their personal feelings, show cautious attitudes, and oppose others' opinions during the process of electronic discussions. It was found that

three out of the seven communicative functions aimed to persuade others to accept one's own idea, so the result suggests that students tended to make others agree with themselves during the electronic discussions. The lexical stance types used in the electronic discussions include adverbials, adjectives, phrases, and auxiliaries. A number of the stance types were used to express more than one communicative function like *really*, *but*, and *however*.

Table 4.8 *Communicative Functions and Lexical Stance Types*

Communicative function	Lexical stance type
1. Secluded from dispute and inviting affirmation from others	Sure
2. Showing agreement	really /also / but
3. Emphasizing one's opinion	really / actually / In fact / In my opinion / however
4. Explicitly expressing personal feelings	almost / so much / very much / so + adjective / unbelievable / totally / too + adjective / especially
5. Showing caution	may / maybe /could / think / It is said that
6. Making a concession to others superficially but indeed convincing others	at least / however / but
7. Explicitly opposing others' position	but

Table 4.9 shows the percentage of all the communicative functions and Table 4.10 the frequencies of all lexical stance types. Showing caution consisted great proportions in both email and MSN discussions. It implies that students engaging in CMC tended to possess a modest attitude when expressing their thoughts. According to Biber and Finegan (1988), adverbials were seldom used to show caution in spoken texts. Still, other linguistic forms were used to express cautious attitudes, like the verbs *think* and *believe*, modals, and negation. Among the lexical stance types of

showing caution in the present study, *think* was used mostly frequently in both discussion modes. In addition, modals occurred more in MSN discussion than in email discussion. To summarize, these lexical stance types occurred more in MSN discussion than in email discussion; this corresponds to Biber and Finegan's result (1988). The instances of showing caution are as follows:

> [Email] *Maybe* we can find some day to play together. Besides of playing tennis, i *think* that the basketball game is also good for playing.
>
> [MSN] I *think* that if we can control ourselves well, and the video game may be a good thing.

Students used many adverbials, adjectives, and patterns (e.g. so+adjective) to explicitly express personal feelings, the total percentage of which ranks the second in both discussion modes (see Table 4.9). Students in both discussion modes preferred so+adjective to show their own feelings such as *so sad*, *so boring*, *so hard*, and others. Furthermore, students used more kinds of lexical stance types to reveal personal feelings in email discussion than in MSN discussion. This may be due to the fact that more emoticons were used in MSN discussion than in email discussion; in other words, students might tend to use emoticons rather than lexical stance types to explicitly express personal feelings in MSN discussion. Besides showing caution, students also showed agreement with others to maintain group harmony since the total percentage in the two discussion modes ranks the third. The percentage of making a concession to others superficially but indeed convincing others ranks the fourth in both discussion modes, so it seems that when students wanted to persuade their interlocutors to accept their ideas, they tended to make a concession to their partner's opinion at first, which might reduce the tension between both parties, and then

propose their own thoughts. Under relaxed circumstances, it was often easier for their thoughts to be accepted.

Table 4.9 *Communicative Functions in Email and MSN*

Communicative function	Email	MSN
Secluded from others and inviting affirmation from others	1%	1%
Showing agreement	17%	10%
Emphasizing one's opinion	9%	5%
Explicitly expressing personal feelings	17%	15%
Showing caution	44%	57%
Making a concession to others first but indeed persuade others	11%	9%
Explicitly opposing others' position	1%	3%
Total	100%	100%

Table 4.10 *Frequency of Lexical Stance Types*

Stance expression	**Email**	**MSN**

really	8	10
actually	1	2
also	16	10
In fact	3	0
In my opinion	2	0
at least	1	0
but	26	25
however	2	0
think / thinks / thought / thinking	53	69
may / might	8	15
maybe	3	8
could	3	5
It is said that	1	0
sure	1	2
almost	5	0
unbelievable	1	0
totally	2	0
especially	0	3
so much	2	1
very much	5	0
too much	0	7
so + adj.	11	8
too + adj.	2	6
Total	156	171

Table 4.11 presents the frequencies of lexical stance types performing various communicative functions. *Really* was used to show agreement and emphasize one's opinions in both discussion modes. *But* was used to show agreement, make a concession first but indeed convince others, and explicitly oppose others' position. *However* was used to emphasize one's opinion and make a concession to others. The examples are as follows.

[Showing agreement]

I like you idea very much. Wii is *really* much easier to play than before.

I haven't played Wii, so I don’t 'know the stories and galleries of Wii. *But* I agree that Wii do a lot influence on our life.

[Emphasize one’s opinion]
I like Wii and *really* want to have one, because it is so fun.

Wii has changed the way of playing computer games for its specific method; well, for me it has not changed my life yet; *however*, it has changed some people's lives indeed for its various playing skills.

[Making a concession to others superficially but indeed convincing others]
I don't play computer games. *But* I know that many friends have bought one.

I have the same opinion with you. The great attraction makes adult considering buying a Wii for exercise. That is unbelievable situation people cannot imagine before, I think. *However*, it also brings some trouble such as illegal import of the products and inappropriate high price!!

[Explicitly opposing others’ opinion]
A: I think I would like to go outside to play the real tennis rather than sitting in front of TV set
B: *But* Nintendo has a long history of manufacturing video games, so I think that they have the advantages which can help them to be the king of video games!

Students used three types of lexical stance types to show agreement and one type of lexical stance types to explicitly oppose others’ opinion in both email and MSN discussion modes. Nonetheless, students used more types of lexical stance types, such as *really*, *actually*, *in fact*, and *however*, to emphasize their own opinions in email discussion than in MSN discussion, which only contains *really* and *actually*. In addition, students also used more kinds of lexical stance types, such as *but* and

however, to make concessions to others in email discussion than MSN discussion, which only contains *but*. The results suggest that students are more able to use a variety of lexical stance types in email discussion than in MSN discussion.

Table 4.11 *Frequency of Lexical Stance Types Performing Various Communicative Functions*

	Email	MSN
really		
Showing agreement	1	4
Emphasizing one's opinion	7	6
but		
Showing agreement	9	3
Making a concession to others first but indeed persuading others	15	15
Explicitly opposing others' position	2	7
however		
Emphasizing one's opinion	1	0
Making a concession to others first but indeed persuading others	1	0

In addition to *but* and *however*, *at least* was also used to make concession to others superficially but actually to persuade others to accept one's own idea. Besides *really*, *actually*, *in fact*, and *however*, *in my opinion* was used to emphasize one's opinion.

> A: I like Wii's new and unique playing methods because the way we play the computer games becomes not just push some buttons, we can act like the actor in the game.

B: Wii sure do a lot influence on our life. *At least*, a lot of girls who never play video games now have an interest in that. But I do not like Wii. Because I think Wii's game don't have good stories and galleries.

It is such a good video game that I want to try it. *In my opinion*, Wii has changed the concept and the way to play game that we had before.

In summary, the students tended to use the verb *think* and modal auxiliary *may* and *might* to show their cautious attitudes towards issues. The high occurrences of *but* in both discussion modes were probably due to the various communicative functions it served, namely showing agreement, making a concession to others first but indeed persuading others, and explicitly opposing others' opinions. Among the lexical stance types of showing agreement, *also* was used most frequently by students to show they had similar opinions with their interlocutors.

According to the analysis, 24 words and phrases in total were identified as lexical stance types. They served seven communicative functions. Showing caution was the most frequently used communicative function in both discussion modes. This suggests that students tended to express their ideas in a mild and moderate way. Thus, the online discussion was not undermined by hostile language, which may do harm to harmony and collaboration between students. On top of that, students in both discussion modes were active to talk their interlocutors into accepting their own ideas by secluding and inviting affirmation from others, emphasizing their own ideas, and even making a concession to others first but indeed trying to persuade others to accept their own thoughts. The results show that CMC is beneficial to students to disclose their innermost feelings and mindset without the fear of embarrassment, which is very unlikely to happen in face-to-face discussion (Bump, 1990). In the present study, it was also found that some words and phrases served more than one communicative function, so students could develop the ability to comprehend what their interlocutor

said based on the shared context. In other words, with the help of social context, students communicating via CMC have the opportunity to learn the functional use of language and acquire pragmatic competence during the interaction.

Among all the lexical stance types, the verb *think* was used most frequently in both email and MSN discussions. This is because students had to show their ideas and attitudes on the topics; however, most of the students used only *I think…*. The result suggests that they fell short of linguistic resources to express personal opinions other than *I think*. In pedagogy, the language teachers can offer alternative expressions, such as *I believe*, *I reckon*, *in my opinion*, *in my mind*, *my own view is that…*, *my position is that…*, *as I see it…*, and others, to enrich students' linguistic repertoire.

Effects of CMC on Essay Writing

Language is learned by means of thought mediation among humans (Vygotsky, 1978). CMC is considered to be a thinking device that helps learners generate their own ideas during the collaborative process with others (Lotman, 1988; Wertsch & Biven, 1992). Therefore, the present study investigates the effects of online discussions as content providers to help students generate ideas for their essay writing.

The sample size of seven essays analyzed for the purpose of calculating GE and NE ideas is small because students were not able to complete the essays in the class and thus were allowed to turn in the essays later, which led to the low turn-in rate. Although the sample size is small, the results derived from the analysis of essays can still provide us a basic understanding of the effects of email and MSN discussions on essay writing. Each of the seven participants on average produced 5.43 GE ideas and 3.43 NE ideas in their essays. t-test value shows that the mean scores have no significant difference (*p*-value=.37, significant at $p < .05$). Although the numbers of

GE ideas and NE ideas are not significantly different, the percentage of GE ideas is more than 50 %, which indicates that students tended to use the ideas produced in CMC-generated discussions in their essay writing. In other words, CMC-based discussions, both MSN and email discussions, can serve as a thinking device, facilitating students to share their ideas and express their stances towards issues.

This study does not distinguish whether the GE ideas came from email discussion or from MSN discussion. This is because the thoughts expressed on essays could be affected by either of the two modes of electronic discussions or the interaction of both. Furthermore, although NE ideas refer to the ideas in essay writing which were not generated from CMC, it may be premature to hold that NE ideas had no relationships with the online discussions because it is still likely that these ideas were inspired by the ideas generated in electronic discussions.

Table 4.12 *Frequency of GE and NE Ideas*

Participants	GE	NE
1	13	1
2	9	8
3	4	3
4	1	7
5	5	2
6	2	3
7	4	0
Total	38	24
%	61	39
Per person	5.43	3.43

N=7

GE = the idea generated from CMC

NE = the idea not generated from CMC

GE + NE ideas = 62 ideas

Online discussion for the purpose of writing conference can function like

brainstorming, helping students generate ideas before they write their text. The result in this study suggests that online discussion can be an appropriate medium for student interaction as pre-writing activities. It also facilitates collaborative learning, one of the characteristics of online discussion (Lotman, 1988; Wertsch & Biven, 1992). In addition, online discussion can be used to develop learner autonomy seeing that students found the materials of writing on their own rather than depended on teacher guidance.

Students' Attitudes towards CMC

Space and time independence and non-face-to-face interaction are two of the important features of online discussion to encourage peer collaboration, which is essential to language learning (Vygotsky, 1978), whereas the rapid interaction of electronic communication may lead to monologues (Moran, 1991). Therefore, it is beneficial to know how students perceive their online discussion experience.

Part A: 7-point Likert scale questions

Students' attitudes towards CMC are shown in Table 4.13. It can be observed that the mean scores of both Item 5 (How easy did you feel to discuss an issue *in depth* through electronic discussion? *1= not easy at all, 7= very easy*) and Item 6 (How easy did you feel to discuss an issue *in English* through electronic discussion? *1= not easy at all, 7= very easy*) were the lowest. This suggests that students feel it not easy to discuss an issue through electronic discussion or in particular in English, although they may feel comfortable in each mode of discussion (Item 1, mean score =4.28). Similarly, Item 8 (Did you feel you had more ideas not expressed yet in electronic discussions because of using English? *1=strong disagree, 7=strong agree*) gets the highest mean score. This can be related to the results of Items 5 and 6. These results suggest that using English to discuss a question online poses a challenge for students,

influences the depth of their discussion, and impedes their idea generation.

Table 4.13 *Attitudes towards CMC (Part A)*

	N	Low score	High score	Mean score	SD	Variance
Comfort						
Item1	47	1	7	4.28	1.60	2.55
Easiness						
Item2	47	1	7	4.09	1.73	2.99
Item3	47	2	7	3.83	1.39	1.93
Item4	47	1	7	3.79	1.23	1.52
Item5	47	1	6	2.66	1.39	1.93
Item6	47	1	7	2.66	1.43	2.06
Opportunity						
Item7	47	1	7	3.94	1.42	2.02
Idea generation						
Item8	47	1	7	5.11	1.78	3.18

N=number, SD=standard deviation

Part B: open-ended questions

More than four fifths of the students have ever participated in electronic discussions, and the media they have used include MSN, email, BBS (Bulletin Board System), e3 (a system developed by National Chiao Tung University), and other online forums. Thirty five used MSN, three use BBS, and two used email, e3 and online forums, respectively. Six students have ever used two kinds of electronic media to communicate with their classmates. More than 80 % of the students had the experience of using computers for communication; thus, most of them were familiar with electronic discussion. It can explain why no one felt it “not easy at all” to understand the ideas his partner expressed through electronic discussion in Item 3. Although the experience of using electronic discussion is prevailing, some students

expressed they disliked discussing their school assignments through computers. Twenty four indicated that it was acceptable to discuss homework via computers, and twenty three indicated that they did not like to discuss homework by this means. The reasons that the students dislike discussing via computers are as follows:

1. The flow of interaction is slow.
2. It is hard to completely comprehend others' ideas.
3. It is hard to clearly express one's own thoughts.

In other words, students who disliked CMC-based homework discussion felt that it is more inefficient to communicate through computers in comparison with face-to-face discussion. With respect to the third reason (It is hard to clearly express one's own thoughts), many students majored in the science and technology, so some of them indicated that it was difficult to show the mathematic symbols on the screen. Therefore, it was inconvenient for them to discuss their school assignments via computers. In addition, among the students who have discussed their homework via computers, some especially stated that they only used Chinese in their discussions. One student who disliked CMC-based homework discussion said that "I don't like it. This is probably because I have to talk in English. Although I can look words up in the electronic dictionary, I still fail to know how to use some words and grammar." Another student indicated that "it is chaotic if too many people communicate online simultaneously." Moreover, some students complained that when communicating via CMC, they cannot tell whether their partners understand their meaning since they do not have access to their partners' facial expressions. In brief, using English to discuss issues may pose a threat for Chinese college students, and communicating through computers instead of face-to-face communication increases the difficulty in negotiation of meaning. These results can help explain why Item 5 and Item 6 get the lowest mean scores and Item 8 gets the highest mean score. The learners strongly felt

that they had difficulty expressing their ideas in English through computers, so they failed to express all the ideas they had during the discussions.

Although some students disliked CMC-based discussion, a commensurate amount of participants (52%) like this kind of discussion. The reasons that the learners like to discuss via computers are as follows:

1. The non-face-to-face discussion makes speakers feel free to express their own ideas.

2. The discussion text can be used to facilitate reflection.

3. The time and space independence of CMC makes discussion more flexible.

4. The online discussion can facilitate collaborative learning.

Most students indicated that it is very convenient to communicate via computers if they are at different places or even different time (i.e., via asynchronous CMC), and the record of previous discussions helps them follow the development of arguments or reflect over the issues that have been discussed. In addition, one student indicated that "you can always meet smart people through electronic discussions. They friendly provide different methods to resolve certain problems, which can help us learn more."

The non-face-to-face communication via computers makes learners become less intimidated and express more, so this is probably why Item1 (How comfortable were you using the electronic discussion? *1=very uncomfortable*, *7=very comfortable*) and Item 7 (Did you feel you had sufficient opportunity to express your ideas during electronic discussion? *1=very little opportunity, 7=ample opportunity*) had high mean scores. One student wrote that "you feel free to say anything without seeing others' faces." Another one said that "you don't worry about being interrupted while you are writing down your ideas via computers."

In the last open-ended question, where the learners were asked to compare face-to-face discussion with electronic discussion, it was discovered that both

discussion modes have advantages and disadvantages. For face-to-face discussion, the advantages are summarized as follows:

1. It can facilitate comprehension and negotiation by means of non-verbal cues; this makes discussion more efficient.

2. The turn-taking is rapid, so it is more interactive.

3. It helps discussants to discuss the issues more directly and profoundly.

The disadvantages are as follows:

1. It is embarrassing to communicate with a stranger face-to-face.

2. The turn-taking is so rapid that one could easily lose track of the topic.

3. The discussion is confined to time and space.

For electronic discussion, the advantages are as follows:

1. It makes discussants more open-minded to express their thoughts.

2. It is less embarrassing to communicate with a stranger via computers.

3. Discussants can communicate at their own pace, so their ideas can be expressed in order.

4. The discussion is independent of time and space, so it is convenient for a group of people who are hard to get together.

The disadvantages are as follows:

1. It is hard to precisely discern others' attitudes towards the issues by means of nonverbal cues.

2. Misunderstanding often happens and it takes more efforts to negotiate meaning.

3. The discussion is shallow, so it is unsuitable to discuss complicated issues.

Since face-to-face discussion and electronic discussion both have their pros and cons, it is suggested that teachers have to design the discussion tasks for the topics of discussion and the purpose of discussion. One of the participants indicated that "I

don’t especially prefer which discussion mode. It all depends on which discussion mode is more appropriate for the situation.”

The number of students who had positive attitudes towards CMC is comparable to the number of students who had negative attitudes towards CMC. This suggests that CMC tasks should be carefully designed so that they can really benefit learners. Language teachers should probe into possible drawbacks and deal with them. The reasons that students disliked CMC could be attributed to students’ language deficiency. Regarding this difficulty, teacher guidance becomes important, such as the provision of topic-related information, linguistic expressions, electronic searching tools, corpora, and the like. The results of the survey also indicate that learners’ level of English proficiency may determine, or constrain in a sense, the quality of online discussion. Therefore, when the teachers consider engaging students in online discussion, they have to take students’ language proficiency into account. Still, the less threatening and embarrassing environments of CMC can encourage students to express their thoughts and share their opinions with each other. Pedagogically, CMC can be used to facilitate students’ language output and collaborative learning. Furthermore, since the use of CMC has its benefits and limitations, it is suggested that when the purpose of class discussion is to inspire low-level students to produce more language output, online discussion might just as well be used. However, when class discussion is aimed for in-depth discussion, it may be better to switch to face-to-face discussion, especially for lower-level students. In other words, choosing appropriate discussion modes can help language teachers achieve different teaching goals.

CHAPTER FIVE

CONCLUSION

This study investigates undergraduate students' linguistic performance through synchronous and asynchronous CMC, their perceptions of using CMC for class discussion, and the effect of CMC on essay writing. Specifically, textual features and the process of both electronic discussions are examined. In this chapter, the results of analyses are summarized and the pedagogical implications and contribution are presented. Moreover, the limitations of this study and suggestions for future research are indicated.

Summary of Results and Pedagogical Implications

Email and MSN discussions seem to have similar effects on the amount of EFL students' word production and the range of vocabulary use. However, email discussion enables learners to use more academic words while MSN discussion enables the use of more high-frequency words. The result implies that these two discussion modes may serve different purposes of vocabulary learning and practice.

Learners produce more complex sentences in asynchronous CMC while more simple sentences in synchronous CMC. It is probably because the slow interaction of asynchronous CMC facilitates learners to organize their ideas with syntactically more complex structures, while the rapid interaction of synchronous CMC accelerates turn taking, which may lead to the use of simple words and repetition of some words frequently. In light of syntactic complexity, asynchronous CMC may be more suitable for writing practice to improve language sophistication.

As for topic development, the expanding move has a greater proportion in MSN

discussion while the challenging move occurs more often in email discussion. This result suggests that off-topic discussion is more unlikely to occur in synchronous CMC compared with asynchronous CMC. In one sense, synchronous CMC can facilitate peer collaboration to complete the task. The total percentage of initiating, expanding, and challenging moves in email discussion is higher than that in MSN discussion, so it shows that asynchronous CMC may benefit more complete topic development in discussion. Moreover, students in email discussion create three forms to refer to previous messages in order to direct their interlocutors to specific issues that have been discussed; namely, explicit reference, paraphrase, and expansion. Based on the results, asynchronous CMC may help learners develop discourse competence in terms of topic development and the use of discourse strategy.

In electronic discussions, a variety of communicative functions are observed. Three out of seven communicative purposes are common in convincing interlocutors of one's own ideas; namely, secluding and inviting affirmation from others, emphasizing one's ideas, and making a concession to others at first but indeed persuading others to accept one's own ideas. In addition, showing caution occurs most frequently in both modes of CMC. This implies that learners tend to take a mild, neutral position when expressing their opinions. In other words, learners try to reach a balance between idea expression and harmony maintenance. The result implies that using CMC for class discussion is practicable for college students seeing that hostile language may not occur so that task progression and interaction can go smoothly.

Turn-taking and meaning negotiation are recurrent in MSN discussion. This is probably due to the turn-by-turn allocation in MSN discussion and the use of simple syntactic structures and the fledgling topic development. Moreover, conversational expressions, vocalization and paralinguistic cues, and emoticons occur frequently in MSN discussion. Structural simplicity and reduction are two salient features of the

conversational expressions. The high frequency of vocalization may be related to meaning negotiation because learners tend to use vocalizing words to show their puzzlement and imply the need for clarification. Paralinguistic cues and emoticons can help learners better express their feelings and emotions.

A lot of ideas generated in CMC-based discussion (61 %) are used in the essay writing, so CMC-based discussion has an effect on learners' language output. Additionally, the EFL college students widely hold that using English in discussion is difficult and they have some ideas unexpressed in electronic discussions. The number of students who like and the number who dislike CMC-based discussion are equal. It is discovered that preference for electronic discussions or for face-to-face discussions depends on the nature of the tasks. The more complicated issues are suggested to be discussed face-to-face, while electronic discussion can be used for easy tasks. The present study also discovers that these intermediate-level college students feel it difficult to discuss an issue in English and in-depth; regarding this, teacher guidance becomes important to help students engage in the online discussion tasks. The guidance can include provision of topic-related information, linguistic expressions, and English language searching tools or corpora.

Limitations of the Study

The study has three limitations. One is the small sample size. Only 47 undergraduate students took part in the online discussion tasks and in the collection of essay writing samples, the researcher only received seven essays. The reason is that the essay writing task is an after-class exercise. Another limitation is that the participants' background is homogeneous, all majoring in science and technology. The background may affect their attitudes towards CMC. In other words, the results cannot be generalized to students in other fields. The other limitation is that the two

discussion sessions were conducted in a sequence, so the second electronic discussion might still be affected by the first one, even though the discussion questions provided were different.

Significance and Suggestions for Future Research

Although the study has limitations, they do not outshine its significance. The electronic discussions can be recorded by computers, helping teachers analyze learners' language performance and interaction. This study, with the help of the recorded electronic discussions, provides teachers a deeper understanding of students' language use and ways of interaction and idea expression. Therefore, language teachers can take advantage of the findings of the study for course design in order to facilitate language learning. Moreover, students' perceptions of CMC-based discussion as revealed from the survey offer useful information to more student-centered activity design.

Since the study contours a primitive profile of EFL college students' language use in and attitudes towards CMC, it is suggested that future research can compare the differences between native students and non-native students in vocabulary use, textual features, and attitudes towards CMC, which can show the directions to help learners improve their English language skills.

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APPENDIXES

Appendix A The Adapted Questionnaire in English

QUESTIONNAIRE

Part A

	1	2	3	4	5	6	7
1. How comfortable were you using the electronic discussion? *1=very uncomfortable, 7=very comfortable*							
2. How easy did you feel to express ideas through electronic discussion? *1= not easy at all, 7= very easy*							
3. How easy did you feel to understand the ideas your partner expressed through electronic discussion? *1= not easy at all, 7= very easy*							
4. How easy did you feel to negotiate meaning during electronic discussion? *1= not easy at all, 7= very easy*							
5. How easy did you feel to discuss a question in depth through electronic discussion? *1= not easy at all, 7= very easy*							
6. How easy did you feel to discuss an issue *in English* through electronic discussion? *1= not easy at all, 7= very easy*							

7. Did you feel you had sufficient opportunity to express your ideas during electronic discussion? *1=very little opportunity, 7=ample opportunity*							
8. Did you feel you had more ideas not expressed yet in electronic discussions because of using English? *1=strong disagree, 7=strong agree*							

Part B

Open-ended questions:

1. Have you ever discussed homework through electronic discussions? If you have, what kind of media did you use?
2. Did you like discussing homework by this way? Why?
3. What did you like most about electronic discussion? Why?
4. What did you like least about electronic discussion? Why?
5. Two kinds of in-class discussions: face-to-face discussions and electronic discussions. What are your perceptions of and attitudes towards these kinds of discussions?

Appendix B The Adapted Questionnaire in Chinese

問卷調查

A 部分

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. 您對於使用網路討論覺得自在嗎**?**							

1=非常不自在, 7=非常自在							
2. 您覺得透過網路討論的方式表達自己的意見容易嗎? *1=非常不容易, 7= 非常容易*							
3. 您覺得在網路上討論時,了解同伴的想法容易嗎? *1=非常不容易, 7= 非常容易*							
4. 您覺得在網路討論中和同伴溝通意見容易嗎? *1=非常不容易, 7= 非常容易*							
5. 您覺得在網路討論中深入討論一個問題容易嗎? *1=非常不容易, 7= 非常容易*							
6. 您覺得在網路上用英文討論一個問題容易嗎? *1=非常不容易, 7= 非常容易*							
7. 您覺得在網路討論的過程中,有足夠的機會發表意見嗎? *1=幾乎沒機會, 7=有充足的機會*							
8. 您覺得自己是否因爲要使用英文而有更多想法未在網路討論中表達出來? *1=強烈不同意, 7=強烈同意*							
9. 您會將網路討論中所產生的意見應用在之後的寫作上嗎? *1=很少, 7=很多*							

B 部分

1. 您過去有透過網路來討論課業嗎？若有，是以哪種網路工具進行？

2. 您喜歡以透過網路討論的方式來討論課業嗎？爲什麼？

3. 對於網路討論，您喜歡的部份是什麼？爲什麼?

4. 對於網路討論，您不喜歡的部份是什麼？爲什麼？

5. 討論的方式有兩種：面對面的討論和網路討論。您對於這兩種討論方式的看法和態度爲何？

Appendix C The Questions for Electronic Discussions

1.Email questions (可任選一題討論或兩題都討論,共計 30 分鐘討論)

(1) The creation of Wii changes the way we play computer games. What influence do you think that Wii has on our life? How do you like or dislike Wii? Why? Give specific reasons and examples to support your answer.

(2) Nintendo has been a superpower in the world of computer games, but now the company has more competitors, such as Microsoft and Sony. If you were the CEO of Nintendo, what would you do to help the company get back to its heights of success 20, 25 years ago?

2.MSN questions (可任選一題討論或兩題都討論,共計 30 分鐘討論)

(1) We know many successful people, such as Shigeru Miyamoto, the video game guru, Bill Gates, the richest person in the world, etc. What personalities do you think these successful people might have? Give specific reasons and examples to support your answer.

(2) Some people say that the virtual world of video games has negative influence on children and even adults. Do you agree or disagree with the statement? Give specific reasons and examples to support your opinion.

3.Essay writing (寫 30 分鐘):

Write an essay about 100~150 words. The topic is “the new video game Wii”. (請以” the new video game Wii”爲題,寫下 100 到 150 字的作文)