

**Code-Switching by Chinese English-as-a-Second-Language Students in
Computer-Mediated Communication: A Multiple Case Study**

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Abstract

This study investigated the contexts of code-switching by Chinese ESL students who differed in age and study level and who lived in a small city in British Columbia. The aim of the study was to examine the code-switching strategies that Chinese ESL students employ when engaged in computer-mediated communication, compare the similarities and differences of these ESL students' code-switching strategies, and explore the relevance of code-switching to English literacy development. Participants in this study comprised three Chinese ESL students who attended elementary school, college, and university respectively, and one parent. Interviews were conducted with each of these participants. In addition, each student was videotaped, and electronic artifacts were collected from each of them. Findings of the study show that code-switching was deeply embedded in its contexts, and it functioned not only as a mechanism to compensate for deficient language, but also as a strategy to fulfill social, psychological or discursive purposes. Some of the code-switching strategies were affected by age and English proficiency. Analysis of the data also indicated that code-switching was beneficial to the English literacy development of these ESL students to varying degrees.

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Chapter One: Introduction

Overview

Information and communication technologies have exerted a significant impact upon every aspect of people's lives. These technologies have the potential to change the way children learn and teachers teach. The widespread use of computer technologies within the broader society has fundamentally altered the nature of children's literacy development (New London Group, 1996; Shetzer & Warschauer, 2000; Warschauer, 1998a).

According to the New London Group (1996), traditional literacy or "mere literacy" has been centered on print literacy only; that is, the reading and writing of print texts. However, with the introduction into and use of new technologies and visual texts in people's literacy practices at home and at school, students encounter, use and interpret multimodal texts and are becoming proficient in multiple kinds of literacies (Lapadat, 2003). Jewitt and Kress (2003) describe multimodal texts as hybrid combinations of a variety of modes, including linguistic, visual, gestural, spatial and audio. Multimodal literacy is, therefore, defined as literacy that encompasses all the various modalities ways in which meaning can be created and communicated in the world today (Jewitt & Kress, 2003). Brown, Lapadat, McGregor, and Thielmann (2006) expand this definition of multimodal literacy to include the ability to use "the multiplicity of written and multimodal genres and digital technologies to interact within a variety of communities of practice both online and offline to accomplish a range of work-related, educational, personal, recreational, and social purposes" (p. 12). The New London Group coined the

term “multiliteracies” to refer to the different literacies of today that, in addition to print, take into account the representational resources (visual, audio, hypertext, etc.) afforded by computers and multimedia technologies. Snyder (2001) argues that print-based reading and writing is now only part of what people have to learn to be literate, and argues that literacy needs to be conceived within a broad social order, what she has called “a new communication order” (p. 117). This new order takes into account the literacy practices associated with screen-based technologies. Within a society packed with technological changes, children’s lives have changed, and their literacy practices have changed also. Thus, it is important to study the impact of the use of technology upon children’s literacy development.

Lapadat (2003) notes in her research proposal¹ that young people are leading the users’ edge of technological change, and any new technological innovation is quickly taken up by children and youth, and the companies that market to them. However, many traditional social institutions like schools change slowly, and a mismatch exists between children’s actual literacy practices at home and classroom practices (see also Prensky, 2001). Furthermore, as many countries such as Canada become more culturally and linguistically diversified, so too are the countries’ school classrooms. Classrooms today are different from those ten years ago, and the nature of literacy has changed in the information age. Educators are finding that traditional instructional approaches are ineffective in meeting the academic requirements of many students, especially those from diverse cultures. For these reasons, it is necessary to look at children’s literacy

¹ This present study is part of a program funded by a Social Science and Humanities Research Council of Canada Standard Research Grant #410-2004-1647, awarded to Judith C. Lapadat, Principal Investigator.

practices at home associated with technologies in order to provide guidance for and insight into what pedagogical innovations should be made in order to bridge the gap between children's actual literacy practices in the home and classroom practices. It is especially important to examine English-as-a-Second-Language (ESL) students' home literacy practices because ESL students joining schools in English-speaking countries with inadequate knowledge of English are confronted with the challenge of learning English in order to integrate socially and academically in their new schools and communities.

This study examines Chinese ESL students' home literacy practices with a focus on computer-mediated communication (CMC), and the linguistic strategies these students employ when they have difficulty expressing themselves in English while engaged in CMC. Ultimately a comparison is made of the contexts in which the Chinese ESL students of different ages and at different study levels employ various linguistic strategies to cope with linguistic difficulties. By examining and comparing students' use of CMC at home and their linguistic strategies, I seek to obtain information that will help educators to accommodate ESL students' learning using multimodal/multiliterate approaches. The following section establishes the context for this study by reviewing the emergence of multiliteracy, by presenting the mismatch between classroom practices and students' home literacy practices, and by identifying the lack of research to date in Asian ESL students' literacy practices. In particular, I review the limitations of the studies that focused on ESL students' home literacy practices. This brief review points to the rationale for and significance of this study.

Establishing the Context of the Study

There is a mismatch between classroom literacy practices and children's literacy practices in their lived lives. As discussed by Lapadat (2003), global social and technological changes have required education to change accordingly, whereas the funding needed for these educational changes is limited. Teachers and administrators face community demands to do more with less on the one hand and a back-to-basics backlash on the other. Although research findings reveal that inquiry-oriented processes for children's construction of knowledge are effective, policy makers attach importance to standards and accountability, and classroom practitioners are caught in the middle (Wells, 2001). Lapadat points out that in Canada, the teaching force is aging, with few young teachers. As well, limited professional development opportunities result in the teachers having less exposure to new ideas (see also Lankshear, Snyder, & Green, 2000). Inadequate political and economic support for teachers' professional development and for changing the organizational structures of schools to accommodate social-technological change are factors that pose obstacles to pedagogical innovations (Brown, Hartwick & Lapadat, 2005; Lankshear et al, 2000; Lapadat, 2003). As a result, many classrooms of today—the way they are equipped and organized, and the curriculum and instructional approaches used—look relatively similar to the classrooms of thirty years ago: one teacher for many students, desks in rows, textbooks, timetables, and the same familiar subjects (Lapadat, 2003).

Bringing new technologies such as computers into schools has been a slow expensive process, and putting the technical, financial, curricular, and epistemological

supports in place to use the computers in meaningful ways has been an even greater struggle (Soderman, Gregory & O'Neill, 1999; Lapadat, 2003). According to a Canadian national survey of French-as-Second-Language (FSL) teachers conducted by Turbull and Lawrence (2002), a majority of the FSL teachers (58%) at all levels across Canada are open to using computers in FSL classrooms. Nevertheless, of those respondents reporting computer use, 61% used computers in a computer lab separate from their classrooms. A sizeable number of teachers surveyed (41%) have never used computer technology in their classes. They cite lack of access as well as a lack of training and knowledge about how to integrate computer technology into their teaching as the two principal reasons for this inexperience in using computer technology in their classrooms. In a similar study by Lam (2000b), second language (L2) teachers who did not use computers cited a lack of knowledge as the primary reason. More specifically, many L2 teachers did not know how using computers could relate to language teaching. Others suggested a lack of access or lack of confidence as reasons for avoiding computer use.

On the other hand, students, in the context of an electronic age with its affordances of multimedia communication technologies, have taken up tools beyond the school setting to develop literacy, such as instant messaging, chat rooms, emails, and interactive web games via the Internet (Cruickshank, 2004; Lam, 2000a, 2004; Lapadat, 2002). They weave meanings they take from the multimodal representations into their own understanding and interactions within the world (Dyson, 2001; Lapadat, 2002). Prensky (2000) asserted that "Our students have changed radically. Today's students are no longer the people our educational system was designed to teach" (p.1). Today's

teenagers are described as *digital natives*, that is: “ ‘native speakers’ of the digital language of computers, video games and the Internet” (p.1), as opposed to teachers who are *digital immigrants*, “who speak an outdated language (that of the pre-digital age), [and] are struggling to teach a population that speaks an entirely new language” (Prensky, 2000, p. 2). The gap therefore needs to be bridged between research findings, educational policy, classroom practices, and children’s lived lives (Lapadat, 2003; Wells, 2001). Wells (1986) explored children’s language and literacy development at home and school through a ten-year longitudinal study in Britain, and his work has profoundly influenced our current understandings about literacy development. However, the research was conducted prior to children’s widespread use of videogames, the Internet, and other computer technologies in their daily lives, and children’s changing literacies are just beginning to be documented (Hull & Schultz, 2001). In particular, there is a dearth of research focused on literacy and technology among L2 learners in Canadian schools.

There is a wealth of research on second language acquisition (SLA), and a separate body of work on CMC. Nevertheless, the examination of CMC as used in SLA is limited in scope as well as in the number of actual studies conducted. Of the studies that have examined the use of CMC in SLA, most have focused on CMC and its classroom application at the college level, and relatively little attention has been paid to L2 learners’ home literacy practices through CMC. Only a small number of studies have examined L2 learners’ literacy practices at home. For example, Cruickshank (2004) explored the literacy practices in the home of four Arabic-speaking teenagers and found

that their literacy practices in multilingual contexts were carried out by means of new technologies such as email, chat room, messaging, and the like. Lam (2000a, 2004) examined Chinese immigrant youths' use of the Internet at home achieving social identities. Studies such as these describe the social and cultural applications connected with technology-mediated literacy practices. In addition to the research mentioned above, Li (2004) suggested, in her study of two Chinese elementary school students' home literacy practices, that the computer is a significant part of the students' after-school learning. She did not investigate, however, how they use computers to assist them in English language learning and what they learned from the use of computers. By focusing on the ESL students' general home literacy practices, these studies failed to take into account ESL students' specific linguistic behaviours and what was actually acquired linguistically through these practices, especially through CMC. What's more, the studies neglected the examination of the implied social and cultural meanings related to the linguistic behaviour as factors influencing ESL students' English language development.

There is an emerging research literature in CMC that has examined different benefits brought by CMC to English literacy and language acquisition of different second-language learners (Anderson-Inman & Horney, 1998; Labbo, Murray & Phillips 1995-96; McKenna, Reinking, Labbo & Kieffer, 1999; Garner & Gillingham, 1998). These studies have addressed the impact of affective, linguistic, social, and cultural factors on SLA.

Of central interest, for the purpose of my study, is the research into *code-switching*. Code refers to any distinct language or dialect (Boztepe, 2003). Gumperz (1982) defines code-switching (CS) as “the juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or subsystems” (p.59). That is, CS refers to a) alternating between two different styles of speech or dialects of the same language within the same conversation, as in the case of monolinguals switching from formal to informal speech, or switching from one dialect to another, and b) alternating between two or more languages within the same conversation, as in the case of bilinguals or multilinguals switching from one language to another (Boztepe, 2003; Huerta-Macias & Quintero, 1992). Kotter (2003), by exploring the online chatting of intermediate L2 learners, found that code-switching promoted L2 literacy development. Hudson (1996) views code-switching as “the inevitable consequence of bilingualism” (p. 51).

However, code-switching has long been stigmatized in education (Lara, 1989; Ramirez & Milk, 1986). When bilingual children mix languages, educators question their academic abilities and potentials, and are more likely to place them in remedial classes (Lara, 1989). Recent research, however, has suggested that code-switching may also be viewed as an additional resource for bilingual speakers to achieve particular conversational purposes and support their learning needs (Flood, Lapp, Tinajero, & Hurley, 1996; Laliberty & Berzins, 2000). It may be that bilingual students use code-switching strategically for language acquisition. At the least, code-switching behavior provides a window into the state of students’ linguistic knowledge and learning

processes. Nevertheless, this linguistic behavior among bilingual children has been the least systematically studied (Romaine, 1995) of all the research on the effect of mixed languages on bilingual children's language development.

As suggested in the literature (Au, 1995; Luke, 1995), students' home literacy practices have an influence on their school success. Numerous studies have indicated that many students from ethnic minority groups are low-achieving in school, and this behaviour has been explained as due to being less motivated or disadvantaged. On the other hand, ESL students from some Asian countries such as China and South Korea are often high achievers in Canadian schools (Li, 2004). Even so, a large percentage of Asian English language learners are behind their native English speaking age/peer groups in their English language proficiency (Ashworth, 2001).

Research studies that clearly and systematically describe Chinese ESL students' home literacy practices involving the use of technology are scarce. Specifically, few researchers (Lam, 2004) have examined Chinese ESL students' use of CMC at home, described their code-switching during CMC, or identified the sociocultural contexts and purposes of code switching in CMC. I have located no studies that have compared the linguistic strategies employed by ESL students who differ in age and study levels in a CMC environment at home.

Therefore, in my study, I will examine Chinese ESL students' use of code-switching in their home literacy practices while using computer-mediated communication. In order to infer the social meanings and the relevance that code-switching has for their English language development, I will identify the contexts

in which code-switching occurs, and compare this linguistic behaviour of Chinese ESL students of different ages and at different study levels.

Rationale for and significance of the present study

This study is important because an exploration of the use of technologies in the home literacy practices of Chinese ESL students is particularly needed and timely for several reasons. With the number of Chinese immigrants to North America growing, the Chinese have become the single largest group of Asians in Canada and the United States (Li, 2004). Chinese learners are often stereotyped as high achievers and therefore are overlooked in literacy research. In fact, however, Chinese students reportedly score higher on standardized tests than other minority groups such as Latinos (Li, 2004) in many districts with high Chinese concentrations (e.g., Vancouver, British Columbia), Chinese students' English proficiency is relatively low compared to that of native-speakers of English (Ashworth, 2001).

Furthermore, over the last decade, a large number of Chinese high school graduates have been enrolling in Canadian post-secondary educational institutions such as colleges to take ESL courses before pursuing their undergraduate degrees at Canadian universities. However, little information is available concerning what technologies this group of students uses at home to assist them with their English language development.

In addition, the writing system of the Chinese language and the English language have little in common. The Chinese language has a non-alphabetic writing system, which is unique in that written Chinese is composed of ideographic Chinese characters, where one or two characters are equivalent to a word or an idea. In contrast, the

graphemic symbols (letters) in the alphabetic writing system of English represent phonemes or speech sounds in spoken language. These systems of writing have little in common. When Chinese ESL students develop their literacy with the aid of technologies, how and for what purposes do they code-switch when they have trouble expressing themselves in English? An understanding and a comparison of Chinese ESL students' use of technologies at home, with a focus on code-switching in particular, will contribute to the literacy literature theoretically as well as pedagogically.

Theoretically, an examination of code-switching between written Chinese and written English will provide insights into the functional models of literacy these students have across two very different writing systems as well as the different affordances of each writing systems for accomplishing specific social purposes. Through this study, I also aim to bring insights into the process of second language acquisition by describing the patterns of code-switching in computer-mediated communication among Chinese ESL students and the factors that influence their linguistic choices. An examination of code-switching behaviour among these students will likely uncover the linguistic, social and psychological factors involved in SLA. This research, therefore, has the potential to make a contribution to theories of second language acquisition.

Findings from this research will have a practical application. The findings will add to our understanding of how to tap into and capitalize on ESL students' linguistic repertoire so that teachers can maximize students' learning. The results from the study will open a window to ESL educators who are endeavoring pedagogically to accommodate Chinese ESL students as well as students from diverse cultures more

broadly. In particular, these findings may promote a change in perspective about the value of developing bilingual students' code-switching in language acquisition, given that in the past, code-switching has been viewed unfavourably by the mainstream society. ESL educators can obtain a better understanding of how these students use both languages and learn through both languages, and can benefit from this information which illuminates a way to assess students' learning and progress in language acquisition. With more students coming from different linguistic backgrounds, teachers are more likely to face students demonstrating code-switching behaviors. With such knowledge, teachers can become more sensitive to the process of acquiring a second language as an evolving process, and consequently design and implement more appropriate instructional strategies.

With appropriate strategies, English-as-a-Second-Language students who have access to the findings of studies of home literacy practices will realize that their linguistic behavior and its social and cultural meanings are related to their English literacy development, hence obtaining an understanding of their English language learning, and building up their confidence. With the potential instructional support from the teachers informed by the study, developing bilingual students will be allowed to use their linguistic and cultural resources, which Laliberty and Berzins (2000) assert supports these students' learning needs. Building on the students' understanding of their native languages can increase their chance for academic success (Flood et al., 1996).

For me as a second language teacher as well as a researcher, I will gain from the results of the study more theoretical knowledge of code-switching and a pragmatic

understanding of its educational implications. Findings from this study will inform interested researchers, including me, of future research areas.

Summary

This chapter has established this study's perspective. The overview presents the general circumstances—the impact of the use of technology upon children and youths' literacy development, and the gap between children's actual literacy practices at home and classroom practices. Students' changing literacies in an electronic age need to be documented in order for the home-classroom gap to be bridged. In particular, studies focused on literacy and technology, especially CMC, among ESL students in Canadian schools are scarce. Although a few studies (Cruickshank, 2004; Lam, 2000a, 2004) have examined general home literacy practices employing technology of ESL students in the United States (U.S.) and Australia, they have failed to explore what was specifically acquired linguistically and socioculturally through these practices. Chinese ESL students, a group that is increasing in number in Canada, require special attention for a variety of reasons. They are high achievers in schools. However, their English proficiency is low compared to that of their native English-speaking peers. Little information is available about Chinese ESL students' home literacy practices regarding the use of the computer. A study of this group of student can begin to make up for this scarcity in the literature. Finally, the significance of the study in both practical and theoretical realms is outlined.

Chapter Two Literature Review

Theoretical Framework

Second language acquisition theories. Many theories regarding second language acquisition (SLA) have been proposed, but there has been little consensus on any single SLA theory. Second language acquisition theories have basically centered around either a *nurture* versus *nature* distinction or on a *empiricism* versus *nativism* distinction. The premise of empiricism is that knowledge originates in the environment, but is understood through our interaction between the environment and our reasoning or senses. In contrast, nativism holds that at least some knowledge is not acquired through interaction with the environment, yet is genetically transmitted and innate. In other words, some theoreticians have based their theories on environmental factors while others believe innate factors determine the acquisition of a second language. In the field of SLA, empiricists are most associated in modern times with the psychologists, Jean Piaget, B. F. Skinner, and Lev Vygotsky, whereas nativists are most associated with the linguists Noam Chomsky and Stephen Krashen. It is worth noting that neither empiricists nor nativists reject entirely the theories of the other. Only the weight empiricists and nativists ascribe to the environmental and innate factors varies, either relatively little or relatively more. For example, in the empiricist paradigm, environmental factors are believed to be more dominant in second language acquisition.

In the nativist paradigm, Chomsky (1975) advanced the well-known *universal grammar theory* in which he defined universal grammar as the system of abstract principles and rules that are shared by all languages, and viewed language as an innate,

rule-governed system (Toohey, 2000). *Rule* refers to “knowledge that a given linguistic feature is used in a particular context with a particular function” (Ellis, 1997, p. 13). Chomsky’s theory, however, only accounted for how language is acquired through a system of grammatical rules and constraints without taking into account communication, the primary function of language, thereby ignoring how sociocultural, socio-historical, and sociopolitical perspectives shape learners, and learning process (Watson-Gegeo, 2004).

Whereas Chomsky’s theory focused on the constraints of grammar formation and the underlying grammatical rules common to all human languages, Krashen (1985) argued that language acquisition does not require extensive use of conscious grammatical rules and proposed a model, based on a psychological perspective, to account for the actual mechanisms involved in second language acquisition (Gass & Selinker, 2001). *Mechanisms* are defined as “devices that specify how cognitive functions operate on input” to drive development from one stage to the next (Long, 1990, p. 654).

Krashen’s Monitor Model has become an influential theory in SLA. This model consists of five hypotheses; (a) the Acquisition-Learning Hypothesis, (b) the Natural Order Hypothesis, (c) the Monitor Hypothesis, (d) the Input Hypothesis, and (e) the Affective Filter Hypothesis. The best known among the five hypotheses is Krashen’s Input Hypothesis (Warschauer, 1997). Krashen postulates that SLA almost wholly depends on the amount of *comprehensible input*, that is, one-way input in the second language. Comprehensible input is referred to as $i+1$, in which i represents learners’

current language level, and 1 represents the knowledge level that is beyond learners' current knowledge. While Krashen (1994) maintains that comprehensible input is all that is needed for language acquisition to happen, others take an interactionist position that acknowledges the role of two-way communication.

Interactionist Perspectives. Long (1985) and Pica (1994) emphasize the importance of interaction in language learning and the necessity for learners to have access to meaningful and comprehensible input for interlanguage development to occur. *Input* refers to the language to which the learner is exposed (Gass & Selinker, 1994). *Interlanguage* is the type of language produced by second- and foreign- language learners who are in the process of learning a language. Selinker (1972) coined this term to refer to the systematic knowledge of the target language independent of both the learner's first language (L1) and L2. Hammers and Blanc (1990) suggest that between the choice of the first language or the second language, there exists a range of intermediary strategies that include the modification of either language and the relative use of both. By a gradual process of trial and error and hypothesis testing, learners slowly succeed in establishing close approximations to the system of the target language.

When learners engage in meaningful activities with their interlocutors, they are compelled to *negotiate for meaning* in order to arrive at a mutual understanding for comprehensible input, test hypotheses related to their developing interlanguage system and have access to feedback related to their output (Long, 1985; Swain, 1985; Swain & Lapkin, 1995). *Output* refers to language production, either spoken or written (Swain, 1985, 1993), or the productive use of language (Gass, 1997). To negotiate meaning,

interlocutors must “express and clarify their intentions, thoughts, opinions, etc., in a way which permits them to arrive at a mutual understanding”(Lightbrown & Spada, 1999, p. 122). Negotiation of meaning is also defined by Pica (1994) as the “modification and restructuring that occurs when learners and their interlocutors anticipate, perceive, or experience difficulties in message comprehensibility” (p.495). Gass (1997) suggests that learners must first focus on their own linguistic deficiencies vis-à-vis the target language—“noticing the gap” (p. 4). In other words, L2 learners must develop their own metalinguistic awareness in order to stimulate a change in their interlanguage (Schmidt, 1990). In sum, interactionist perspectives assert that interaction results in negotiation of meaning, which is acknowledged as a facilitator of learning (Gass, 1997). Negotiation draws learners’ attention to erroneous or inappropriate forms of their utterances, and creates a situation in which learners receive feedback directly and indirectly from their interlocutors and consequently produce output, thereby facilitating second language acquisition (Gass, 1997; Long, 1985; Pica,1994; Swain, 1985).The following sections will explain the different aspects of interactionist perspectives.

Comprehensible Input Hypothesis. Long (1985) builds upon and extends the Input Hypothesis proposed by Krashen (1985). Long claims that comprehensible input is necessary yet not sufficient, and believes in the role of interaction in generating comprehensible input. According to Long, input shaped through interaction contributes directly and powerfully to acquisition, and what makes input comprehensible is the negotiation of meaning or the modification of the interaction when a comprehension problem occurs. Modified interaction is partly accomplished through the conversational

repair moves of negotiation of meaning, including linguistic simplification as well as conversational modifications (Ariza & Hancock, 2003) such as clarification, confirmation checks, self repetition, recasts, explicit corrections (Jepson, 2005) or code-switching (Kotter, 2003). The resultant interactionally modified input that learners are exposed to and the way in which other speakers interact in conversations with learners is a crucial element in the language acquisition process (Lightbown & Spada, 1993), and optimizes SLA (Gass, 1997), because in the course of modified interaction or negotiation of meaning, learners are provided opportunities to focus on the linguistic forms of their utterances, making linguistic forms more salient and hence creating a readiness for learning (Gass, 1997; Pica, Holliday, Lewis & Morgenthaler, 1989). The study by Pica et al. (1989) revealed that when the L2 learners show difficulty in understanding, the native speakers provide linguistic modifications in the input such as repeating and reformulating their original utterances for the learners. The learners concurrently make reformulations of their own interlanguage utterance based on the feedback that they receive.

Nevertheless, Varonis and Gass (1985) note that learner-learner interaction between two non-native speakers (NNS-NNS) results in more negotiation of meaning than does an interaction between a native speaker and non-native speaker (NS-NNS), because NNS feel freer with one another to indicate non-comprehension and negotiate for meaning. What is worth noting is that when learners modify an original utterance for greater comprehensibility, they adjust its form, or in other words, they are pushed to form comprehensible output. The attention to language forms and structures is

hypothesized as conducive to interlanguage development (Pica et al. 1989). Given that Long's comprehensible input hypothesis puts emphasis on input through interaction, Swain (1995) claims that comprehensible input is inadequate in facilitating second language acquisition, and proposes her comprehensible output hypothesis.

Comprehensible Output Hypothesis. The output hypothesis proposes that language acquisition may occur through producing language (Swain, 1985, 1993). Swain emphasizes the crucial role of comprehensible output or language production, either spoken or written, in L2 development. She argues that apart from comprehensible input, output is also crucial. The output, Swain (1985) hypothesizes, serves four primary functions in SLA, that is to, (a) enhance fluency, (b) create awareness of language knowledge gaps, (c) provide opportunities to experiment with language forms and structures, and (d) obtain feedback from others about language use. She argues that “[production/output] ... may force the learner to move from semantic processing to syntactic processing” (p. 249). Gass (1997) suggested that no serious speculation was placed on the idea that output or language use could be part of the learning mechanism prior to Swain's (1985) important paper, in which she introduced the notion of comprehensible or *pushed* output; that is, “learners are pushed or stretched in their production as a necessary part of making themselves understood. In so doing, they might modify a previous utterance or they might try forms that they hadn't used before.” (p.249). According to Ellis (1990), “production will aid acquisition only when the learner is pushed. Opportunities to speak may not in themselves be sufficient” (p.118).

Schmidt (1990) highlights the importance of noticing the linguistic gap. Noticing the gap or *apperception* occurs when learners consciously focus on their own linguistic deficiency or problematic aspects in the target language (Gass, 1997). When learners experience communication breakdowns, they are forced to attend to the L2 forms before modifying their output to make it more comprehensible. Learners' focus on the linguistic features of the target language and meaningful use of their linguistic resources raises learners' awareness of their linguistic deficiency, which is a prerequisite for the restructuring of learners' linguistic knowledge (Gass & Varonis, 1994; Swain & Lapkin, 1995). Noticing a problem pushes learners into a more syntactic-processing mode (Swain & Lapkin, 1995) that will help them to internalize new forms (Pica et al., 1989) and improve the accuracy of their existing grammatical knowledge (Nobuyoshi & Ellis, 1993). This facilitation of SLA, however, does not seem to be acquired by comprehensible input alone (Swain, 1995).

Comprehensible output assists learners in conveying meanings while providing linguistic challenges. In producing the L2, learners will become aware of a linguistic problem brought to their attention by feedback provided to them by the interlocutor that can be used to revise their interlanguage (Ellis, 1997). Noticing a problem pushes learners to modify their output. In so doing, learners may sometimes be forced into a more syntactic-processing mode than might occur in comprehension (Swain & Lapkin, 1995).

The Interaction Hypotheses stress the importance of negotiation of meaning in facilitating second language development. Negotiation of meaning arises when

interlocutors seek to prevent a communicative breakdown from occurring or to remedy a breakdown that has already occurred (Ellis, 1999). In other words, negotiation of meaning results in interactional modifications that help learners to understand each other. Language acquisition is enhanced in the sense that input is made more comprehensible through input modification, feedback is provided, output is elicited, and learners are forced to focus on certain aspects of their speech (Long, 1996; Swain, 1985).

According to the interactionist approach, conversational interaction forms the basis for language development (Long, 1996). This is similar to conversation analysis (CA) in that the central premise of CA is that CA focuses on analyzing talk-in-interaction.

Conversation Analysis. Conversation analysis is defined as the study of “the social organization of ‘conversation,’ or ‘talk-in-interaction,’ by a detailed inspection of tape recordings and transcripts” (ten Have, 1997, p. 1). It represents both a theoretical stance and a methodology (Lapadat, 1999; Psathas, 1995) to analyzing naturalistic talk (Lapadat, 1999). The CA method reflects conversational analysts' theories about the nature of conversation and how the conversation can be empirically studied to reveal participants' strategies for expressing themselves, reaching understandings, repairing misunderstandings, and so forth (Lapadat, 1999). The central concern of CA is with the nature of turn-taking in talk-in-interaction (Hutchby & Wooffitt, 1998), such as: (a) how is naturally occurring talk organized, (b) how do interlocutors achieve orderly turn-taking, and (c) what are the systematic resources used by interlocutors in the achievement? According to Markee (2000), CA seeks to uncover sequential organization, turn-taking,

and repair of talk-in-interaction, thereby making it most suitable for analysis of linguistic details. The detailed linguistic approach to analysis in CA, and the focus of interest (i.e., conversation and how it is achieved and maintained), is similar to my focus of interest in this study, especially when it comes to conversational repair.

I have chosen, however, not to ground my study theoretically in the CA approach for lack of a good fit. First, CA rejects preformulated theoretical categories and testing hypothesis, because the interest of CA is in discovering “the *structures*, the *machinery*, the *organized practices*, the *formal procedures*, the ways in which order is produced” (Psathas, 1995, p. 3). Therefore, CA approach is a heuristic-inductive, hypothesis-generating approach, and questions are formulated through the analysis of the data. I have, however, already formulated the research questions in my mind based on personal experiences and the literature search, and therefore have provided a theoretical framework. Second, CA focuses on sequential organization, turn-taking and repair of the talk-in-action. Many of the rules and procedures in CA do not transfer well to the CMC environment. For example, online chat turns are not sequential in that the absence of simultaneous feedback may result in discontinuity and/or overlap within turn sequences. As a result, the communication in online chat is disrupted and discontinuous: many different topics can be carried out simultaneously, often by the same speaker. A speaker can receive multiple responses to different previous turns and use the same turn to post simultaneously several messages in response to different topics.

Given the underpinnings of conversation analysis, CA has not been much used in the literature of CMC. The interactionist approach to SLA, however, has been applied to

computer-mediated communication as a theoretical framework, in that negotiation of meaning frequently occurs in CMC between non-native-speakers (NNS), and between native-speakers (NS) and non-native-speakers (Blake, 2000; Pelletieri, 2000; Smith, 2003; Toyoda & Harrison, 2002). Blake proposes strong possibilities for using CMC in language learning because with the CMC medium,

L2 learners heighten their metalinguistic awareness of where they are in their own L2 vocabulary development and where they still need to go in order to gain more target-like lexical control. Doing tasks in a CMC environment, then, generates apperceived input, which can subsequently be used to modify and improve their vocabulary (p.131).

By examining the comprehensible input and output hypotheses discussed above, it can be seen that Krashen's model regards language as a natural phenomenon, and emphasizes individual characteristics and cognitive processes over the wider socio-historical contexts that shape language acquisition. Although Long and Swain's models stress the joint contribution of the linguistic environment and learners' internal mechanism in language acquisition, social and cultural contexts that inextricably shape language are overlooked. A more encompassing conceptual framework is necessary—the sociocultural perspective, advanced from the psycholinguistic insights of Vygotsky and based on the nurturist ideas. Sociocultural perspectives on language learning provide a complementary position that considers language learners in direct relation to their social and cultural surroundings where participants engage in activities co-constructed with other individuals (Lantolf & Pavlenko, 1995).

Sociocultural Perspectives. Socio-cultural perspectives of learning became popularized in North America in the 1990s, and have become ubiquitous in SLA

research ever since Lantolf and Appel (1994) brought together the work of scholars who were attempting to extend Vygotsky's theory to second language research. Sociocultural perspectives can be traced back to the writings of Vygotsky, a Russian cognitive psychologist. Vygotsky's theoretical framework is based on the assumption that human activities take place in cultural contexts and are mediated by language and other symbol systems. Mediation is the mechanism through which external, socio-cultural activities are transformed into internal, mental functioning. Mediation is the instrument of cognitive change (Kozulin, 1990). In describing sociocultural influences upon human mental activity, Vygotsky (1981) argued:

Any function in the child's cultural development appears...on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. (p.163)

Neither the interpsychological nor the intrapsychological function exists as a separate entity; they are closely connected (Wertsch, 1991a). Throughout the mental developmental process, language is viewed as the primary symbolic mediating tool between social interaction and the development of higher order mental processes (Mitchell & Myles, 1998). The tools and signs to which one is exposed, therefore, influence or mediate new patterns of thought and mental functioning (Wertsch, 1991a). *Tools* can be both material and psychological in mediating human activities, and therefore human learning (Chandler-Olcott & Mahar, 2004). Vygotsky (1934/1978) distinguishes between material tools that work on the object and psychological tools that mediate the relationship to the environment, action and thought. Material tools involve

textbooks, notebooks, computers, and so forth. *Sign systems*, such as language, diagrams, arithmetic, formulae, or the behavior of another human being in social interaction, are psychological tools for human activities. Human beings use these tools to mediate relationships with themselves, others, objects and the world. In this way, Vygotsky (1934/1978) linked society to mind through mediation, and viewed the acquisition of language as a sociocultural phenomenon, linking the social with the cognitive.

According to Wertsch (1991a, 1991b), sociocultural competence and learning, or what he called new mental functions and patterns of thought, are gained from the mediational assistance of tools, signs and *scaffolding* when it is offered within one's zone of proximal development (ZPD). Vygotsky (1934/1978) defined the ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p.86). This idea emphasizes that an individual develops higher cognitive levels when the gaps in his/her thinking and problem solving are supported by adults, peers, or more capable others. This support is called scaffolding, the graduated assistance provided to an individual by more capable others. Through graduated assistance, the individual can internalize external knowledge and eventually reach the stage of consciously controlling the knowledge in order to accomplish learning tasks (Wood, Bruner & Ross, 1976). The social environment supports development in such a way that what can be done collaboratively now will be accomplished independently at a later date.

Wells (1999) points out that the ZPD is formed not just with an individual learner, but rather in the interaction between the learner, coparticipants, and available tools during involvement in a common activity. The joint activity requires the novice to construct with the expert a shared perspective or intersubjectivity (Rommetveit, 1985; cited in Anton & DiCammilla, 1998). According to Wertsch (1985), intersubjectivity is achieved when “interlocutors share some aspect of their situation definitions” (p.59). In other words, learners must share some kind of communicative contexts within the L2 learning environment. Darhower (2002) notes that the context may be shared if interlocutors have similar background knowledge about one topic. It is this common communicative context that enables learners to cooperate and interact (Vygotsky, 1962). Hence, it is critical for an individual to participate actively in the learning process for learning to occur.

Sociocultural perspectives emphasize the interdependence of social and individual processes in the co-construction of knowledge. Sociocultural theorists postulate that language is both a social and cognitive development phenomenon rather than a private series of activities that occurs solely in the head. Through social interactions, children come to internalize and gain performance competence in the socioculturally defined context (Vygotsky, 1934/1978).

Sociocultural theorists assert that social and cultural contexts are central to the process of identity formation, and identity formation is an ongoing process of learning and change. According to Wenger (1998),

building an identity consists of negotiating the meanings of our experience of membership in social communities. The concept of identity serves as a pivot between the social and the individual, so that each can be talked about in terms of the other (p.145).

Wenger's (1998) social theory of learning combines the concepts of active engagement and identity formation as mutually inclusive within social communities (Brown et al., 2006; Lapadat, 2003). Meanwhile, Wenger holds that using a tool when engaged in an activity changes the nature of that activity, and participating in the changed activity thus changes the members of the community (Chandler-Olcott & Mahar, 2003). Activity theory, which has its roots in Vygotsky, also emphasizes the role played by tools, both material and psychological, in mediating human learning. Tool use affects a number of components within a community of practice, defined by Wenger as a community "created over time by the sustained pursuit of a shared enterprise" (p.45). The components include the purpose for participating in the activity; the rules for participating; identities participants define and construct through the activity, and so forth. Consequently, tools are used to "enact and maintain 'socially situated identities' " within the joint activity (Chandler-Olcott & Mahar, 2003, p. 362).

Sociocultural perspectives have been gaining increasing influence in SLA research in that they complement the inadequacies of nativist and mechanistic theories of SLA and attempt to erase boundaries between language learning and language use and between learning and developmental processes. The sociocultural approach to SLA is now applied to the field of CMC. CMC involves a mediational process that is simultaneously undertaken through material tools (computer/software), and psychological tools (language/texts) (Freire, 1994). As far as second language learning is

concerned, computers mediate L2 learners' literacy practices on the one hand and language mediates their higher mental functioning, resulting in new learning on the other. In a CMC scenario where communication is basically undertaken through language, L2 learners are engaged in social interaction with their language partners, either native-speakers or non-native speakers, via email, online chat, or audio-video conferencing. Through the interaction, a group can construct knowledge together, "thus linking reflection and interaction" (Warschauer, 1997, p. 437). Computer-mediated communication such as online discussions and asynchronous conferencing is viewed as a desirable mode of communication and believed to heighten interactivity between learners (Herring, 1999; Lapadat, 2002; Nguyen & Kellogg, 2005). In an online environment where a visual record can be obtained in the form of text, negotiation of meaning is facilitated and collective conceptualization of ideas is enhanced (Herring, 1999; Lapadat, 2002; Nguyen & Kellogg, 2005). During online interaction, learners collaboratively establish coherence of their communication by conversational repair moves (Herring, 1999). Computer-mediated communication has been theorized as a crucial means to realize interactivity in online teaching and learning environments and promote a "learner-centered interactive approach," and to lead to the awareness of the sociocultural nature of the target language and the development of situated cognition (Romiszowski & Mason, 1996; Salaberry, 2001).

Computer-mediated communication as a mediating tool supports evolving social and cultural communities, in which identity construction takes place within the context of practice or joint activity (Brown et al., 2006; Chandler-Olcott & Mahar, 2003;

Nguyen, & Kellogg, 2005). Spears and Lea (1992) argue that in networked learning environments social identity stems from one's presentation of identity as part of a group or in assuming a social role within the interaction. They further assert that in an environment where there is no visual feedback, one is more self-aware than in face-to-face settings. In a similar vein, Yates (1997) views online identity construction as something that occurs through discourse, and claims that all texts carry markers that can identify their authors in different ways. Hodgson (2002) suggests that an examination of the use of language in networked learning environments can reveal how the process of identity-construction works through dialogue. Similarly, Beach (2000) points out that activity-theory-influenced perspectives can guide research that examines how readers, viewers, and composers of media texts "construct their identities within the competing contexts of their own immediate, local activity, as well as within the larger context of a virtual media world" (p.13).

My understanding and analysis of this study reflects both the interactionist and sociocultural perspectives on SLA. It is not sufficient to choose one of the two approaches to SLA. The interactionist approach allows me to pay particular attention to the nature of the interactions L2 learners typically engage in. It focuses on investigating, for example, the role of negotiation for meaning in the contexts of both NS-NNS and NNS-NNS conversations, and the role of comprehensible input and output in SLA. Using this approach to explore the development or the use of specific linguistic features of L2, I can address the issue of L2 learning. The sociocultural approach, on the other hand, enables me to address the issue of SL use; that is, the interactive, collaborative,

and socially situated nature of L2 use and learning. These two approaches complement each other in that both the linguistic and the sociocultural features of SLA are investigated, hence holistically unveiling the process of language learning and use. I attempt to apply the two theories to different components of analysis in turn. The possibility also exists that some components in the data could be explained by one theory only. The integration of both approaches thus does not create theoretical conflicts that can affect my approach to analysis and interpretation of the data. Instead, the integration increases the likelihood of understanding a language phenomenon through different lenses given the complexity of language learning and use.

Summary

The comprehensible input hypothesis claims that negotiation of meaning occurs when interlocutors interact in an attempt to avoid or repair communicative breakdowns, and it is facilitative of SLA. During negotiation for meaning, input is modified and made comprehensible. The comprehensible output hypothesis argues that comprehensible input is not sufficient for second language learning to occur, and therefore stresses the importance of output in promoting SLA. In the L2 production, learners can notice their linguistic problems which in turn force learners to modify their output. The interactionist approach has been applied to CMC as a theoretical framework for the reason that learning activities in CMC environments promote negotiation of meaning which is believed to enhance SLA. While the interactionist approach attaches importance to the interaction between the learners' cognitive mechanisms and the linguistic environment in facilitating SLA, it has failed in examining social and cultural contexts by which

language is bound. Sociocultural perspectives of language learning provide a complementary position for interaction hypotheses. Sociocultural perspectives view language as the primary symbolic mediating tool between social interaction and the development of higher order mental process. Language acquisition occurs when learners co-construct knowledge with their peers or more capable others through mediating assistance of tools, signs and human scaffolding. While the learner and his/her coparticipants engage in joint activities, they construct through mediation not only a shared perspective, or intersubjectivity, but also an identity within the community of practice. In CMC contexts, L2 learners actively participate in learning activities and assume their social roles within the interaction. My study is grounded within both interactionist and sociocultural perspectives.

Literature Review

This section reviews the relationship between ESL students' home literacy practices and academic success, CMC and its application in language learning, studies of CMC and second language learning, and studies of CS. The first area of the literature review highlights the importance of integration of ESL students' home literacy practices into school literacy. The computer, as an integral part of ESL students' after-school activities, plays a significant role in their literacy development. CMC has started to attract researchers' and educators' attention to the application of CMC to second language teaching and learning. Therefore, there is an emerging literature in studies of CMC. Code-switching, a widely observed behaviour among ESL students, appears not only in their daily conversation and classroom interaction, but also when they

communicate in English in online environments. A review of the literature in CS is important in establishing the backdrop of this study.

ESL students' home literacy practices

Two major theories have been suggested as possible explanations for schools' failure to ensure academic success for students from minority backgrounds (Cairney & Ruge, 1998). The first is the theory of cultural discontinuity (Heath, 1983), and the second is the theory of structural inequality (Au, 1993).

The theory of cultural discontinuity argues that cultural mismatches, including differences in language, literacy beliefs, and interactional patterns between teachers and students result in difficulties in communication and interaction in the classroom, and consequently school failure (Gee, 1996; Heath 1983; Jacob & Jordan, 1993; Karanja, 2005; Ogbu, 1982). The home culture of students from minority groups is often described as traditional and static (Heath & McLaughlin, 1993). These cultural mismatches negatively affect the literacy learning of students whose home culture does not reflect that of the school. Some researchers have identified the difference between the language and literacy of school and that of homes and communities as a significant factor in the achievement or non-achievement of students at school (Foster, 1992; Heath, 1983; Scribner & Cole, 1981). As familiarity with school literacy is a mark of school success, students from minority cultural backgrounds have to learn a different set of literacy conventions and often experience difficulties with schooling (Lopez, 1999; McCarthy, 1997).

The theory of structural inequality looks beyond mismatches between the culture of the home and the school (Cairney & Ruge, 1998). It argues that minority students' failure at school reflects structural inequalities in the broader social, political and economic spheres (Ogbu, 1987; Au, 1993). This theory takes into account the power relationships between groups, and holds that schools function to maintain the status quo.

Au (1995) attributed minority students' educational disadvantage to "oppressive social structures that create vast inequalities in power and opportunity favouring the dominant group" (p.87). In a similar vein, Luke (1995) argued that schools "naturalise particular interactional patterns and textual practices in ways that systematically exclude those students from economically marginal and culturally different backgrounds" (p.16). In the literature, many studies attribute minority students' low achievement to their parents, and a lack of reading materials in the home (Blackledge, 2000; Delgado-Gaitan, 1990; Vincent, 1996).

However, other studies have come to a different conclusion. For example, Saxena (1994) and Taylor (1997) observed that a school usually defines "books" as novels in English read for enjoyment, thus excluding the range of reading materials in various languages in the home. With regard to minority students' culture, Heath and McLaughlin, (1993) noted that schools often define students and their families according to their ethnic background, which is viewed as static and traditional. However, ethnic minority groups are undergoing dramatic social and cultural changes (Cruikshank, 2004), and "tangled cultural experiences" (Clifford, 1997, p. 136) typify migrant families in modern society (Inda & Rosaldo, 2002). Cairney and Ruge's (1998) study on

minority students indicated that there is no single or simple answer to the question of how matches and mismatches in home and school literacy practices impact on students' school success. In their study, the most academically successful students were those whose family literacy practices reproduced school literacy practices, whereas the dominant home literacy practices of those less academically successful students failed in reproducing school literacy practices.

In my view, whether family environments, languages, or the children themselves contribute to minority students' academic success is a debatable issue. The implicit assumption of Cairney and Ruge's (1998) study that school literacy is the best or most complete view of literacy needs questioning. Street (1995) raises the concern that non-school literacies are viewed as inferior and should be remediated for by enhanced schooling.

I would argue that this view has become obsolete in an increasingly diversified and technologically advancing society. To ensure minority students' academic success, school literacy should extend beyond its restricted experiences and attempt to respond to the cultural and linguistic diversity of its community, especially in the information age when literacies are changing and evolving into multiliteracies. Studies have indicated that students' literacy practices in multilingual contexts are dynamic and develop rapidly in response to technological and cultural changes (Cruickshank, 2004; Lam, 2000a, 2004). For example, in Cruickshank's examination of the literacy practices of four Arabic-speaking teenagers, he found that the four teenagers were taking an active role in a shift to technology-mediated literacy and in the mediation of both Arabic and English

literacy. He observed that these teenagers had taken up new technologies such as email, chat room, messaging, and so forth for very specific purposes, such as to create a network of friendship that was immediate but linked across space and time. Lam's studies (2000a, 2004) of Chinese immigrant youth show how they come to occupy new social positions and identities by acquiring and appropriating new discourses in online environments. In her studies, Lam has considered not only how social contexts shape language use in online environment, but also how online communication shapes social contexts and the participants' identity formation. If schools are to be adjusted to meet the needs of students from diverse social, cultural and language backgrounds and to take advantage of the increasingly electronic media for literate action and interaction, then a necessary starting point is to develop an understanding of students' home literacy practices. In particular, researchers need to examine home literacy practices using CMC, an increasingly popular communication and language learning form in modern society. Accordingly, school literacy practices can build on, rather than replace, students' home literacy practices.

Computer-mediated communication and its application in language learning

Traditionally, computer-assisted language learning is associated with self-contained programmed applications such as drills, simulations, tutorials, instructional games and tests. With the advent of new technologies, computers have been connected to one another in either local or global networks, and the emphasis has shifted to the role of computers in facilitating or mediating human communication. Computers have fundamentally altered the way people communicate and have become a significant

element in the teaching and learning environment. Warschauer (1998a) highlights the incorporation of computer technology in language learning, and asserts that computer technology is no longer just a possible tool but an essential new medium of language and literacy practices alongside face-to-face communication and the printed page.

One aspect of computer use is computer-mediated communication (CMC).

Computer-mediated communication refers to the use of online, interpersonal communication via the Internet or specific local area network (LAN) software programs (Warschauer, 1997). It means that students can communicate with each other, using a computer as the means of communication. Interactive CMC forms are divided into two main types—synchronous communication and asynchronous communication (Lapadat, 2002; Levy, 1997). *Synchronous communication* takes place as a rapid or real time exchange, for example, text or voice online chat, MSN messenger, whereas *asynchronous communication* is protracted or has a delayed message system, free of time constraints (e.g., e-mail) (Warschauer & Healey 1998). Both communication forms underscore learning as a collaborative act that happens in a social and political context, with students and teacher working jointly in the networked interaction (Lapadat, 2002; Ortega, 1997).

As the role of computers has shifted from a “computer as tutor” to a resource and tool for learning, asynchronous and synchronous CMC have created a major shift in how teachers and students think about teaching and learning. As noted by Warschauer and Meskill (2000), language teachers throughout the US have been employing CMC in language classrooms in various forms, and this is particularly true in higher education

where students and teachers have greater access to computer laboratories and Internet accounts than in K-12 schools. Meanwhile students have been using CMC forms, such as MSN, online chat and email as literacy practices at home. There is an increasing amount of information regarding the practices of CMC used in language learning environments.

Computer-mediated communication and second language learning

Equalization of participation. A dramatic increase has been reported in participation in CMC among postsecondary L2 learners in formal second language programs. The findings of the studies by Beauvois (1992), Kelm (1992), and Kern (1995) illustrate a greater degree of student participation in CMC contexts than in face-to-face (F2F) contexts and higher percentage of student talk versus teacher talk. Kelm and Beauvois report increases in the participation patterns of shy, low-motivated and unsuccessful students, who were perceived by their instructors as less willing to participate in teacher-led discussions. Similarly, a study by Kern reveals that electronic discussions engender a radical change in the proportion of student versus teacher language production—students have more turns and produce more words and sentences in electronic discussions than in oral discussions.

Quality of language production. Studies of online language interaction show that the language produced in CMC contexts by students in second language acquisition programs is qualitatively better and more coherent and cohesive than the language produced in face-to-face (F2F) classroom communication. Chun (1994) reports that students of German tend to produce and initiate language that covers a wide range of

communicative and discourse functions. Kern (1995) points out that the overall students' language production in her French language class reflects a higher level of sophistication than in oral discussions. Warschauer (1996) conducted a similar study and found that his students of German produce language that was lexically and syntactically more complex. Lapadat's (2002) study on online written interaction reports that written interaction in asynchronous CMC contexts scaffolds more sophisticated language use, because as participants strive to formulate their ideas and thoughts in writing by the use of a written medium, they tend to use critical and higher order thinking processes such as analysis, synthesis, and evaluation. Although her study is conducted in first language contexts, its findings also apply to second language contexts in the sense that interactivity of asynchronous CMC allows all users, including L2 learners, to take their time, reflect, consider their audience's perspectives, and utilize higher order thinking skills (Lapadat, 2002).

Linguistic skills. Substantial evidence has been presented in support of the role of synchronous and asynchronous CMC in facilitating the acquisition of linguistic skills in a second language. A study by Warschauer (1999) suggests that computer-assisted discussion enables students to notice the input better from others' messages and integrate that input into their own messages, therefore increasing opportunities for learning of new linguistic elements together, such as collocations and common phrases. In a similar study (Blake, 2000) of networked discussions using the synchronous chat programme, it was reported that CMC stimulated L2 learners to negotiate meaning, which generated language modifications and a focus on linguistic forms as L2 learners exchange

information and repair communication breakdowns (see also Kitade, 2000). Lexical confusions triggered most of the negotiations between students, as reported by Blake, rather than morphological or syntactical ones. A study by Varonis and Gass (1985) shows that in L2 contexts, learner-learner interaction involving Non-Native Speakers (NNS)-NNS dyadic interactions result in more meaning negotiating exchanges than Native Speakers (NS)-NNS interaction. They argued that NNS feel freer with one another to indicate non-comprehension and negotiate for meaning. A case study by St. John and Cash (1995) of a high-intermediate learner of German reveals that the learner systematically studied the vocabulary and phrases in his email exchange with a native German speaker and subsequently incorporated the new vocabulary and the phrases into his own writing. Wang (1998) compared dialogue journals written with paper and pencil by one group of ESL students and transmitted over e-mail by a second group. She found that the email group communicated more frequently by asking and responding to more questions, and used a greater variety of language functions than did the paper-and-pencil group. The more frequent communication generated by the email group suggests that CMC affords greater interactivity. These studies have shown that CMC promotes negotiation of meaning from which comprehensible input and modified output result. Negotiation of meaning has been identified as a crucial element in facilitating SLA (Gass, 1997; Long, 1985; Pica, 1994; Swain, 1985).

Social dynamics. Researchers have reported that language learners express a positive attitude towards computer use when they engage in language learning tasks. According to some researchers (Kern, 1995; see also Warschauer, 1996), CMC can boost

motivation for using the target language and reduce anxiety over classroom participation. Means and Olson's study (1997) also indicated an increase in motivation levels when students were using computers for educational tasks. Various accounts have shown that, as compared to F2F interaction, CMC provides a more equitable platform with regard to the quantity and quality of participation across gender, socioeconomic status, and age (Beauvois, 1992; Kelm, 1992; Kern, 1995; Sullivan & Pratt, 1996; Waschauer, 1996; Waschauer & Meskill, 2000). The equalizing effect of CMC generates a less threatening forum in L2 discussion that is conducive to language learning (Waschauer, 1996). Sproull and Kiesler (1991) note that Internet communities create interaction based on shared interest rather than physical proximity, thus allowing members of these communities to be simultaneously linked and buffered from one another. Consequently, many of the social norms that restrict interaction in the classroom are either absent or greatly reduced, and students feel less shy and anxious, and are more willing to experiment with linguistic forms (Kelm, 1992; Kern, 1995). In a similar study, Ma (1996) reported that on the Internet, Asian students were more direct and open than they would be in F2F contexts, in which loss of face would occur if they demonstrated inappropriate social or linguistic behavior. The students Ma studied also exhibited a reduced level of anxiety in online as compared to F2F contexts (see also Sullivan and Pratt, 1996).

Identity construction. Language is an important way of expressing one's identity and group membership. Beebe (1981) views transfer in language learning as an assertion of cultural identity, in which learners may choose to accommodate the speech of their interlocutors, to conform to norms, to negotiate identity via linguistic choices to express

themselves, or to perform a variety of these actions. The interrelatedness of SLA and identity construction has been documented in empirical studies of classroom, natural, and CMC language learning settings (Kern, Ware & Warschauer, 2004; Lam, 2004; Lapadat, 2003; Nguyen & Kellogg, 2005; Norton, 1997; Norton & Toohey, 2001; Pavlenko & Lantolf, 2000; Spears & Lea, 1992; Toohey, 2000).

There is a consensus among researchers that the process of learning a new language is also the process of identity construction, transformation and negotiation. For example, Toohey (2000) conducted a study on young children from minority language backgrounds in mainstream English-medium classrooms and found that their capabilities for learning English were greatly affected by their identity construction. Shotter (1993) asserts in his study that identity construction occurs within and through dialogue. He argues that through using certain kinds of languages, people construct different social relationships as well as a sense of their own identity. Spears and Lea (1992) argue that in networked learning environments one's social identity is presented by being part of a group or assuming a social role within the interaction. They further point out that one is more self-aware in networked learning environments than in F2F situations where no visual feedback is available. The idea behind their statement is that one develops a stronger social identity online than that developed in F2F settings.

Nguyen and Kellogg (2005) studied gay rights and homosexuality via electronic bulletin board postings in a content-based English for Speakers of Other Languages (ESOL) class and analyzed how students constructed their identities and demonstrated that language socialization was facilitated by the affordances of computer technology.

Computer-mediated communication, which offers the use of the written mode of online bulletin board postings, enables the class members to focus strategically on specific word usage and expressions and to negotiate meaning socially (see also Herrings, 1999). The students collectively constructed an understanding of key concepts such as *discrimination, normal* or *abnormal*. The process of achieving this understanding was displayed visually in the form of text, which helped students to “perceive a contrast between their values and others” (Nguyen & Kellogg, 2005, p.20), and therefore become socialized into the second language and culture. Nguyen and Kellogg’s study indicated that when learning a second language, students may, through linguistic choices, conform to norms, negotiate identities, or express themselves in unique ways. The process of constructing new identities in the CMC environment involves students’ dynamic collaborative meaning negotiations with others within a specific community of practice. Similarly, Hodgson (2002) proposed that an analysis of people’s different ways of expression can examine the processes through which social relationships are constructed and people acquire a sense of their own identity. She suggests that we need to examine closely the use of language in networked learning environments so as to uncover the process of identity construction through dialogue.

Code-switching

Code-switching (CS) is a widely observed phenomenon, especially in multilingual and multicultural communities. A variety of terms have been employed in the literature to describe the specific occurrences of this type of linguistic behavior—code-switching, code-mixing, code-alteration, code-changing, borrowing, and so forth. Among these

terms, two pairs need clarification—code-switching and code-mixing, and code-switching and borrowing. According to Hudson (1996), there is a distinction between code-switching and code-mixing. *Code-switching* occurs when people, particularly bilinguals or multilinguals, intentionally switch from one language or dialect to another due to factors such as situation, subject, feeling, and sense of belonging. This switching occurs at the sentence level, or what Sridhar and Sridhar (1980) have called the inter-sentential level. On the other hand, *code-mixing* occurs when people unintentionally incorporate small units (words or short phrases) from one language or dialect to another (Hudson, 1996). Code-mixing occurs on the word or phrase level, or what Sridhar and Sridhar (1980) have called the intra-sentential level. However, the boundary between the two terms sometimes is blurred, given the fact that the general degree of language differentiation or the speaker's intent needs to be taken into account, and more often than not, it is difficult to assess accurately a speaker's intent (Albrecht, 2004).

Unlike code-switching and code-mixing which mix languages in speech, borrowing, as explained by Hudson (1996), mixes language systems themselves, “because an item is ‘borrowed’ from one language to become part of the other language” (p.55). For example, the French phrase, *fait accompli*, and the Spanish word, *macho*, have been borrowed into the English language. According to Hudson, borrowed words or loan words are those words that have a history: ordinary people can associate borrowed words with any other language. Myers-Scotton (1988) distinguishes code-switching and borrowing according to the role of the social content of a word:

code-switching involves switched words which carry social significance, while borrowing does not. It is impossible, however, to classify every occurrence of an inserted item as code-switching or borrowing (Albrecht, 2004). Considering that these terms have not been standardized in the literature (Boztepe, 2003; Huerta-Macias & Quintero, 1992; Romaine, 1995), and my intent is to describe holistically the alternate use of two languages which occurred among Chinese ESL students during their home literacy practices in CMC, I will use the term code-switching to describe any alternation between English and Chinese.

According to Crystal (1987), the reasons for the switching are three-fold: first, when a speaker has difficulty expressing him/herself in one language, he/she may switch to the other to compensate for the deficiency; second, switching commonly occurs when an individual wishes to express solidarity with a particular social group. Rapport is established between the speaker and the listener when the listener responds with a similar switch; and third, the speaker wishes to convey his/her attitude towards the listener. These notions suggest the code-switching may be used as a socio-linguistic tool by bilingual speakers through either compensating for language deficiency or constructing identity.

Code-switching in sociolinguistics. Two distinct linguistic approaches have been applied to the study of CS: structural and sociolinguistic. The structural approach to CS focuses on grammatical aspects of CS in attempts to identify syntactic and morphosyntactic constraints on CS. *Morphosyntax* refers to the set of rules that govern linguistic units whose properties are defined by both morphological and syntactic criteria.

In contrast, the sociolinguistic approach, consistent with the view of CS as primarily a discourse phenomenon, is mostly concerned with how social meanings are created in CS and what specific discourse functions CS serves (Boztepe, 2003). Auer (1984) points out that while grammatical constraints on CS may be necessary conditions for some instances of code-switching, they are not sufficient to describe the reason for or effect of a particular code-switching. Consequently, the structural approach fails to answer the basic questions of why code-switching occurs.

Studies of CS have been carried out extensively in bilingual contexts from sociolinguistic perspectives. Blom and Gumperz (1972), whose approach has been the most influential in defining code-switching and establishing code-switching as a focus of research, identified two different types of code switching: situational and metaphorical. *Situational switching* occurs when speakers associate a certain code with social roles and situations. For instance, a teacher may deliver a formal lecture in the standard dialect, but switch to the local dialect when he/she wants to encourage an open discussion. On the other hand, *metaphorical switching* is triggered by changes in topic within a single social setting. For example, Blom and Gumperz (1972) observed that while the use of a non-standard dialect occurred in greetings and inquires about family affairs among the local people in a small town in Norway, the standard dialect occurred in conversations about business transactions. They argue that aside from purely linguistic factors, a bilingual speaker's code choice is affected by the participant, the setting, and the topic. A bilingual speaker makes code choice according to "a particular constellations of people, gathered in particular settings during a particular span of time" (p. 423) for a

certain activity. Later acknowledging that it is generally difficult for analysts to identify particular language choices as situational or metaphorical, Gumperz (1982) adopted another terminology: conversational code-switching. It was, however, described and defined largely in terms of metaphorical switching.

Myers-Scotton (1983) developed Blom and Gumperz's situational and metaphorical dichotomy, and presented a Markedness Model which attempted to define, in general terms, the psycho-social factors that motivate a bilingual speaker to choose one language over another for a particular utterance or stretch of discourse. According to Myers-Scotton, *marked* refers to the unexpected use of a code over another, whereas *unmarked* refers to the conventional use of a code. The social purpose of conversation is the negotiation of a set of rights and obligations between speakers and addressee, which she calls a "rights-and-obligations" set (RO set) (p.117). Within this model, language choice indexes an identity, and is associated with particular social roles. Therefore, the code used in CS has socio-psychological associations, making it indexical of a RO set. By speaking a particular language, a speaker signals his/her understanding of the current situation and particularly his/her relevant role within the context. By speaking more than one language, speakers may initiate negotiation over relevant social roles. According to this model, speakers understand the indexical value of each language in their repertoire. For each situation, there is an expected or unmarked language, indexing the appropriate values for participant relations. A speaker generally chooses the unmarked language, since it expresses relationship between speaker, hearer, and setting. However, speakers analyze the potential risks and benefits of all other potential choices, and may make a

marked choice on the basis of this calculation. Studies by Gumperz (1982) and Myers-Scotton (1983) have been echoed by many other researchers (Bourdieu, 1977; Genesee & Bourhis, 1988; Gibbons, 1987) who argue that code choices are made as a result of both social factors and those related to the immediate situation.

Studies have been conducted of the discourse functions of CS, and several of these researchers have reported that CS functions primarily as a symbol of group identity and solidarity among members of the speech community (Beebe, 1981; Gal, 1978; Milroy, 1987). Gumperz (1982) identified six basic discourse functions that CS serves in conversation: (a) quotations, (b) addressee specification, (c) interjections, (d) reiteration, (e) message qualification, and (f) personalization versus objectivization. According to Gumperz, quotations occur when someone else's utterance is used either as a direct quotation or as reported speech. In addressee specification, the speaker switches code to direct the message to one particular person among several addressees present in the immediate environment. Interjections refer to sentence fillers, such as the English filler *you know* inserted in an otherwise completely Spanish utterance. Reiteration occurs when the speaker repeats a message in the other code to clarify what is said. Message qualification is defined as an elaboration of the preceding utterance in the other code. Personalization versus objectivization refers to the degree of the speaker involvement in a message; for example, in the case of giving one's statement more authority in a dispute through CS. Gumperz's study suggests that the functions of code-switching range from conveying intentional meaning to signaling the social identities of the speakers involved.

Numerous studies of CS have examined the social meaning and discourse functions that CS serves from a sociolinguistic perspective. They have analyzed the many and diverse ways in which CS and society entwine, or how CS serves social purposes and is shaped by the social nature of human beings. However, most of these influential studies have investigated this linguistic behavior with people who were fluent in both languages, or people who alternated between two dialects, but not with learners who were in the process of acquiring a second language. A common feature of these studies is that they focused on “expert” code-switching by bilinguals, which is smooth, and viewed as an advanced skill (Romaine, 1995). Sociolinguistic studies consider code-switching to be one of the linguistic means bilinguals exploit in negotiations of their social relations. Studies are scant that focus on ESL students whose second language level does not enable them to communicate fluently. Furthermore, I would argue that the sociolinguistic approach has failed to discover what the speaker accomplishes both linguistically and socioculturally through CS, or how CS is related to the development of L2. Despite the numerous studies of CS through structural and sociolinguistic perspectives, studies of CS are limited in the SLA area, especially in the area of language learning in a CMC environment.

Code-switching in second language acquisition. In studying code-switching behavior in the second language learning contexts, researchers of recent studies (e.g., Anton & DiCamilla, 1998; Brooks, 1992; Swain & Lapkin, 2000; Wells, 1998) do not employ the term, “code-switching”. The focus of their studies has been on L1 use in the L2 classroom. L1 use in the L2 classroom has long been a controversial issue between

both researchers in SLA and foreign language (FL) classroom teachers (Thoms, Liao & Szustak, 2005).

Until recently, employing L1 to carry out a learning task in the L2 classroom was viewed as counter-productive. Previous research tended to indicate that overuse of L1 deprives learners of input in the target language (Carroll, 1975; Chaudron, 1988; Wong-Fillmore, 1985), with the implication that the more learners are exposed to input in the target language, the more they will learn, thus denying the role of L1 in L2 acquisition. As claimed by Dickson (1992) and Gass (1988), however, mere exposure to input in the target language cannot ensure *intake*, which is defined by Ellis (1997) as “the portion of the input that learners attend to and take into short-term memory”. Swain (1985, 1993) asserts that modification of the input, as well as either or both interaction and the output, may determine whether or not input becomes intake. Therefore, Turnbull (2001) suggests that input in the target language may become intake more readily if teachers resort to L1 judiciously to “catalyze the intake process in some way” (p. 531).

Some recent studies by Brooks (1992) and other researchers (Anton & DiCamilla, 1998; Brooks, 1992; Brooks & Donato, 1994; Cook, 2001; Darhower, 2002; Fernández-García, & Martínez-Arbelaiz, 2002; Wells, 1998) have examined the role of L1 in the L2 classroom among second language learners whose L2 proficiency was relatively low. These studies have thrown light upon the benefits of the use of L1 in the L2 learning environment. For example, by examining the L1 use of eight pairs of Grade 11 Spanish learners engaged in an information-gap activity, Brooks and Donato (1994) report that L1 use is a “normal psycholinguistic process that facilitates L2

production and allows learners both to initiate and sustain verbal interaction with one another” (p. 268). Furthermore, Platt and Brooks (1994) noted that students use their first language when they engage in a difficult task involving problem solving. According to Platt and Brook, L2 learners resort to their L1 when they talk to themselves (private speech); when they define a learning task for themselves (situation definition); and when they comment on their own language production (metatalk). In a similar vein, Anton and DiCamilla (1998) highlighted the critical functions of L1 in the L2 learning process by examining students who participate in a collaborative writing task in the L2 environment. Their findings indicated that L1 is used as a mediating tool to facilitate scaffolding; to achieve intersubjectivity with their partners during collaborative pair work; and to externalize one’s inner speech during cognitively difficult tasks. In their study, Anton and DiCamilla demonstrated that L2 learners resort to their L1 not only to mediate the cognitive process used in problem-solving tasks, but also to access L2 linguistic forms.

To provide empirical evidence of the advantages of L1 in the L2 classroom, Swain and Lapkin (2000) investigated the use of L1 by two groups of Grade 8 French immersion students as they completed a dictogloss or jigsaw task. The results of the study show that L1 use has three major functions: “(a) moving the task along, (b) focusing attention, and (c) interpersonal interaction” (pp. 257-8), and that L1 is used most frequently for task management purposes. Swain and Lapkin analyzed the relationship between the amount of L1 use and the quality of students’ writing, as well as the variability in task performance across student pairs. Significant negative

correlations were found between the percentage of L1 use and the quality of the performance in the jigsaw task group. However, no significant correlations were found in the dictogloss task group. The explanation for this result, according to Swain and Lapkin, is that the dictogloss students needed to use their first language more to understand the story than did the jigsaw students who had a series of pictures to interpret. Swain and Lapkin concluded that judicious use of L1 can support L2 learning in the sense that it should neither be prohibited nor actively be encouraged as it may substitute for, rather than support L2 learning. The conclusion Swain and Lapkin have drawn from their empirical study is significant in understanding the role that L1 plays in L2 learning tasks.

However, these studies are small in number, and restricted to classroom settings where L2 learners share a first language and are situated in their home countries learning a second/foreign language. Unlike those L2 learners in the studies discussed above, English-as-second-language students who are situated outside of their countries of origin, such as ESL students in Canada, are confronted with not only linguistic but also psychological and cultural challenges that have an impact upon their second language acquisition. However, a few studies have been conducted that systematically investigate the function of L1 among ESL learners with relatively low L2 proficiency in natural L2 learning contexts beyond the classroom, such as in CMC environments, and therefore, importance should be attached to such studies.

Studies of code-switching in computer-mediated communication. Because new technologies such as CMC are increasingly being used in L2 learning environments, research in code-switching in CMC has been rather limited and needs to be expanded. The limited information available about L2 learners' code-switching within the CMC context suggests that learners employ this linguistic strategy not only to compensate for language deficiency for communicative purposes but also to create an ethnic identity. Kotter (2003) investigated how German learners of English and American learners of German exploited their bilingual knowledge during the online MOO (Multi-User Object-Oriented)-based tandem exchanges. MOO is a text-based online environment that is similar to a chatroom. This study examined how the participating language learners code-switched and how their metalinguistic skills were enhanced in the online tandem between NNS and NS. The study showed that these learners were engaged in negotiation of meaning via MOO to avoid communication breakdowns. One of the ways was code-switching, which language learners employed to negotiate meaning and scaffold their partners' task in order to establish and sustain mutual understanding. By code-switching, the learners also attempted to prompt their partners to revert to the established code of a conversation or converge on their choice of code to receive additional input in their L2 and sometimes to get further opportunities to practice their own target language skills. As a result of negotiating meaning and code-switching, the learners' metalinguistic abilities were developed. Nevertheless, it still remains unknown how L2 learners code-switch in natural or informal electronic language learning

environments between NNS and NNS, the specific linguistic skills that would be facilitated, and the circumstances under which code-switching would occur.

Lam (2004) conducted a study based on a language socialization framework to examine the home literacy practices of two teenage Chinese immigrants in the United States. She studied their use of English on the internet, with a focus on their social and discursive practices in a Cantonese/English bilingual chat room. Lam argues that the Internet chat room provided a context for language socialization in which a mixed-code variety of English was adopted and developed among the focal youth and their peers across the world. This variety of English includes varying degrees of code-switching from predominately English to predominately Cantonese. Drawing on the linguistic and discursive conventions of Cantonese, code-switching not only helped the girls and their peers develop “a sense of fluency in English” (p. 59), but also distinguished them from both monolingual English speakers and monolingual Cantonese speakers, thus constructing their collective ethnic identity as bilingual speakers of English and Cantonese. The resulting new identity, as reported, has “influenced their relation to the English language in the US” (p.59).

Lam has contributed to the literature by addressing explicitly Chinese ESL students’ construction of identity on the Internet through code-switching. Her study also touches upon the issue of the mixed-code variety of English, specifically code-switching, and its relevance to English language development. However, this line of research could be further supported by evidence from chat room exchanges exhibiting what language

skills are developed, and tracing the contexts in which the code-switching occurs, and identifying the communicative purposes of the code-switching.

Research Questions

In this study based on interactionist and sociocultural perspectives, and motivated by my personal experience as a bilingual speaking Mandarin Chinese as the first language and English as the second, I examine Chinese ESL students' code-switching behaviour which occurred when they were engaged in home literacy practices in CMC contexts, compare the code-switching strategies employed by the Chinese ESL students, and infer the relatedness code-switching had for the students' English language development. This study is useful in that it contributes to second language acquisition theories, enriches literature in CMC, provides guidance for ESL educators on how to innovate their instruction in order to meet ESL students' needs, and helps ESL students build up their confidence in learning English. The research questions are formulated as follows:

1. How do Chinese ESL students code-switch across languages and modalities, according to their communicative purposes, when engaged in computer-mediated communication?
2. What are the similarities and differences in computer-mediated communication among Chinese ESL students who differ in age and level of study, particularly the way they code-switch?
3. What is the relevance of code-switching to the participants' English language development?

Summary

There is no conclusion in the literature as to what contributes to minority students' academic failure. Research findings indicate that home literacy practices are one of the factors that affect minority students' school success. Computers have become an important part in the home literacy practices of students from ethnic groups. Computer-mediated communication has been incorporated in language teaching and learning, mostly at the college level. Numerous studies show that CMC has brought about a myriad of benefits to students in terms of language learning. Code-switching, a widely observed linguistic behavior among bilingual students, occurs in CMC. Although CS has been studied extensively through structural and sociolinguistic approaches, the studies of CS in SLA, especially in CMC, are rather limited. The available studies of CS in CMC demonstrate that the code-switching strategies bilingual students employ serve linguistic purposes as well as social functions. Therefore, this study examined the code-switching strategies Chinese ESL students employed while engaged in CMC at home, identified the contexts in which code-switching came about, and looked at the relevance of code-switching to English language development.

Chapter Three: Research Design and Methods

Introduction

I used a qualitative research approach in this study. I employed a multiple case study design in order to compare the ways Chinese English-as-a-Second-Language (ESL) students who differ in age and study level code-switch in Computer-Mediated Communication (CMC). My sample of 4 participants included three Chinese ESL students and the parent of the student who was under the age of 18. I gathered data through interviews using open-ended interview questions and probes to pursue important leads. Finally, I utilized an inductive thematic analysis approach for data analysis through a qualitative data analysis package NVivo, and this approach enabled me to discover overarching themes that emerged from the individual data and from across the participants. Each of these aspects of the method is addressed in detail below.

Research Design

I chose to use a qualitative multiple case study approach in my study for a variety of reasons. First, Lincoln and Guba (1985) argue that qualitative methods are more suitable to dealing with multiple realities and more sensitive to “the many mutually shaping influences and value patterns that may be encountered” (p. 40). Code-switching (CS) in CMC is a complex process in which a variety of factors may contribute to the occurrence of CS. The factors may involve linguistic, social and cultural elements and interact in unique ways for different individuals or within different contexts (Crystal, 1987; Lam, 2004). Gaining in-depth prospective information of a complicated phenomenon, in this case, code-switching, may be

difficult to express quantitatively (Bodgan & Biklen, 2003; Strauss & Corbin, 1990). Second, a quantitative approach could oversimplify the problem and fail to capture the complexity of the issue under investigation and required making too many *a priori* assumptions about each variable that may not reflect the events accurately (Miles & Huberman, 1984). Because my study was aimed at exploring, describing, and understanding the variables that may have a role to play in code-switching in CMC, I took a qualitative approach which facilitates descriptive and explorative study (Bodgan & Biklen, 2003). This approach allowed an investigation of participants' code-switching in CMC. From this exploratory study, I made sense of the participants' linguistic behavior in terms of the meanings they brought to their environments. Third, a qualitative approach enabled me, as a researcher, to act as an active learner, reporting a detailed descriptive account from the participants' view rather than as an "expert" who passes judgment on participants (Cresswell, 1994).

Within the qualitative paradigm, I adopted a multiple case study method in the present study. Yin (1989) contends that a case study method is preferable to examine a contemporary phenomenon in its real-life context, especially when the unit of study cannot be separated from its context. Miller (1997) indicates that the case study method has the potential to account for language learning as discourse acquisition, and the real-life settings under which L2 learners operate thus become important in capturing the multi-dimensional factors that influence second language acquisition (SLA). As a linguistic behavior occurring in the course of home literacy practices in CMC (Lam, 2004), code-switching is complex and highly contextual. Rather than attempt to study

these phenomena—code-switching, and real-life settings or context—in CMC at home separately, the present study captured the rich contexts of code-switching in CMC and delved into the factors influencing this linguistic behavior. Of the various approaches to case studies, a multiple case study design was suitable for this study, because I not only investigated a contemporary phenomenon within its natural setting through holistic inquiry but also compared the three participants in an attempt to “build a general explanation that fits each case of the individual cases, even though the cases may vary in their details” (Yin, 1989, p. 108). In so doing, the potential for generalizing beyond a particular case is increased, and an interpretation based on evidence from several cases can be fuller than that based on a single case (Miles & Huberman, 1984; Merriam, 1988). Generalization of findings from a multiple case study is aimed toward some broader theory (Yin, 1989), reassuring the researcher that “the events and processes in one well-described setting are not wholly idiosyncratic” (Miles & Huberman, 1984).

Participants

Sampling is crucial for data analysis in a qualitative study, and “must be theoretically driven—whether the theory is prespecified or emerges as you go” (Miles & Huberman, 1994, p. 29). In my study, I employed a purposeful sampling strategy, a strategy that enabled me to seek information-rich cases that can be studied in depth (Patton, 1990). Of the various types of purposeful sampling, I selected *maximum variation sampling* suggested by Patton (1990; see also Miles & Huberman, 1994). Patton argues that maximum variation sampling can yield detailed descriptions of each

case, in addition to identifying the central themes or principal outcomes that cut across cases. Therefore, I deliberately searched for variations to see whether main patterns would still hold and to increase confidence in conclusions (Miles & Huberman, 1994).

The study took place in a mid-sized northern Canadian city, to which I gave the code name “Northernlight”. My selection criteria were as follows. First, they should be students who differ in age and level of studies. Second, they should be recent arrivals in Canada within last year. Third, they should come from mainland China, and speak Mandarin Chinese as their first language.

I set these selection criteria for the prospective participants for a number of reasons. First, according to Blom and Gumperz (1972), language proficiency is one of the three factors found to affect code-switching. Participants at different study levels are supposed to differ in English proficiency due to the length of their English study and the exposure to this language. English proficiency affects the purpose behind code-switching.

Second, the participants, as recent arrivals in Canada, have not completely adapted to their studies, or to the culture and life here. In particular, their English proficiency was limited at the time of the study, and therefore, does not enable them to communicate in written English with ease. As a result, code-switching would be more likely to occur and to occur more frequently (over the course of use of technologies at home) than would be otherwise, and code-switching would be more observable and comparable.

Third, Mandarin Chinese spoken in mainland China is different from that spoken in Taiwan, and from Cantonese, one of the Chinese dialects spoken in Hong Kong. The

Chinese expressions used in mainland China and Taiwan and Hong Kong differ. Furthermore, simplified Chinese characters are used in mainland China, whereas the traditional complex forms of Chinese characters are used in Taiwan and Hong Kong. I am from mainland China, speak Mandarin Chinese, and am most familiar with the simplified Chinese characters. Therefore, as a researcher, I can most productively analyze and interpret simplified Chinese characters and the Mandarin language.

Lastly, although Hong Kong and Taiwan are parts of China, and Mandarin is their official language, they differ in terms of values and customs due to their long separation from mainland China and differ in their political systems. For all of these reasons, I limited my sample to Mandarin-speaking recent arrivals from mainland China.

Therefore, despite my attempt to achieve variation in sampling, I was limited in my choice of participants, as I required Mandarin-speaking participants who were recent arrivals from mainland China and differed in age and levels of study, and the population fitting this description in Northernlight is small. My sample was, in part, a sample of convenience, but within the constraints, I was striving to achieve maximum variation.

Three Chinese ESL students (Amy, Baillie, and Cynthia) who met my selection criteria and one parent (Emma) participated in the study. All names are pseudonyms. Amy, 13 years of age, was in elementary school; Baillie, 20 years of age, was in college; Cynthia, 25 years of age, was in university. Emma, the parent, is an immigrant, and has been self-employed since her arrival in Canada. Selected participants in this study reflected a range of educational institutions and levels of study in the community, ranging from elementary to post secondary.

Upon approval of this study by the University of Northern British Columbia (UNBC) Research Ethics Board, I embarked on the recruitment of the participants. Through a potluck dinner organized by the local Chinese community, of which I am a member, I became acquainted with two immigrant families that had arrived in Northernlight last year. Each family had a child attending elementary school. With the parents of these two children, I discussed home computer use and the parents' attitudes towards computers. As a result of the discussion, I invited a parent who was supportive of her child's use of computer at home, and her child's participation in my study.

As well, I spoke to a few women who recently arrived in the city and who were either taking ESL courses at the local community college or pursuing their undergraduate/graduate studies at the university. I also became acquainted with them at a party given by the local Chinese community. By speaking with them, I found that some of these female students used the computer to communicate with their friends or classmates only in Chinese, and some communicated with friends or classmates sometimes in Chinese and sometimes in English. I had a further talk with those students who communicated on the internet in both Chinese and English and asked them whether they had encountered difficulty in expressing themselves entirely in English. Then I focused on those who articulated their difficulty. From these students, I invited one from the college and one student from the university to participate, both of whom showed interest in my study, and with whom I felt comfortable talking with. Ideally, I would have liked to include a high school student in my study as well, but was not able to locate a suitable participant who met my criteria.

Data Collection

I used a variety of qualitative data gathering techniques in this study. The particular methods selected for this research included (a) audio-taping interviews with the participants, (b) video-taping the participants' actual use of computers, and (c) collecting documents such as electronic artifacts. Yin (1993) suggests that multiple sources of evidence can provide multiple measures of the same phenomenon. Findings from a multiple case study through triangulating multiple data sources are likely to be more convincing and accurate (Yin, 1993).

Interviews. Although a variety of different data collection methods may be adopted across disciplines that employ the case study method, semi-structured interviews are popular because they address the topic at hand and draw from the informant's emerging world view (Merriam, 1988). Guided by *depth interviewing* techniques recommended by Patton (1987), I used open-ended interview questions to pursue important leads and probed particular details through follow-up questions (see Appendix A for interview questions). Depth interviewing refers to "asking open-ended questions, listening to and recording the answers, and then following up with additional relevant questions" (Patton, 1987, p. 108). Open-ended questions (for example, "How do you feel about the use of computer at home?") solicit the interviewee's unstructured answers, and yield in-depth responses about his/her experiences, perceptions, opinions, feelings, and knowledge (Patton, 1987). In contrast, closed-ended questions (for example, "Which of these books do you prefer, fiction or non-fiction?") restrict the interviewee's responses by supplying alternative answers and requiring him/her to choose from a fixed set of

possible responses. Interview questions were formulated based upon the following sources of information: (a) the research questions for this study, (b) the literature review conducted for this study and (c) my own knowledge and experience as a teacher and L2 learner. As well, I am the parent of a teenager girl who code-switched between English and Mandarin when using CMC, and this personal knowledge helped me to frame pertinent questions. The open-ended interview questions enabled me to obtain as much information as possible from the participants, as well as to direct and regulate each participant's responses in the sense that data are complete from each participant on the topics addressed in the interview (Patton, 1987).

Video-taping. To corroborate the data gathered from the interviews, I also collected information through videotaping observations, and analyzing electronic artifacts (Yin, 1993). I observed and video-taped the participants' computer use, specifically when they chatted online, to record what was going on in their online chatting.

Electronic artifacts. The participants provided me with the electronic transcripts of their online chatting either in chat rooms or on MSN, and other electronic artifacts of computer products, such as emails, graphics, and web pages. These electronic artifacts were their personal social communication. These documents provided detailed empirical evidence of code-switching to clarify or corroborate the participants' descriptions and explanations from the interviews. These supplementary data enabled me to generate a clearer understanding of code-switching in CMC.

Procedure. I met with all of the participants separately and articulated my responsibilities and expectations of them, and what they could expect of me. I discussed the explanatory information about the study and also provided this information in the form of written letters both in English and Chinese (see Appendix B) and the consent forms both in English and Chinese (see Appendix C) with all the participants prior to their signing the consent forms. My oral explanations were provided in Mandarin. The parent of the participant from elementary school signed the consent form to allow her child to participate, and also agreed to participate herself. As well, I offered to answer any questions or address any concerns they may have had concerning the study.

After the participants had given informed consent for their participation, I determined the student participants' English proficiency by administering the Canadian Language Benchmark (CLB) Assessment which is used primarily for placement in language training by the Immigrant and Multicultural Services Society in Northernlight. This test is not a pretest in pretest-posttest comparisons used in a true experimental design. The purpose of pretest-posttest comparisons is to assess a pedagogical or technological intervention by detecting differences in learning outcomes between two points in time – before and after the intervention. The present study did not involve any intervention and did not intend to compare any learning outcomes quantitatively. I administered the test so as to identify the developmental levels of the participants' resources in the English language, and to give a clear indication of how participants with different resources in English employ code-switching strategies in different social contexts. The assessment measures three areas of language ability: a) speaking/listening,

b) reading, and c) writing. Given the nature of the present study, only reading and writing were assessed. According to the Canadian Language Benchmarks, there are three stages, namely, basic proficiency; intermediate proficiency; advanced proficiency, with benchmarks 1-4 at each stage. The test results show that the participant from the elementary school was somewhere between levels 3 and 4 at Stage 1 (basic high proficiency) regarding English reading and writing. The English reading and writing level of the participant from the college was somewhere between levels 5 and 6 at Stage 2 (low intermediate proficiency). The participant from the university reached the level of 7 or 8 at Stage 2 (high intermediate proficiency). I administered the test in order to help me interpret the purposes of the code-switching strategies among the three participants.

Upon the completion of the test, I scheduled the interviews and video-taping. Appointments for interviews and video-taping were made at the participants' convenience, and the parent was involved in the scheduling of her child's interviews and video-taping.

The participants and I share a first language. I therefore conducted the interviews in Mandarin Chinese, which enabled the participants to express themselves fully and accurately. Each participant (the three students and the parent) was interviewed individually twice, with each of the two sessions lasting approximately 30 minutes. The rationale for having two sessions is threefold. First, I was able to acquire an in-depth account of the contexts of their code-switching in CMC without making them tired by interviewing them for one long session. Second, it was possible for me to clarify some questions or pose additional important questions during the second session after

conducting preliminary data analysis of the first interview. Third, the second session offered me a chance to check information with the participants to ensure validity of the initial data and findings. The video-taping for each of the student participants was carried out after the second interview, and lasted about 30 minutes. I conducted the video-taping in the home of each of the participants, with the video camera oriented at the screen at times, and at other times oriented simultaneously at the screen, the participant and the keyboard. After I completed the entire data collection for the first case, I proceeded with the second and then the third. Data collection was done case by case, because doing more than one case at a time may lead to confusion (Bogdan & Biklen, 2003).

The interviews of the four participants were tape recorded for transcription. Immediately following each interview, I transcribed the interview in Chinese and then translated it into English. I also wrote post-session memos to capture non-verbal information from the interviews (Yin, 1994), and my reflections about the interview sessions. The students provided me with some of their electronic artifacts, such as electronic copies of emails, MSN chat, or graphics after the second interview, and the electronic transcripts of their online chat after the video-taping. These field notes and electronic artifacts played an instrumental role in generating some follow-up questions with particular participants to obtain additional information and also in establishing a context for interpreting and making sense out of the interview (Patton, 1987).

Researcher Role and Reflexivity

Bogdan and Biklen (2003) recommend that researchers “lighten up” their personal opinions, and argue that it is neither possible nor desirable for researchers to enter the field of study as “a clean slate” (p. 34) no matter how much they try to divorce their research from their past experiences, status, beliefs, and values. Researchers should aim to become more reflective and conscious of how their past experiences, status, beliefs and values shape and enrich their research rather than trying to eliminate their previous experiences (Bogdan & Biklen, 2003).

From the outset and throughout the subsequent stages of the study, I positioned myself as a researcher who had an informed theoretical framework and was responsible for data collection and analysis, as a teacher who had had experience working with students studying English as a foreign language in my country of origin, and as a learner who wished to gain knowledge about how Chinese ESL students employ code-switching with the aid of CMC. At the same time, I recognized that I entered the field of study also as a part-time instructor at the university, as a mother of a teenage girl, as a member of the local Chinese community, and as a full-time graduate student. I realized that the participants might have been aware of my multiple roles, which could affect the establishment of trust with the participants. The self-awareness of my previous experiences and multiple statuses enabled me to proceed cautiously into the field of study.

Van Lier (1988) points out that the researcher brings ideas and experiences he/she has gained over the years to the study, which provides some common ground between

the research and the setting. I was aware that I possessed an informed conceptual framework established during the literature search and shaped by my personal experiences. As well, I am a bilingual Chinese person/woman, speaking Mandarin Chinese as my first language and English as the second. I experienced code-switching when I was at an early stage of English literacy development, and am still employing code-switching strategies in interaction with the local Chinese people and in some social functions. I taught English at a university in my home country for quite a number of years, and I have noticed the way in which my students code-switched while answering questions in English and working on compositions. As the mother of a teenage girl, I have observed that my daughter uses the computer at home as an aid to English studies, and that she switches languages while engaged in activities on the Internet. As a current user of computer technology, I communicate by means of the computer with my Chinese friends home and abroad, and code-switch under some circumstances when I send emails. I am conscious that the code-switching strategies I employed when I was at an early stage of English literacy development differ considerably from the ones I adopt now. I am also cognizant that the way my students code-switched (at a time when computer technologies were not popularized in my country of origin) might differ, to a certain degree, from the way current bilingual students code-switch with the aid of today's technologies. The conceptual framework, my personal and professional experiences have influenced the way I have conceptualized this research, the formulation of the research and interview questions.

Bogdan and Biklen (2003) suggest that cultural identity sometimes facilitates fieldwork, and sometimes complicates it when researchers are studying people within their same ethnic group or when they are studying people in another culture. The participants and I share the same cultural background and speak the same first language, and therefore, I had an in-depth understanding of the participants' customs and values. Additionally, I am pursuing my studies as an international student at a Canadian university. My status as a part-time instructor at the university might cause the two participants from post-secondary institutions to keep a distance from me, and therefore, after I selected them as the participants of my study, I endeavored to approach them as a graduate student by doing things together with them, such as inviting them for dinner and sharing my previous and current experiences as a student with them. All of my endeavors led to my identification with the two participants without much difficulty, and consequently their good cooperation with my research study. The parent participant completed her graduate studies in the United States and is approximately the same age as I am. Our similar personal and educational backgrounds brought us together quickly. The friendship I established with the parent also brought the teenaged participant closer to me. Besides, being a mother myself, I have experiences of approaching a teenager in a "proper" way. My multiple statuses facilitated communication and rapport with the participants and the parent.

On the other hand, the self-awareness of my multiple roles and the realization of the subjectivity I may bring to the study made me constantly confront my own opinions with the data, as suggested by Bogdan and Biklen (2003). I therefore remained

constantly aware of my contribution to the construction of meaning at all stages and in all aspects of my research, due to my role of being both an insider and outsider (Bogdan & Biklen, 2003). I reflected throughout the research process upon the ways in which my involvement, such as my own values, experiences, interests and cultural identity, shaped the research and how the research may have affected me and possibly changed me as a researcher. I always thought about the assumptions I made over the course of my study, and interrogated the subjective beliefs, thought, attitude and opinions I brought to the study. When the data conflicted with my general opinions, I tried to be open to the argument, and to shape my thinking by the empirical world I was exploring rather than being defensive of my opinions (Bogdan & Biklen, 2003). I also kept a reflective journal to record my thoughts that arose throughout the research process.

Ethical Considerations

Being an ethical and responsible researcher is very important. From the time when I decided to conduct the present study and started to select participants to the time when I collected data and wrote a report of findings, I considered ethical issues, and incorporated them into my practice.

The first ethical consideration was to secure the informed consent of all the participants and from the parent of the participant under the age of 19. To ensure that the selected participants fully understood the nature of the study, and what would be expected of them prior to consenting to participate, I met with each of the participants and the parent, and explained to them the purpose of my study. I informed them verbally and in writing that their participation was voluntary, that there was no obligation on their

part to participate, and that they had the right to withdraw at any time. The participants also were informed that if anyone of them chose to withdraw, any data collected on him/her would not be used in my study. In order for every participant and the parent to understand fully the nature of my study and the voluntary nature of their participation, I prepared letters to participants and the parent, and consent forms both in English and in Chinese (see Appendix B).

My next ethical consideration was to ensure and maintain the participants' anonymity and confidentiality of the personal information that they provided. The local Chinese community in Northernlight is relatively small, and as a person from mainland China myself, I know many members of the local community. The selection of the participants was not random, but consisted of individuals of my immediate acquaintance. Such being the case, I assured the participants in writing and verbally that confidentiality of such information as the schools they were attending would be maintained through the use of code names in the transcripts and in reports of the findings. I made it clear to them that I would avoid using any information that would allude to the identification of an individual, and that I would be the only person to have access to the original audio and video-taped information they provided. Once I entered the data into a computerized password protected database, I would keep the tapes in a locked file for a maximum of two years and then they would be destroyed. The participants also were informed that the final report of the findings from this study would be available in the form of a thesis at the university library for anyone who wished to access the findings (see Appendix B).

I assured them that this study would adhere to the required ethical rules and guidelines, and that approval from the Research Ethics Board at UNBC had been obtained.

Overview of Data Analysis Approach.

Data analysis is an ongoing cyclical process integrated with all phases of qualitative research (Merriam, 1988; Miles & Huberman, 1994). Data collection should be conducted simultaneously with analysis from the first time a qualitative researcher gets to the field, thus easing the potentially huge and overwhelming data analysis task (Miles & Huberman, 1994). As the data were collected and analyzed, I had the opportunity to examine the existing data to determine whether new data needed to be gathered in order to clarify, confirm, or fill in gaps that may exist in the current data. Preliminary data analysis drove an ongoing data collection in the sense that it allowed me to reshape my perspective and revise data collection techniques to collect richer, more relevant data (Miles & Huberman, 1994).

I began data analysis following the first interview with a participant. Simultaneous data collection and analysis offered me an opportunity to collect more data from her and subsequently from the other participants, to clarify and confirm my emerging understandings and to uncover ideas that required further investigation. The four participants in my study were interviewed individually for two sessions each. I analyzed the data from the first session with a view to presenting to the participants ideas that emerged from the preliminary data analysis for member checking, before moving on to collect additional data in the second session. Member checking involves taking data and interpretations back to the participants from whom the data and interpretations were

derived and checking with them the plausibility of the results (Merriam, 1988). Doing so can ensure the validity of qualitative research (Merriam, 1988). After analyzing data from the second interview and videotaping, and conducting a preliminary analysis of the artifacts provided by the participants, such as MSN chat transcripts, emails, webpages, or graphics, I made a follow-up inquiry via telephone about specific issues. For example, I posed questions such as “Why did you code-switch here?”, or “Why did you use the Chinese interjection to code-switch?” to obtain clarification or confirmation. Preliminary data analysis and my follow-up inquiry enabled me not only to present to the participants my interpretations of their data for member checking but also to reduce the likelihood of misinterpretations in my subsequent data analysis.

Data analysis software. I used the qualitative data analysis (QDA) software package *QSR NUD*IST Vivo (v2.0)*, commonly referred to *NVivo* (Richards, 1999), for data analysis and management in this study. The features and functions of the software allowed me to make multiple passes at my data as I examined, labeled, and re-labeled code categories during the analysis. NVivo provided an avenue of writing and storing ideas that emerged during data analysis process. It also presented me with tools for searching, coding, sorting, merging, linking my data, and conceptualizing my findings. A description and discussion of the software functions that I used in my data analysis is provided in the *Data analysis* section of the Research Findings of Chapter IV.

Steps in data analysis. It is central to qualitative research to understand and apply appropriate methods of data analysis. In this study, I applied a mixture of both inductive and deductive approaches, with an inductive thematic analysis as the major method, so

as to discover overarching themes that emerged from each individual participant's data and across all the participants' data (Miles & Huberman, 1994). The process of data analysis is shown in Figure 1.

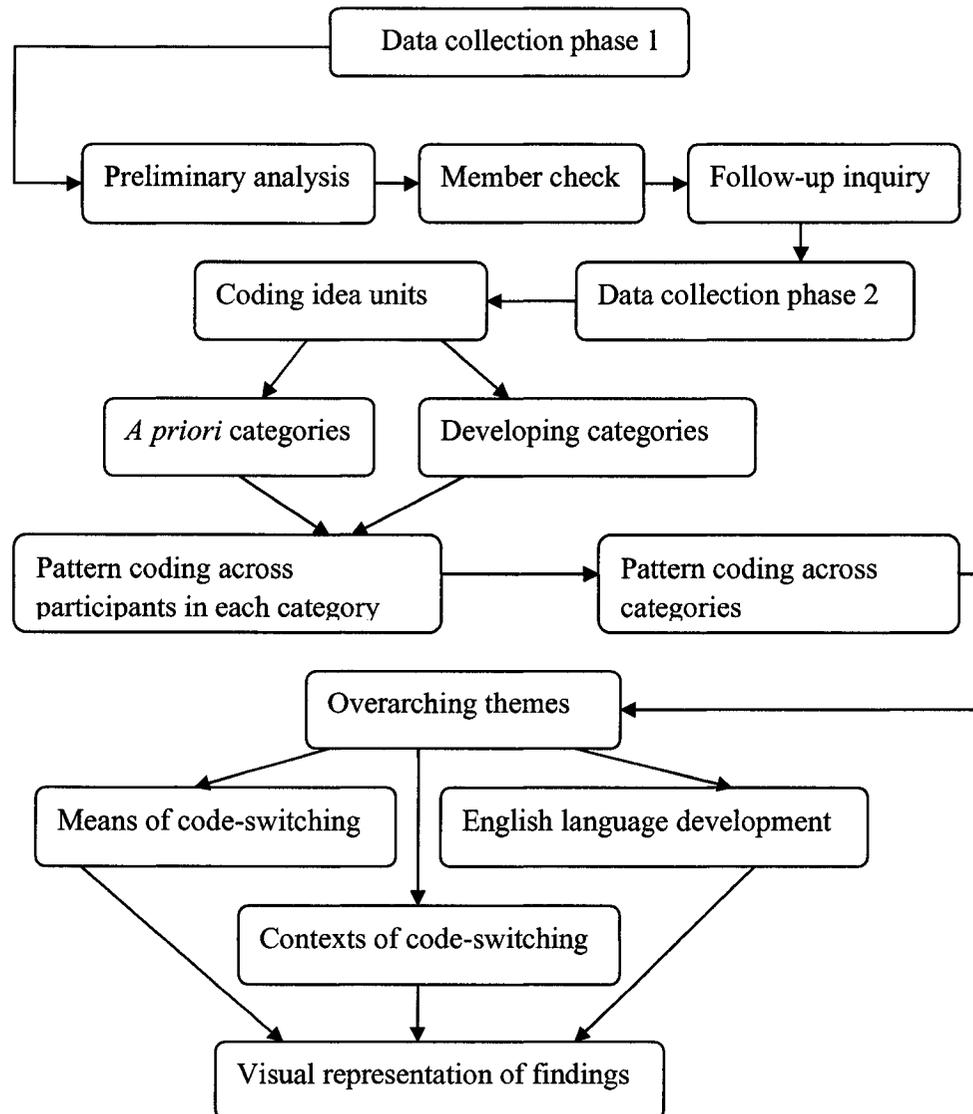


Figure 1. Process of Data Analysis.

For each participant, in order to make sense out of the data, I first performed a preliminary analysis of the data of the first interview before conducting the second interview with the participant. After the preliminary analysis of the artifacts collected

from the student participant after the second interview and the video-taping, I made a follow-up inquiry via telephone. During this process, I underlined significant parts of the transcription and made marginal notes to avoid losing initial impressions.

Another essential component of data analysis in this step was development of the coding criterion to operationalize the identification of code-switching instances. In this study, I defined code-switching as alternating between English and Mandarin Chinese either at intrasentential level or at intersentential level. This definition played an instrumental role in my decision-making about the inclusion and exclusion of instances of code-switching. All of the electronic artifacts the participants provided were their personal online communications solely in English, except for the segments where code-switching occurred. I thus set the coding criterion as shown in Table 1.

First, I included instances of the use of Chinese notional words, Chinese interjections, such as *aiya*, *eng*, and *en*, modal particles (tone-indicating particles, such as *ba*, *la*, *ne*, and so forth) used at the end of an English sentence, and the use of a Chinese sentence, as code-switching. For example, “What is *chuanqi*?” *Chuanqi*, written in Pinyin, or Romanized Chinese, means a legend. Another example is : “*aiya*, it is time to watch TV”. *Aiya*, a Chinese interjection, indicates surprise. In “impossible *ba*”, *ba*, a Chinese modal particle, indicates that the speaker does not fully believe the preceding statement made by her interlocutor. In “Guess” “*bu shuo jiu suan le*”, *bu shuo jiu suan le*, a Chinese sentence in Pinyin, means that it is okay if you don’t want to tell me.

Table 1. *Coding Criteria of Code-switching*

Coding Criteria of Code-switching	Examples
Inclusion of instances of code-switching	
Use of Chinese notional words	What is <i>chuanqi</i> ?(legend) ¹
Use of Chinese interjections	<i>aiya</i> , it is time to watch TV. (<i>aiya</i> indicates surprise.)
Use of Chinese modal particles	Impossible <i>ba</i> . (<i>ba</i> indicates that the speaker does not fully believe the preceding statement made by her interlocutor.)
Use of numbers which are homophones with some Chinese words	88 (meaning “bye-bye”)
Use of a Chinese sentence	<i>bu shuo jiu suan le</i> (It is ok if you don’t want to tell me.)
Exclusion of instances of code-switching	
Use of Chinese onomatopes which are also used in the same way as in the English language	<i>haha</i> , I just finished mine. (<i>haha</i> imitates the sound of laughter.)
Use of numbers which are homophones with some English words	Wait 4 me. (Wait for me.)
Use of emoticons	My finger still hurts👉.

Note 1. Words or sentences in the parentheses are my translations or explanations.

Second, I also included the use of numbers that are homophones with some Chinese words. For example, 88 is pronounced [ba ba], and was used to mean *bye-bye*.

Third, numbers—which are homophones with some English words—were excluded from code-switching when used within an English sentence. For example, “wait 4 me” means “wait for me”, but does not involve switching between languages.

Fourth, instances of use of Chinese onomatopes (words which imitate the sound of a thing or an action) which have their English equivalents, such as *haha*, or *hehe*, were excluded. Examples include “I haven’t finished my assignment”, or “*haha*, I just finished mine”. *Haha*, written in Pinyin or Romanized Chinese, is an onomatopoeic

word which imitates the sound of laughter in the Chinese language. *Haha* is also used in the English language with the same function as in the Chinese language.

Fifth, instances of use of emoticons are excluded, because they are a universal means to express one's emotions and attitudes in a CMC environment. An example is "my finger still hurts 🤕".

In further analysis of the field notes, interview transcripts, and the artifacts, I proceeded through three analytical steps suggested by Lincoln & Guba (1985)—unitizing textual data into idea units, coding categories, and integrating categories. In outlining the different steps, I define each step, describe explicitly how I worked with the data at each step, and identify the NVivo (Richards, 1999) functions that proved helpful in handling and analyzing the data.

Summary

A qualitative multiple case study approach was most suitable for my study for a number of reasons. Code-switching behaviour, deeply embedded in its contexts, can be affected by linguistic, social, and cultural factors. A qualitative approach allowed an in-depth examination of the complexity of code-switching and of the factors that influence code-switching. A multiple case study design enabled a comparison of the three cases in order to build a general pattern that could explain the code-switching behaviour of each case. Similar findings based on several cases could be more convincing than from a single case, thereby increasing the potential for generalization beyond a particular case. I employed a maximum variation sampling strategy in selecting the participants in this study. The participants involved one parent, and three students

who differed in age and attended educational institutions ranging from elementary to post-secondary. All of them were recent arrivals in Canada within last year, come from mainland China, and speak Mandarin Chinese as their first language. I gathered data from multiple sources, including audio-taping of interviews with the participants, video-taping of the participants' actual use of the computer, and collection of electronic artifacts such as transcripts of online chatting, emails, graphics and webpages. Findings from a multiple case study through triangulating multiple data sources tend to be more convincing. In my study, I positioned myself as a researcher, a teacher, and a learner. At the same time, I was aware that I assumed many other roles, such as the mother of a teenager, and a member of the local Chinese community. My multiple roles, my self-awareness of these roles, and my personal experiences made me reflect constantly on my contributions to the construction of meaning throughout the research. I applied a mixture of both inductive and deductive approaches in my study. Data analysis was conducted through two phases. I used the qualitative data analysis software package, commonly referred to as *NVivo*, to analyze the data through three analytical steps—unitizing textual data into idea units, coding categories, and integrating categories.

Chapter Four: Research Findings

In this chapter, I delineate the profiles of the participants, discuss findings by going through the specific steps adopted for data analysis, and provide interpretations of the participants' code-switching behaviour through microanalysis of the excerpts drawn from the electronic artifacts. I also make a comparison of the code-switching strategies Chinese ESL students employed when engaged in computer-mediated communication.

Participants' Profiles

Amy. Amy is a female student from mainland China. She was 13 years of age and in grade 6 when I interviewed her. She had been in Canada for approximately 5 months, and had been receiving ESL support from the school she attended. She was the only Chinese girl in her school. Her English learning commenced during a one-year stay in the United States when she was in Grade 3, and her mother was pursuing her graduate studies there. She returned to China, and finished her Grade 4 and Grade 5 in her home country. She immigrated to Canada together with her mother when she was in Grade 6.

Since her arrival and the commencement of her school life in Canada, she told me that she felt that she had an enormous amount of free time to herself due to little homework, as opposed to that in China. As soon as school is over each day, she has time at home to pursue her own interests. What makes her happy is that she feels she is starting to pick up English.

By talking with her for the first time at a potluck dinner, I learned that after she returned to China from the United States, she continued learning English by taking an English course offered in her school, and by reading some simple English books, with

the encouragement of her mother. She enjoys painting Chinese ink and wash, playing the flute, and working with the computer, doing a number of things on it. The computer has become an important part of her life since she arrived in Canada. She said her parents did not allow her to play with the computer while in China, because of the huge amount of homework assigned and the tough competition among the students. The only time available to her to work with the computer was when she had a computer class in school. However, because life in Canada is more relaxed in the sense that she did not have as heavy a load of homework as she did in China, she can now spend more time doing what interests her. Her suppressed interest in the computer was able to flourish. Yet her mother limited her to two hours a day on the computer.

On the basis of her background, I perceived Amy to be a suitable candidate for my study. The initial conversation and subsequent interviews with her portrayed Amy as vocal, lively, and keen to learn new things, especially as related to computers. These characteristics were evident in her remarks describing her typical activities after school in Canada:

After school, I watch TV, do some painting or play the flute. I play computer games, download music, do emails, chat on the Internet, look for graphics, or learn to design my own webpage. The activities on the computer are exciting. When I am at school, all I meet are my classmates in Canada. When I get home, I can email and chat with my Chinese friends. I mainly chat with my former Chinese classmates or relatives who have immigrated to Canada or the US. It makes me feel good. With a computer, life is not boring any more. On the internet, I communicate with them sometimes in Chinese and sometimes in English.

Sometimes, she chatted on MSN (a popular Internet chat line) with one of her cousins who immigrated to Canada and was attending a university. Sometimes she

joined a chat room in China on the Internet called the Wang Wang English chat room. Her mother learned from others that this chat room was popular among the English learners in China, and was a good place to practice English. Initially Amy did not join the chat room for fear that her English was not good enough, but soon decided to try it out as a way to learn English. She had been participating in the chat room for nearly two months when I interviewed her. She indicated in the interview that she switched to Chinese when she had difficulty expressing herself in English in an email or when engaged in an English conversation online.

Baillie. Baillie is a female student from mainland China. She was 19 years old and was attending college when I interviewed her. She came to Canada unaccompanied as an international student, and had been taking ESL courses at the college for eleven months. In China, she began to learn English in Grade 7, and continued to take it until the end of high school. Although she studied English for 6 years, she said she still felt weak at listening, speaking, writing, and grammar, due to little exposure to authentic English in China. She said that her reading is better than her other skills, and that her vocabulary needs to be enlarged. She intends to pursue undergraduate study in business, and wishes to study at a university after satisfying the ESL entry requirements. She has a personal computer, and much of her communication with friends is through the Internet. After school, she usually reads the news on the Internet, and chats online with her classmates in China and in Northernlight. She chats on MSN more than doing email. She has a Chinese webpage instead of an English one. Baillie is soft-spoken and quiet, but was willing to provide information relevant to my study. When asked what language she uses

while chatting online or sending emails, and about her opinions about use of the computer, she said:

I chat or do email sometimes in Chinese, sometimes in English. I did my webpage in Chinese only. I use English when my classmates use English with me first. I love the activities on the Internet. They facilitate communication with my classmates.

She recounted that she has little trouble conveying some simple ideas in English while engaged in chatting online. When it comes to expressing complicated ideas, difficulties occur, and she tends to switch to Chinese.

Cynthia. Cynthia is a female student from mainland China. Cynthia was 25 years of age and had been in Canada for 7 months, and was pursuing her graduate studies at university when I interviewed her. She came to Canada as an international graduate student, and has been taking graduate courses in her major field ever since. She started to learn English in Grade 7 in China, and had a 10-year history of learning English. After passing the National College Entrance Examination held every year in China, she was admitted to a science program by a Chinese university, and was conferred the degree of Bachelor of Science after four years of study at this university. Soon after her graduation from university, she located a job in a company, and prepared in her spare time for the Test of English as a Foreign Language (TOEFL), as she realized that pursuing graduate studies in an English-speaking country would give her an edge in selection of future careers. Greatly motivated, she worked hard, and received a TOEFL score of 598, which met the English language requirement of the university she attends.

After more than two years' working experience in China, she came to Canada and switched from working to being a full-time graduate student. She said that, since her arrival in Canada, she sensed that the English she learned in China was insufficient to enable her to communicate fluently with others, verbally or in writing. She also said that her English language insufficiency posed challenges for her academic studies in the English language used at the Canadian university she attends. Therefore, she often asks her Canadian classmates or the Learning Skills Center at the university to help her with her writing.

She has a personal computer, which has been both a great help with her studies and an instrumental means of communication with her family, friends and classmates. She described herself as a person who enjoys making friends and sharing things with them. She impressed me as sociable, articulate, bright, and eager to learn. Her description of her typical after-school activity showed that chatting on line had been an indispensable means of communication in her life.

I usually work on my assignments and chat on the Internet after school. I like the chatting software very much. It has brought convenience to people, especially to us students. It is pretty expensive for me to communicate with my families and friends in China via phone. Chatting on MSN is also a kind of fun added to my boring life, a way to kill time and have fun.

She also sends emails to her Chinese friends in Chinese and Canadian friends in English. In response to a question concerning the languages she may use to chat, she remarked that she chatted mostly with her Chinese friends and classmates, sometimes in Chinese, and sometimes in English. She indicated that she had difficulty expressing herself in English time and again when talking in English. When this happened, she would

alternate English and Chinese. It is a common practice for her to use the two languages alternately.

Emma. Emma is Amy's mother. She immigrated to Canada together with her daughter. She was an engineer in China, and set up her own company there. She registered and established a corporation soon after she arrived in Canada. She pursued her graduate studies, and obtained a Master's degree in chemistry in the United States. It was during that time that her daughter visited and stayed with her for one year. Upon completion of her studies, she and Amy returned to China. Two years later, they came to Canada, as independent immigrants. Her ambition was to expand her business internationally, and more importantly, to seek a better education for Amy in Canada.

Like most Chinese parents, she attaches great importance to her daughter's education. She perceives that education in Canada is better, in the sense that it provides a relaxed environment which allows students to develop their interests, and ultimately realize their potential. In her opinion, Amy's improvement in English is a top priority. As a result, she is very supportive of activities which she feels could facilitate English literacy development. She encourages Amy to communicate as much as possible with her classmates at school, to write English emails to her classmates and friends in China, and to design an English webpage. She considers these online activities, if carried out properly, beneficial to developing Amy's English proficiency. She said, "Doing emails and chatting in English gives Amy an opportunity to practice her writing. Chatting in English can foster in her a way of thinking quickly in English. This influence is immeasurable." At the same time, she was worried about the safety of the chat room in

that the chat room was usually full of strangers. Therefore, she constantly reminded Amy that the purpose of chatting there was to practice English, and taught Amy some self-protective measures. I interviewed Emma in order to obtain a detailed account of Amy's computer use as well as her attitude towards computer use.

Data Analysis

Data analysis in the present study underwent three steps. Findings emerged during the data analysis processes, and I simultaneously provided interpretations while developing and explicating the analysis processes.

The first step in the analysis involved a careful reading of each transcript and artifact, and identifying units of data. Units of data are defined as pieces of fieldnotes, transcripts, or documents that fall under a particular topic (Bogdan & Biklen, 2003). According to Lincoln and Guba (1985), what is taken as a unit has two characteristics. First, a unit is heuristic in the sense that it enables the researcher to have some understanding or to take some action. Second, it is the smallest piece of information about something that is interpretable in the absence of any additional information (Lincoln & Guba, 1985). These units of data each conveyed a particular meaning, and were then assigned a preliminary coding category. The data units were informative in the sense that they enlightened me on some specific issues relevant to my study. The units that I identified for coding varied from a few words or phrases to a single sentence or several sentences, to paragraphs (Bogdan & Biklen, 2003; Lincoln & Guba, 1985; Miles & Huberman, 1994). The coding categories I created each represented a particular topic

as presented by the data. I also wrote down thoughts and ideas that sketched out relationships I noticed (Miles & Huberman, 1994).

For the actual NVivo analysis, I started by creating a project in which to store data, thoughts, key concepts, and links between them. I then imported all the document files of verbatim interview transcripts, processed and saved as rich text format (rtf), into the project. I did not import the electronic artifacts provided by the student participants. Instead, I manually coded them for the reason that the NVivo software cannot display the Chinese characters in the artifacts, thus rendering computer coding impossible. I manually conducted a microanalysis of verbal interactions which contained code-switching in the artifacts, such as chat room or MSN data, emails, webpages or graphic data.

During the NVivo coding process, I used the coder window instead of other coding options because I could easily and quickly change or delete codes as needed. I highlighted the text segment that I wanted to code, and then entered the desired code name in the space provided. Then I saved the code at a node. Because my purpose at this stage was to break down data into meaningful units, the codes lacked structure and all the nodes were, therefore, saved as free nodes (non-hierarchical categories). I proceeded with the process of highlighting and coding until I had coded all units of data in one transcript before moving on to the next. Because the coder window displays the node names of the already created nodes, text segments from other transcripts that qualified to be coded at an existing node were simply selected and coded at the appropriate nodes. New free nodes were created to code text segments from subsequent transcripts that

expressed new ideas. This process generated a long list of free nodes which I believed adequately covered my data.

Step two of the data analysis involved sorting the initially coded generic idea units into categories. This process utilized *a priori* categories, for example, *effective communication*, *lexical gap*, *playful use of language*, and *identity construction*. As well, I developed new categories that were grounded in the data. In this way, I operationalized code-switching.

I created some code categories as prespecified or *a priori* categories (Miles & Huberman, 1994) from theoretical frameworks, the literature, and the research questions. I assigned them to the units of data that fell under the particular topic represented by the coding category (Miles & Huberman, 1994; Dogdan & Biklen, 2003). By so doing, I was able to discover the usefulness of the *a priori* categories I had created, and modify them. These *a priori* codes featured extensively in the participants' interviews and artifacts, making them important components of themes that emerged from the data.

At the same time I developed new descriptive categories, which highlighted the similarities and differences among units of data. Data units that were similar in meaning were grouped together under one category and different ones formed the basis for a different category. The development of coding categories is, therefore, an iterative cycle where the analyst re-examines the categories over and over until all data units have been coded under some category (Miles & Huberman, 1994). It was also a common practice in my analysis to sort one segment of text simultaneously into several different categories, as suggested by Bogdan and Biklen (2003). It was possible for units of data

to fall under multiple codes and for the coding segments to overlap each other. For example, in “*aiya*, I forgot”, *aiya* is a Chinese interjection, indicating here that the speaker suddenly remembered that she forgot something. This code-switching fell simultaneously under the categories of *lexical gap* and *effective communication*.

In order to examine and assess similarities and differences among idea units from all the transcripts, I used NodeLink in NVivo. This feature is a powerful tool that automatically links all the nodes and data units coded at them to all the transcripts in the project. Through Node Explorer, I obtained access to NodeLink, which linked me to the tool, Browse Node. This linkage enabled me to browse each node to see what codes were common across documents. Thus I carried out a node-by-node comparison across participants’ data to identify the similarities and differences of idea units coded at them. I assigned segments that conveyed similar ideas under an *a priori* category or a newly developed category. I also merged codes that I felt conveyed the same ideas but were grouped under different categories. After re-examining and re-organizing these categories, I developed 14 categories, each of which represented a particular topic. These categories were: *Chinese Character, Pinyin, Graphic, Lexical Gap, Identity Construction, Effective Communication, Topic Change, Rhetorical Effect, Informal Situation, Vocabulary, Listening Comprehension, Speaking, Writing, and Grammar*.

I used the DataBite link feature in NVivo to annotate any thoughts that I had about particular data units. Most of these annotations were interpretive or inferential in nature, making them useful in further data analysis. As well, I created a memo in which I wrote a description of each category to assist me in maintaining a clear distinction between

categories, and thoughts and ideas that emerged about particular categories as I created them. These thoughts and ideas were revisited as the analysis progressed.

At this stage, using the same code categories, I manually coded the artifacts provided by each student participant, and wrote my thoughts and ideas about the text segments on the margin beside them. Through coding the artifacts, I discovered a frequently occurring topic, which was not mentioned by any of the participants in the interviews, thereby developing one new important category, namely, *Structural Gap*. I added this category to the free nodes in NVivo for the purpose of eventually developing visual representations of the findings. Consequently the total number of code categories amounted to 15 as shown in Table 2. In order to draw a clear picture of the contexts of code-switching, I will provide an example from the data of each context of code-switching, as shown in Table 3.

Step three of the data analysis involved integrating code categories by determining conceptual relationships within and among the assorted categories (Lincoln & Guba, 1985). To establish the relationships, I reviewed each category and its text segment, and then conducted a cross-category comparison, in an attempt to identify which categories applied to only a single participant and which ones that ran across two or all three of the student participants. Such a comparison is in line with the purpose of the study—to examine the contexts of code-switching, and compare the similarities and differences among the three participants in code-switching. For example, the category *Identity Construction* ran across all the student participants, whereas the category *Graphic* existed only in the transcripts for one participant.

Table 2. *Code Categories*

Categories	Descriptions
Chinese characters	use of Chinese words to code-switch
Pinyin	use of Romanized Chinese to code-switch
Graphic	pictures with English and Chinese characters on them
Lexical gap	code-switching due to an interlocutor's inability to use an English word
Structural gap	code-switching due to an interlocutor's inability to construct a sentence in English
Identity construction	code-switching to construct an identity
Effective communication	code-switching due to a need to express an idea accurately
Topic change	code-switching due to the change of a topic
Rhetorical effect	code-switching for fun or to create humour
Informal situation	code-switching in informal situations
Vocabulary	the participant's perceived increase in English vocabulary due to code-switching
Listening comprehension	the participant's perceived improvement in English listening comprehension
Speaking	the participant's perceived improvement in the ability to speak English
Writing	the participant's perceived improvement in the ability write in English
Grammar	the participant's perceived improvement in English grammar

Table 3. *Contexts of Code-switching*

Contexts	Examples
Lexical gap	When the plane was landing, I saw the city's <i>quanmao</i> (a bird's-eye view) ¹ .
Structural gap	Ok. <i>Fang ni yi ma.</i> (I'll let you off this time.)
Identity construction	A: My nose need to smell the food <i>ma</i> B: ok <i>de</i> , but how. (<i>ma</i> and <i>de</i> are Chinese modal particles used to indicate the tones of the utterances.)
Effective communication	A: You miss Chinese food. B: <i>aiya</i> , it is time to watch TV. I am leaving. (<i>aiya</i> indicates surprise.)
Rhetorical effect	u made me laugh 4 le. (The Chinese pronunciation of 4 has the same meaning of death. The sentence means you made me laugh to death)
Topic change	A: help, help!!!! $dC=(k_2-k_1C)dt$, $t=0$ 时 $C=C_0$, k_1 和 k_2 是常数, 解这个方程 B: OMG. I don't know. (The second part of A's utterance means that when $dC=(k_2-k_1C)dt$, $t=0$, $C=C_0$ and k_1 and k_2 are constant. Solve the differential equation.)
Informal situation	This context was only discussed in the interview.

Note 1. Words or sentences in the parentheses are my translations or explanations.

An examination of all the categories enabled me to find patterns among them. All the identified relevant categories were then grouped together by pattern codes according to their similarities. The pattern codes are superordinate categories of code-switching acts, or overarching themes. The same procedure was implemented in the analysis of the artifacts. As a result, themes were developed both from the research questions and from the accounts of the participants. The pattern coding yielded three overarching themes, namely: *Means of code-switching*, *Contexts of code-switching*, and *English language development*. I made a within-case and cross-case analysis of the coded transcripts and

artifacts to identify the similarities and differences among the student participants in code-switching, which is shown in Table 4.

Table 4. *Similarities and Differences in Code-switching*

	Amy(13) ¹	Baillie(20)	Cynthia(25)
Means of CS			
Chinese Character	√	√	√
Pinyin	√	√	√
Graphic	√		
Contexts of CS			
Lexical gap	√	√	√
Structural gap	√	√	√
Identity construction	√	√	√
Effective communication	√		√
Topic change			√
Rhetorical effect	√		√
Informal situation			√
English language development			
Vocabulary	√	√	√
Listening comprehension	√		
Speaking	√	√	√
Writing	√	√	√
Grammar		√	

Note 1. The numbers in parentheses after the three names indicate the age of the participants.

With all the free codes displayed in the node explorer, I created top-level tree nodes under the titles of the three overarching themes to store the various code categories. I selected a free node with a particular code category, such as *lexical gap*, and dragged it to the corresponding tree node, such as *contexts of code-switching*, as a child, then deleted the free code from the free node area. I continued with this process until almost all the free nodes were dragged to the tree nodes into which they fit. Those free nodes that could not fit into any of the three nodes, however, were retained for further consideration. By the end of this process, I had a total of 3 nodes, 15 sub-tree

nodes, and 4 free nodes. Of these tree nodes, the three themes were the superordinate (parent) nodes, and 15 code categories formed the subordinate (child) nodes. The 4 free nodes dealt with the participants' attitude towards use of the computer, and included *Attitudes toward Computer Use*, *Advantages of Using Computers*, *Disadvantages of Using Computers*, and *Activities on the Internet*. They were used to describe the participants' profiles.

In order to explore relationships and speculate about the findings of the study, I used the Modeler to model the patterns to assist with visualizing a conceptual framework. With Model Explorer open, I established the name of the model by selecting Properties, and giving a name to it. Then through Add Node, I selected the three tree nodes respectively. After speculating about the relationships among the three nodes, I used Add Link to show the connection among the three nodes. Figure 2 shows the visual representation of the findings of the study. It indicates the three overarching themes emerging from the data, each with its subordinate code categories. The first theme, *means of code-switching*, involves the three ways the participants employed to code-switch. The second theme, *contexts of code-switching*, represents the seven contexts in which code-switching occurred. The first and second themes are related to the third theme, *English language development*, which reflects the participants' perceived improvement in five aspects of English skills due to code-switching between English and Chinese.

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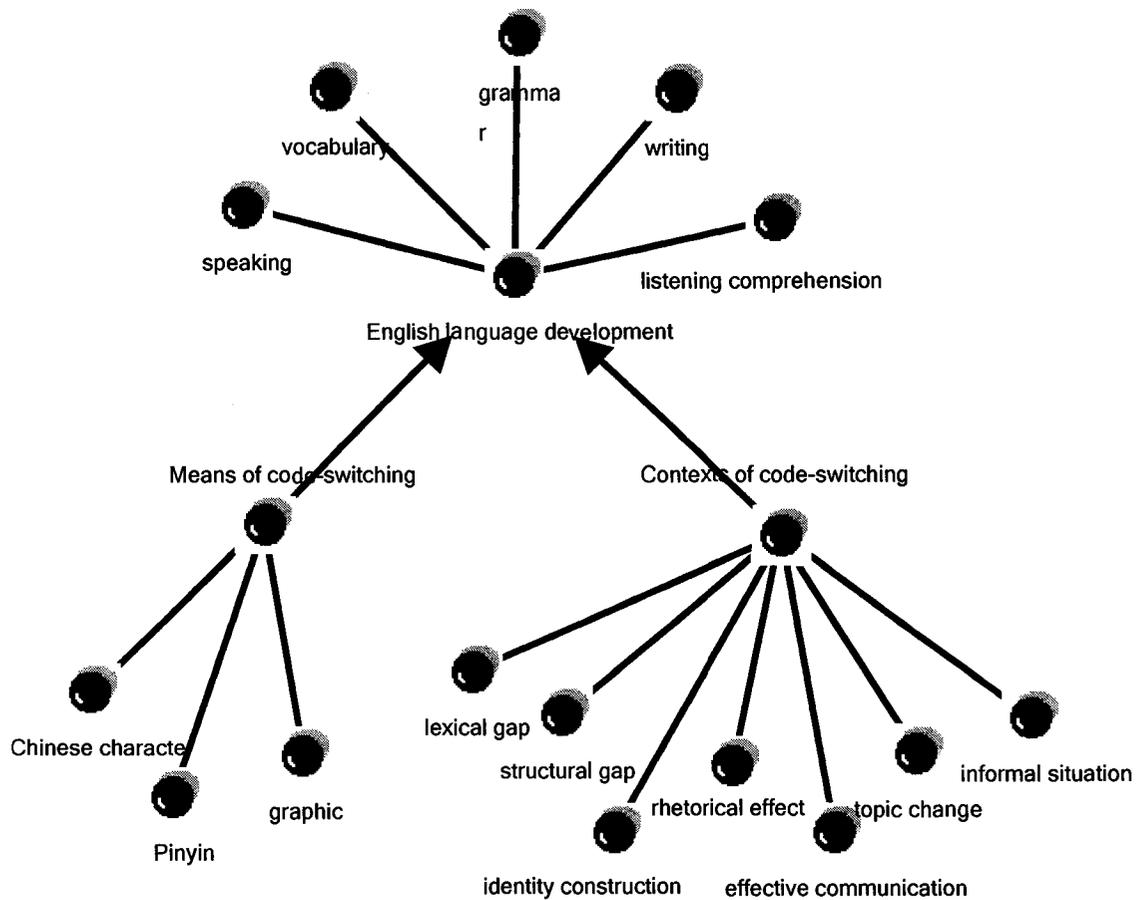


Figure 2. Code-switching and English Language Development

NVivo eased the task of coding and identifying relationships among categories.

The linkage to units of data and text segments of all participants' data presented the extent to which code categories were shared by participants. Codes and categories were well organized and easily retrieved for further analysis. Their re-organization, if required, was rendered fast and less laborious.

Writing the Chinese Language on Computers

The three overarching themes that emerged from the student participants' data—means of code-switching, contexts of code-switching, and English language

development, represent the means and contexts of Chinese ESL students' code-switching in CMC as well as their perceptions of the ways in which code-switching help them improve their English. In the following section, I will first present a brief description of the Chinese language, in particular, its writing and pronunciation systems, in order to help readers understand the participants' choice of means of CS, and then describe and explain in detail each of the themes, using quotes from the student participants' interviews, and excerpts from their artifacts, with a view to illustrate the factors that affected Chinese ESL students' code-switching in CMC, and its relevance to their English language development.

The Chinese written language has no alphabet, and consists of a logographic writing system, which employs a large number of symbols, known as characters, to represent individual words or morphemes. One or two characters correspond roughly to one word. For example, there is one Chinese character, 水, meaning water, and two Chinese characters, 英语, meaning English. These symbols, in turn, are given a pronunciation, written as Pinyin, but the pronunciation varies from dialect to dialect while the meaning is constant and Pinyin used is the same in all dialects except in Cantonese. Pinyin is the international standard romanization scheme for Chinese characters, which is merely a tool for learning pronunciation, not a replacement for characters. There are four tones in Pinyin, and one Pinyin usually represents many Chinese characters. For example, *han* with the fourth tone can represent Chinese characters which may mean *sweat, drought, brave, Chinese*, and so forth. Thus you have

to learn the Chinese characters together with the correct tones to master the written language.

When it comes to typing Chinese characters using standard keyboards, the Pinyin input method is used. However, when users type Pinyin on the computer, they do not type the four tone markers, because typing the markers requires a new font, which many computers do not have, and it is complicated and time-consuming to put tone markers above Pinyin. When one toneless Pinyin is typed, a menu of all the Chinese characters which share the same Pinyin, but with the four tones, will show up, and the user needs to select from this long menu the characters he/she intends, based on the context.

Therefore, it takes more time to type Chinese characters than Pinyin. However, characters can convey an idea accurately and the meanings they express are usually clear at a glance. When Chinese people communicate with each other on the Internet, they may prefer Pinyin, if they express themselves using short sentences. They may prefer Chinese characters, if they need to express themselves using long sentences. This is because the interlocutors have to spend much more time figuring out the meanings of a long sentence written in toneless Pinyin than in Chinese characters. A long sentence written in Pinyin without tone markers can lead to confusion (see the example in the section of *Chinese characters*).

Means of Code-switching

This theme indicated the different ways Chinese ESL students code-switched from English to Chinese in CMC. These means of code-switching included inserting Chinese

characters, typing segments of text in Pinyin, and employing graphics with Chinese characters written on them.

Chinese characters. The student participants' data, including the transcripts and artifacts, showed that they all used Chinese characters as a way of code-switching to a varying extent. Their artifacts show that they inserted Chinese words or phrases into English sentences at the intra-sentential level. Some entire sentences were written in Chinese at the inter-sentential level.

Amy's artifacts indicated that Chinese characters only occurred within the sentences that were part of the graphics that she produced (see Figure 3.), and Pinyin was the major means of CS for her. This was consistent with her remarks in the interviews. She said, "It is much less troublesome for me to type Pinyin. So I prefer to use Pinyin to replace those English words or phrases I don't know". Asked during the follow-up inquiry why she incorporated characters in her graphic, she replied,

I don't know how to express some words and phrases, so I used Chinese to replace them. The mixture of English and characters makes the picture look funnier, and I can express myself in a more vivid way with the Chinese characters.

From her remarks, it could be inferred that Amy viewed Chinese characters as a more effective way of expressing herself compared with Pinyin, yet Pinyin was more expedient in many situations.

Baillie, on the other hand, preferred Chinese characters to Pinyin. This is how she explained her preference,

I would rather use Chinese characters, because I will sound shallow if I use Pinyin. Chinese characters look sophisticated and can fully express my feelings. I just feel better using characters.

Cynthia indicated in the interviews that she would rather use Chinese characters if she needed to express herself with a whole sentence she found hard to say in English or if she wanted to express an idea accurately. The reason for using Chinese characters, as she explained, was that a long sentence in Pinyin very likely results in misunderstanding due to the nature of the Chinese language. Her artifacts confirmed her remarks in the interviews. For example, the Chinese character code-switching, 我昨晚蒸了米粉肉, means that “I steamed rice flour pork last night”, in which 我 corresponds to *I*, 昨晚 to *last night*, 蒸了 to *steamed*, and 米粉肉 to *rice flour pork*. *Wo zuo wan zheng le mi fen rou* is the Pinyin representation of the Chinese sentence 我昨晚蒸了米粉肉, in which *wo* corresponds to 我, *zuo wan* to 昨晚, *zheng le* to 蒸了, and *mi fen rou* to 米粉肉. In this sentence in toneless Pinyin, the key word which can cause less accuracy in conveying ideas is *zheng*, which means *steaming* if with the first tone, and means *cooking* in colloquial Northern Mandarin Chinese if with the third tone. Therefore, the sentence in Pinyin can denote the meaning “I steamed rice flour pork last night” or “I cooked rice flour pork last night”. Cynthia also mentioned that if she and the chatting partner had a discussion about a topic which required using lots of specific terms, such as cooking terms, the whole conversation would be switched from English to Chinese.

There was a consensus among the three participants, whether expressed explicitly or implicitly, that ideographic Chinese characters are expressive in that they transmit messages accurately and vividly. Baillie’s comment that Chinese characters can make a

person look sophisticated indicates that she employed Chinese characters as a tool to position herself and represent who she was in that moment, thereby constructing her socially situated identity.

Pinyin. Both Amy and Cynthia indicated in their interviews that they used Pinyin as a means of code-switching, and their artifacts confirmed their remarks. They both considered that the quick speed of typing Pinyin as contributing to this choice. When asked about the reason for choosing Pinyin, Amy related, “Using Pinyin is easy and efficient” Cynthia also attested to this in her words, “Personally, I use Pinyin....I cannot type characters fast.” For example, in the sentence “If you put potato in *mian tiao*, you must be crazy”, *mian tiao*, meaning noodles, is written in Pinyin.

Baillie claimed in the interviews that she only used Chinese characters for code-switching. When I examined her artifacts, I found that she did adopt Pinyin to type some Chinese modal particles. She said that when chatting in English, all Chinese chatters used Pinyin if they wanted to express their tones transmitted by Chinese modal particles, with almost no exception. This situation was similar to the one discussed by Gumperz (1982) in that there are discrepancies between speakers’ descriptions of their own bilingual usage and tape-recordings of their informal talk with the occurrences of code-switching. The discrepancy between the interview and the artifact further confirmed the claim by Yin (1994) that data from multiple sources are likely to be more accurate. Baillie’s artifacts revealed that she drew on Chinese characters to replace nouns, verbs, phrases, or sentences, but used Pinyin to replace the Chinese modal particles (see *Identity Construction* in later section for further information about modal

particles). A possible explanation was that she personally viewed the replacement by characters of nouns, verbs, or sentences as code-switching, whereas use of Chinese modal particles was not considered to be code-switching. The follow-up inquiry via telephone suggested that typing Chinese modal particles in Pinyin was already a habit for these chatters, and therefore, she subconsciously conformed to this habit.

Graphics. Amy was the only participant among the three who used graphics as a means of code-switching. She tended to search websites for funny graphics and wrote English sentences which contained some Chinese characters or Pinyin onto the graphic image in order to create a special effect on communication. Then she sent these graphics to her classmates or friends. One of her graphics (see Figure 3.), entitled *La Monolibean*, was a transformed portrait of Mona Lisa, on which Mona Lisa was holding a toy bear, with her face replaced by Mr. Beans' funny smiling face. The words written on it read: "U didn't reply my 贴子. Well my 报答 for u is.....Make u laugh~~笑死 U." (You didn't reply to my message. Well, my reward for you is to make you laugh to death.) Amy wanted to chat with one of her former classmates and friend in China at QQ, a Chinese chatting site, but had failed to find her there. As a result, she left her friend a message at QQ, in the hope that her friend would reply to this message. Not having received any response from her friend, she sent this graphic to her. This novel means enabled her to convey exactly and visually what she wished to express. As she explained, "This graphic can help me express my feelings more vividly". In mediating her activities, she employed both material tools such as computer, and psychological tools such as language, to achieve what she desired. The uniqueness in her means of

code-switching, among the three student participants, may be attributed to the fact that she enjoys painting, she has more free time available to search for such graphics, or she has a lively personality and imagination corresponding to her age. Another explanation is that she, as the youngest participant, is growing up as a *digital native* (Prensky, 2000) and becoming proficient in multimodal literacy.



Figure 3. La MonaLibean

Figure 3 and Excerpt 5 in the later section also present the use of electronic communication conventions (e.g., the acronym *OMG* for *Oh my god*, *u* for *you* and *ur* for *your*). In real-time synchronous communication (e.g., chatting online), participants send messages that are brief; informal with regard to the conventions of spelling, grammar, and punctuation; and utilize short-cuts (Lapadat, 2002). The pressure to be brief and rapid results in the decreased premium on using standard conventions of writing and the prevalence of typographical errors (Lapadat, 2002). Such replacement of, for example, *you* by *u*, pertains to the kind of code-switching between two different styles of speech of the same language (Gumperz, 1982), as in this case of switching between formal and informal English. This loosening of the conventions of written English in a sense gives permission for easy code-switching between languages, and the ready use of homophones (see *Rhetoric Effect* for a definition and more information).

No matter what means they employed to code-switch, the process of their code-switching reflects that negotiation of meaning is going on in order to avoid a breakdown in communicative and to achieve particular communication aims. For example, Amy's communication intent in the example above was more than just avoiding communication breakdown. Rather, she was conveying her eagerness to talk humorously and multimodally. Meanwhile during negotiation, social alignment is formed, and identity constructed among the participants of online communication. Therefore, the participants utilized different Chinese writing systems to code-switch for different communicative and social purposes. The following section, from interactionist and sociocultural perspectives, will illustrate with excerpts from the participants'

electronic artifacts how they responded to input from their partners and modified their output during negotiation of meaning. I also discuss what social factors are involved in this process.

Contexts of Code-switching

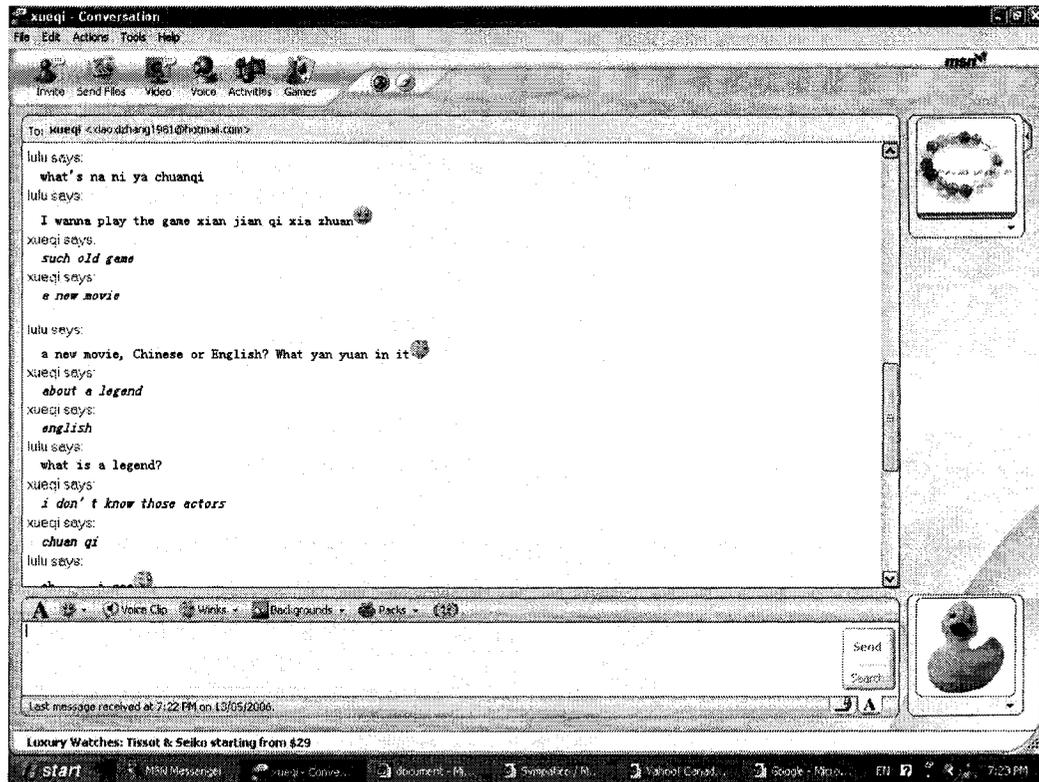
This theme represents the various contexts in which Chinese ESL students resorted to their native language to resolve problems or tackle issues emerging during communication in English. These situations that elicited code-switching not only stemmed from linguistic difficulties, but also reflected social and cultural aspects of communication and language acquisition. In many ways, this theme most reveals the breadth and complexity of code-switching.

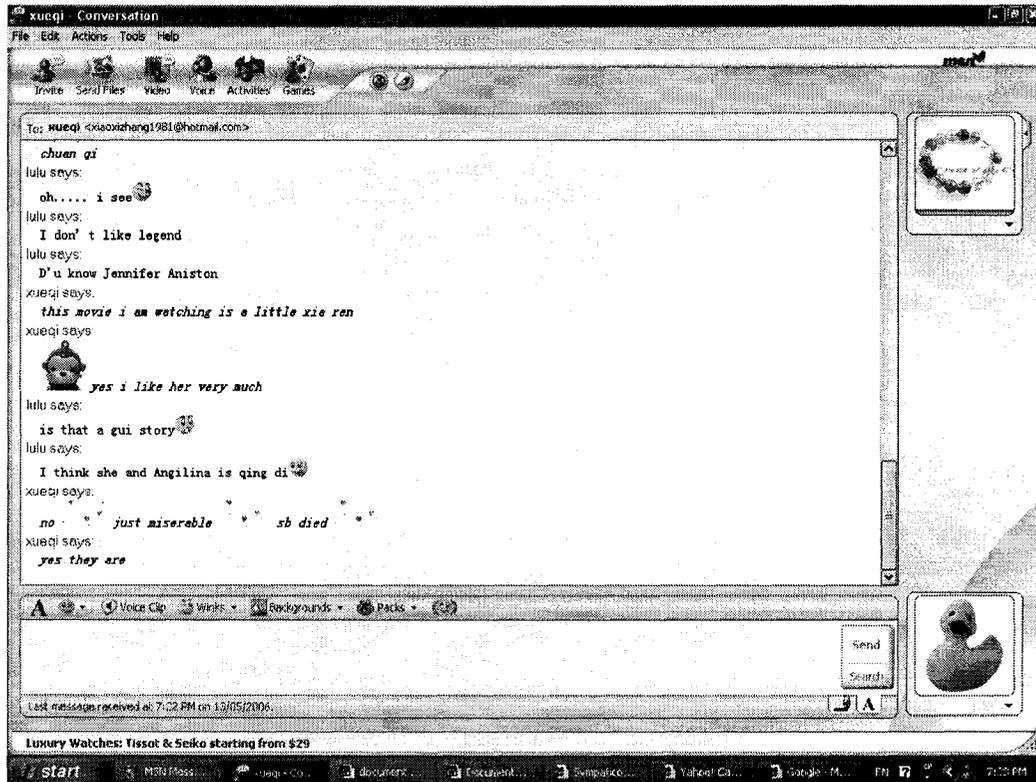
Lexical gap. In the analysis of the participants' chat online, it was clear that code-switching triggered negotiation of meaning, in which scaffolded help was provided in the Zone of Proximal Development (ZPD). Without exception, all three participants acknowledged in the interviews that they used their L1 when confronted with an English lexical challenge (Crystal, 1987). Their chat records demonstrated that they switched to Chinese when they had trouble with English words or phrases. Amy, Baillie, and Cynthia were new arrivals to Canada, and their English vocabulary was not sufficient to enable them to express themselves freely. It is understandable that lexical difficulties arose during communication online, especially when they had to produce a quick response to the input from their partners in a chat online. The following excerpts illustrate how code-switching functioned as a mediating device for the novice to enlist help, and a more capable person to provide scaffolding.

Excerpt 1 is a conversation between lulu (Amy's nickname) and xueqi, Amy's cousin who was a new immigrant and is pursuing her undergraduate studies in Canada.

In this excerpt, lulu and xueqi were talking about a new movie.

Excerpt 1. (from Amy's MSN chat)





In the first turn, (in this study I used *turn* to refer to one line in the conversation in order for readers to match conveniently the discussion with the chat shown on the screen), lulu asked in English mixed with Pinyin, the Romanized Chinese, “what’s na ni ya chuangqi?” (what is Na Ni Ya legend?). In the second turn, lulu asked about playing the computer game entitled “xian jian qi xia zhuan” (Story of Seven Chivalrous Men with Immortal Swords). In the first two turns, lulu overtly addressed the problem of accessing the lexical items non-existent in her English vocabulary repertoire to express her ideas. As a result, she mediated her interaction by switching to Pinyin, to make herself understood. Switching to Chinese may heighten lulu’s metalinguistic awareness of her L2 vocabulary development (Blake, 2000), and push her to pay more attention to the word in the target language (Long, 1996; Swain 1995) as long as it was contributed by the chat partner.

It seemed that xueqi did not know the English name of the game either, and offered a simple response “such old game” to tell lulu that she was not interested in playing the game with her. Then in xueqi’s next turn, she proceeded with the topic about the movie, *Na Ni Ya legend*, lulu initiated by saying “a new movie”. *Legend* was not a new word to her. So, in her third turn, she built upon the topic of legends, using the word, *legend*. In lulu’s third turn, she wondered about who were the actors in the movie by saying “what yan yuan (actors) in it”. Lulu’s fourth turn signaled that she still had difficulty understanding the word *legend*, so she started negotiating by enlisting help (“what is a legend”) in order to clarify the meaning of the unknown word. Xueqi, in her fifth turn, produced her output by providing the English word, *actor*, in response to lulu’s question “what yan yuan (actors) in it”. Then in her sixth turn, xueqi provided linguistic modifications in the input by explaining *legend* in Romanized Chinese “chuan qi” to make her message comprehensible. In so doing, xueqi deployed her L1 as a mediating tool to provide scaffolding to lulu possibly because xueqi herself was experiencing difficulty in paraphrasing *legend* in English. It is also possible that xueqi did not want to take the trouble to relate *legend* in English, so she reverted to her L1 for the sake of expedience. Lulu’s utterance “oh...I see” signaled that mutual understanding was established collaboratively.

Language input and output were provided during the turns of the utterances. To keep the conversation going, lulu was pushed by the feedback she received from xueqi to form a comprehensible output “I don’t like legend”. Xueqi’s output in turn had become lulu’s input which pushed lulu to form this output.

What is worth noticing is xueqi's utterance on the second screen: "This movie I am watching is a little xia ren", in which xueqi reverted to her L1 *xia ren* (scary). The possible reason for xueqi's code-switching was that being aware of lulu's limited vocabulary, xueqi was mediating the interaction through the use of L1 to accommodate lulu's language competence. In this case, it seems that code-switching was employed as a contextualization strategy by xueqi for discourse purposes (Gumperz, 1982).

Understanding xueqi's utterance, lulu raised a question "is that a *gui* story" (is that a ghost story?), and then continued the topic about Jennifer Aniston by stating "I think she and Angilina is *qing di*" (I think she and Angilina are rivals in love). In these two utterances of lulu's, Pinyin was exploited as a mediating tool for lulu to convey her ideas. The exchanges between lulu and xueqi revealed that plenty of negotiation of meaning and mediation by code-switching occurred, through which learning seems to be taking place in lulu's ZPD (Vygotsky, 1934/1978). The linguistic modifications in this communicative interaction, triggered mainly by lexical confusion, appear to facilitate second language acquisition (Smith, 2004; Tudini, 2003). This facilitation of language acquisition was also realized through scaffolding provided by a more capable person, xueqi.

Learning may take place during the interaction and negotiation of meaning between lulu and xueqi. On the other hand, the interaction and negotiation of meaning occurred in a social context where lulu and xueqi used code-switching strategies to comment on films and cultural legends, as a result of which communication became meaningful.

The following excerpt is a conversation between Cynthia and one of her former classmates in China. The first part provides the background of the conversation, and the second part is on the screens

The exchanges in Excerpt 2 were between Sissy-painful, Cynthia's nickname and love World Cup, a former classmate of hers, a male English interpreter in China. The excerpt started with Sissy-painful talking about her left hand which she cut while cooking.

Excerpt 2. (from Cynthia's MSN chat)

Sissy-painful says:

 I cut my finger the day before yesterday.

Sissy-painful says:

 and a little serious.

Sissy-painful says:

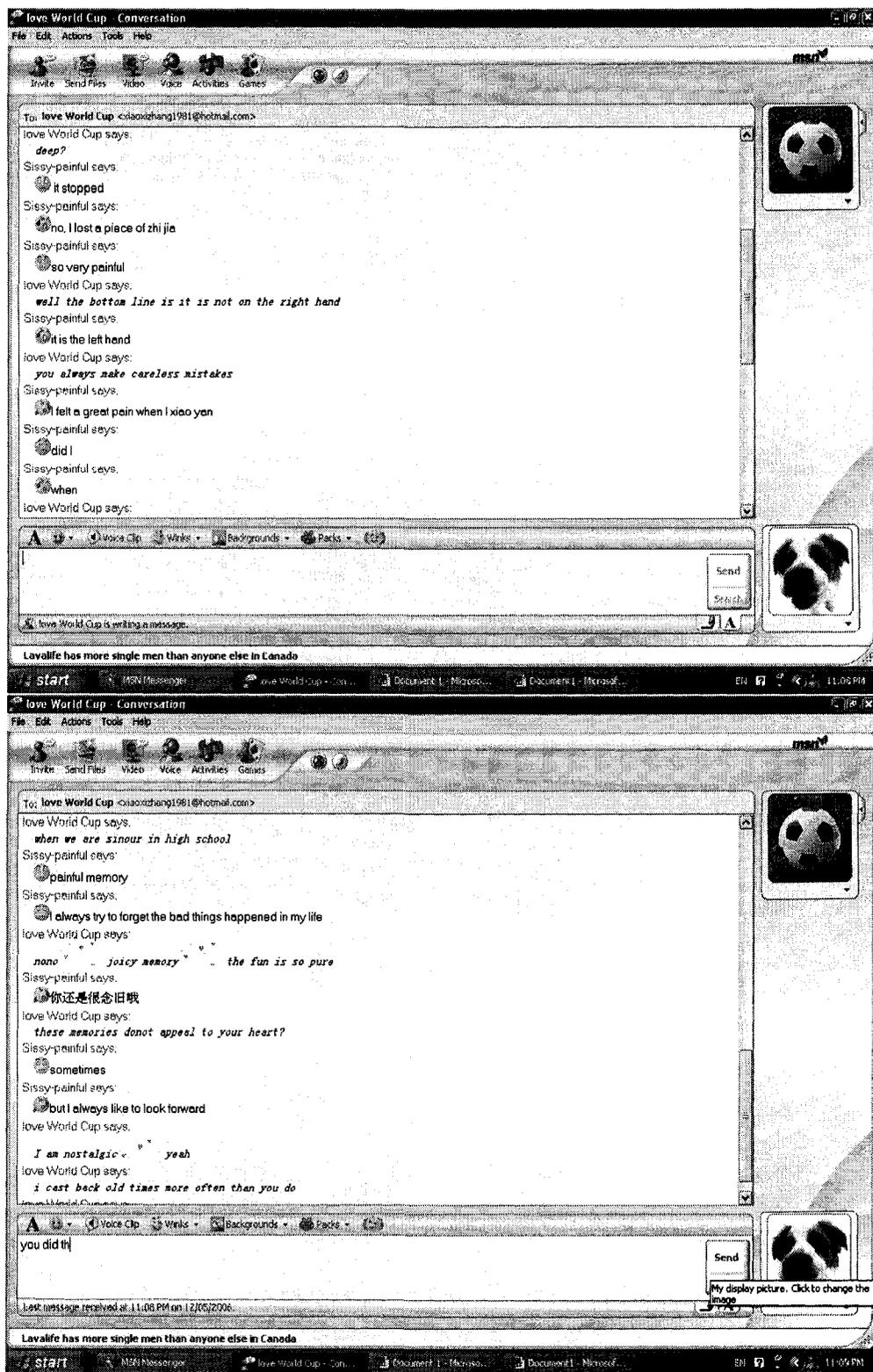
 very painful.

love World Cup says:

the cutting occurred during cooking?

Sissy-painful says:

 Yes. It was bleeding all the time.



This is why Cynthia called herself “Sissy-painful” rather than just “Sissy” when chatting that day. Cynthia’s other electronic transcripts indicate that she gave herself different

nicknames such as “Sissy-oh my” according to her mood at the time when she was chatting. The occurrences of code-switching in this excerpt were not as frequent as in Amy (lulu)’s discussed above. With a larger vocabulary and higher English level than Amy’s, Cynthia still had difficulties with some English words, such as in her second turn on the first screen “ I lost a piece of *zhi jia*” (fingernail), and in her sixth turn “I felt a great pain when I *xiao yan*” (treated the cut). The lexical gap caused her to switch to Romanized Chinese as a compensation for language deficiency. In this case, Cynthia simply mediated her interaction with love World Cup with the help of L1, and code-switching was used as a repair move in an attempt to avoid a communication breakdown (Kotter, 2003).

In Sissy’s 12th turn, she switched to an entire Chinese sentence by saying “你还是很念旧哦” (You are still very nostalgic), in which 念旧 (nostalgic) was a key word unknown to Cynthia. This sentence structure was simple enough not to pose any possible obstacle to Cynthia. Therefore, my interpretation is that when she switched, in this context, to the whole Chinese sentence, she went beyond compensating for language deficiency. The last word in the sentence, 哦, served as a tone-softener, thus changing the tone of the conversation from Sissy’s complaining about the cut in the fingernail to recalling warmly their high school days. This switch enabled Cynthia to express better and more effectively her mood and emotion. In her utterances, Cynthia also extensively used emoticons, all of which are sad facial expressions and served to add details and emotions to her utterances. In this exchange of utterances, learning could take place in Cynthia’s ZPD when love World Cup reiterated in English in his second turn from the

last that “I am nostalgic, yeah”, filling in the lexical gap in Cynthia’s English vocabulary as well as emphasizing what had been said. What’s more, within this exchange, Cynthia employed the code-switching strategy to describe love World Cup as a nostalgic person as opposed to depicting herself as a forward-looking person. Through their exchanges involving code-switching, they were constructing their identities (nostalgic vs. forward-looking), hence their relationship with each other. From interactionist and sociocultural perspectives, interlocutors may gain knowledge during an interaction between each other through negotiation of meaning, or co-construct knowledge through constructing their identities in a social setting among peers.

Although code-switching in this context was triggered by linguistic deficiency, this code-switching should not be considered less productive, because the participants used this kind of code-switching strategically to help them learn new English vocabulary. L2 learners not only practiced code-switching consciously or subconsciously in the course of learning an L2, but also used code-switching as a learning strategy. The online exchanges between the chat participants support the Input Hypothesis (Long, 1985; Pica, 1994) and Output Hypothesis (Swain, 1995). Negotiation of meaning occurs when the chat participants interact online in an effort to maintain the conversation. During negotiation of meaning, they modify their input and manage to make it comprehensible. At the same time, they can notice their linguistic problems which in turn force them to modify their output in producing the target language. The result is also consistent with the findings of Smith’s (2003) study that lexical problems are a main trigger for negotiation within CMC contexts.

The excerpts demonstrate that the chat participants noticed the input from others' messages and integrated that input into their own messages, therefore increasing opportunities for linguistic learning. Code-switching was often interpreted by CMC conversational partners as a signal that the other lacked knowledge of a particular vocabulary item, and prompted them to supply the term, but within the context of achieving a joint understanding of meaning within the topic at hand. In these examples, the interaction may help L2 learners learn new English vocabulary, which was consistent with Warschauer's (1999) study. In CMC contexts, especially synchronous CMC, the chat participants have to formulate their ideas within a short period of time and produce their output in order to communicate with each other, and this is achieved through code-switching to negotiate meaning. In other words, negotiation is central to second language development in that negotiation makes both input and output comprehensible (Blake, 2000; Pellettieri, 2000; Smith, 2003). Meaningful output is as necessary to language learning as meaningful input, because the experience of producing language creates awareness of language gaps, provides opportunities to experiment with language forms, and leads to more effective processing of input.

On the other hand, the excerpts indicate that a lot more was going on than simply modification of input or output. The participants were interacting on multiple layers simultaneously, using code-switching to present their identities, negotiate their relationships, comment on culture (e.g., films and cultural legends), express emotions, and so forth, playfully and multimodally (see Table 5). It is through this meaningful communication between interlocutors that learning occurs.

Table 5. *Social Functions of Code-switching*

Functions	Means of achieving the functions
Construct identities	By inserting Chinese interjections and modal particles in an English utterance, the participants tried to conform to the norms of their community of practice, thereby constructing their identity
Negotiate relationships	By recalling the school days, the participant switched to Chinese to describe her chat partner as a nostalgic person vs. herself as a forward-looking person, with the implication that she did not intend to recall what had happened between them in the past.
Comment on culture	By switching to Chinese to capture what the Chinese words connote culturally, the participant was able to proceed with culturally-saturated topics, such as movie, legend, and cooking.
Express emotions	By using Chinese interjections and graphics which contain code-switching, the participants conveyed their emotions vividly, humorously and multimodally.

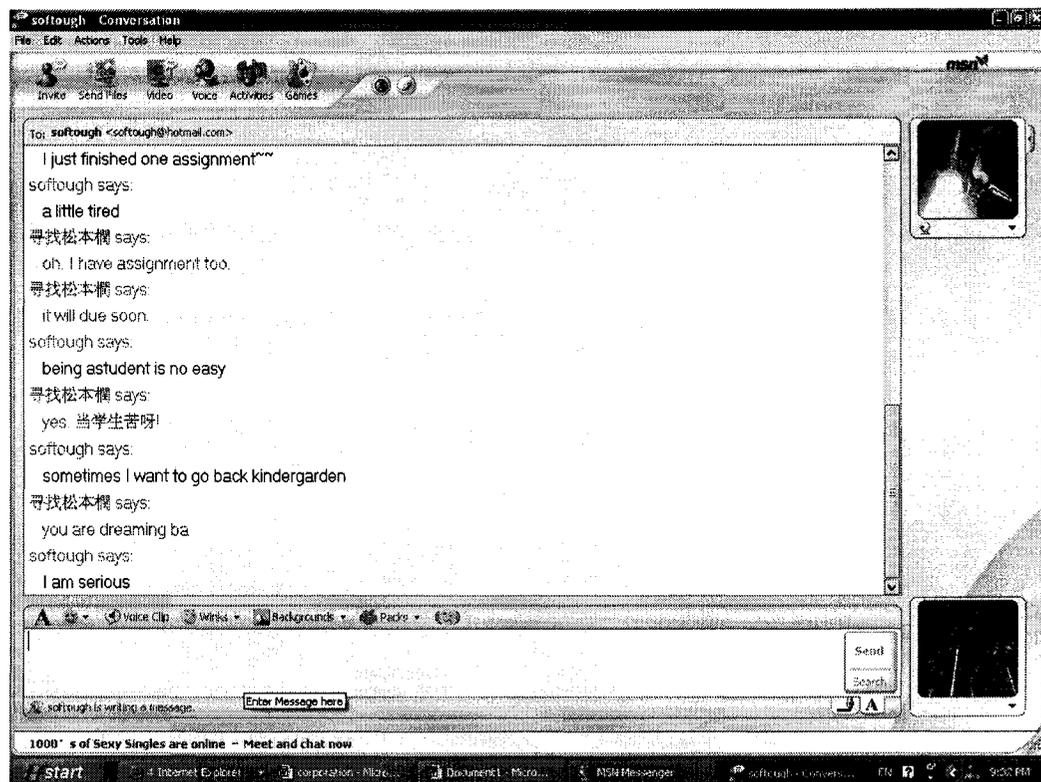
These two excerpts document the basic theme of Vygotskian sociocultural theory in that knowledge is social in nature and is constructed, with language as a key mediating tool, through a process of collaboration, interaction and communication among learners in social settings. In these excerpts, utterances in L1 mediated the linguistic and metalinguistic processes that these ESL learners used in solving meaning problems emerging during interaction. In the Vygotsian perspective, it is through scaffolding by or in collaboration with more capable others or peers that learners move from one level to a higher level within the learner's ZPD. Moving successfully from one level to a higher level is achieved through both material tools, such as a computer, and psychological tools, such as language, (e.g., the resources of L1 as in this study), as well as through the

behavior of another human being in a social setting. These findings provide support to Ortega's conclusion (1997) that text chat enables participants with varying levels of expertise to assist with one another in co-constructing social activity.

Structural gap. When engaged in the chat online, the participants switched into Chinese to compensate for language deficiency, as well as to construct a social space that enabled them to achieve shared understanding, or intersubjectivity (Rommetveit, 1985). Amy, Baillie, and Cynthia all resorted to Chinese when they encountered difficulty expressing an idea with an entire sentence. Their current English level restricted them from expressing their emotions and opinions fully, and many of the English idioms were still beyond their reach. Like the lexical gaps they experience, a structural gap exists between their knowledge of Chinese sentence structures and their developing knowledge of English sentence structures (syntax). As a result, they use code-switching as a compensation for this grammatical language deficiency (Crystal, 1987). The following excerpts demonstrate how the participants used code-switching to accommodate for grammatical gaps between Chinese sentence structures and English sentence structures, and to achieve intersubjectivity.

In the excerpt that follows, 寻找松本欄 (Baillie's nickname, meaning looking for Song Ben Run, a famous singer) was chatting with softough, another Chinese girl studying in Canada.

Excerpt 3. (from Baillie's MSN chat)



In this excerpt, softough was complaining about the assignment she had to submit by saying that “being a student is no easy”, and 寻找松本欄 (Looking for Song Ben Run) responded affirmatively to what softough said by reiterating what had been said in Chinese characters “当学生苦呀” (being a student means going through a hard time).

In this exchange, softough’s utterance “being a student is no easy” elicited 寻找松本欄 (Looking for Song Ben Run)’s code-switching, whereas another of softough’s utterances, “I have just finished one assignment”, did not. My interpretation is that softough’s utterance in the first turn might not pose any linguistic challenge to 寻找松本欄 (Looking for Song Ben Run) so that the latter could respond in English, and that both of the interlocutors were talking about their assignments without making any comments or complaints. However, softough’s comments or complaint about the assignments

“being a student is no easy” aroused 寻找松本欄 (Looking for Song Ben Run)’s resonance due to their similar situation. 寻找松本欄 (looking for Song Ben Run), therefore, echoed by switching to a Chinese sentence “当学生苦呀” (being a student means going through a hard time). This sentence is similar in meaning to the sentence “being a student is no easy.”, but the two sentences have shades of meanings in that the latter puts more emphasis on the difficulty of being a student and is more complex in grammar than the former. In addition, 呀 (ya), a Chinese modal particle, converts 寻找松本欄 (Looking for Song Ben Run)’s utterance from simply a statement into a sigh.

When asked in the interview why this code-switching occurred here, 寻找松本欄 (Looking for Song Ben Run) said that she did not possess adequate English grammatical knowledge which could enable her to express herself in the way she wanted, and therefore switched from English to an entire Chinese sentence. Realizing that 寻找松本欄 (Looking for Song Ben Run) had a shared perspective on this topic with her, she continued with this topic by producing another utterance “Sometimes I want to go back kindergarden”. 寻找松本欄 (Looking for Song Ben Run) replied with a mocking tone “You are dreaming *ba*” (*ba* is a Chinese modal particle, which in this context signalled a mocking tone). At this point disagreement occurred, and they started to negotiate to maintain the conversation. In this context, code-switching acted not only as a mechanism to solve linguistic difficulties, specifically difficulties caused by lack of knowledge about English syntax, but also as a means to arrive at a shared understanding of the topic, and thereby establishing intersubjectivity.

In these exchanges, there are grammatical errors (e.g., it will due soon. go back kindergarden) and one spelling error (kindergarden). According to the script on the screen, neither of the chat participants seemed to have noticed the errors and attempted to correct them. When asked in the follow-up inquiry whether there were any errors in their utterances, Baillie gave an affirmative answer and said that she recognized these errors, but did not bother to correct them because these errors did not interfere with her understanding the other interlocutor.

In the following excerpt, the conversation was between 寻找松本欄 (Looking for Song Ben Run) and her friend, weiwei.

Excerpt 4 (from Baillie's MSN chat)

1. weiwei says:

I think he is interested in that girl.

2. 寻找松本欄 (Looking for Song Ben Run) says:

yes, I think so too.

3. weiwei says:

at the very beginning, that girl took him an ordinary friend

4. 寻找松本欄 (Looking for Song Ben Run) says:

that was cus she had a bf at that time

5. 寻找松本欄 (Looking for Song Ben Run) says:

时过境迁 (Things have changed with the passage of time.)

6. 寻找松本欄 (Looking for Song Ben Run) says:

此一时彼一时 (That was one situation and this is another.)

7. weiwei says:

everything can change *la*. (*la* is a Chinese modal particle)

8. 寻找松本榎 (Looking for Song Ben Run) says:

I know.

9. 寻找松本榎 (Looking for Song Ben Run) says:

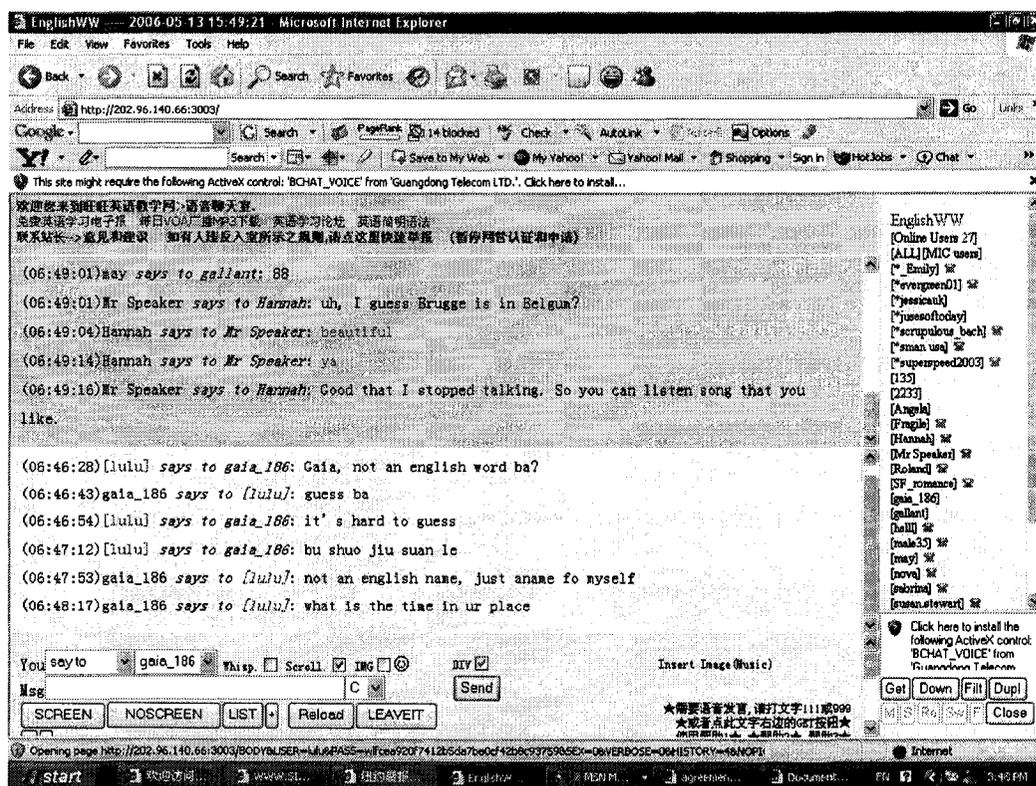
it is not easy to find a good bf *ya*. (*ya* is a Chinese modal particle.)

In this excerpt, words or sentences in parenthesis are my translations or explanations. This conversation started with weiwei's assumption about a man who is interested in a girl. In line 2, 寻找松本榎 (Looking for Song Ben Run) confirmed weiwei's assumption. According to the context of the exchanges, 寻找松本榎 (Looking for Song Ben Run) and weiwei both know the man and the girl. In line 3, weiwei continued to talk about the relationship between the man and the girl. In line 4, 寻找松本榎 (Looking for Song Ben Run) provided the reason why the girl took the man as an ordinary friend. In lines 5 and 6, 寻找松本榎 (Looking for Song Ben Run) started to comment on the development of their relationship from being ordinary friends to lovers by switching to two entire Chinese sentences, 时过境迁(Things have changed with the passage of time), and 此一时彼一时 (That was one situation and this is another). In line 7, weiwei proceeded with the topic, echoing what 寻找松本榎 (Looking for Song Ben Run) said, as shown in "everything can change *la*". In line 8, 寻找松本榎 (Looking for Song Ben Run) indicated her understanding of the previous comment in line 7, and provided her own comment in line 9.

In these exchanges, 寻找松本欄 (Looking for Song Ben Run) conveyed her attitude towards the topic by using idiomatic Chinese expressions because, according to what she said in the follow-up inquiry, she did not know for sure the idiomatic English equivalents. Code-switching in this context, therefore, functioned as a defensive mechanism for the chat participant to bridge the gaps between her idiomatic Chinese expressions and idiomatic English equivalents, and establish mutual agreement on the issue she was discussing to ensure effective communication. That is, she used her L1 to create and maintain intersubjectivity. It is worth noting that in line 7 “everything can change *la*” and line 9 “it is not easy to find a good bf *ya*”, two Chinese particles, *la* and *ya*, were used to express the tones of their utterances, from which the chat participants could sense each other's attitude towards the topic. In this conversational context, *la* indicates a sigh, suggesting that one is helpless in preventing things from changing, and *ya* is similar in function to *la*, indicating a helpless sigh. The two chat participants employed two modal particles, differing in written form and pronunciation, yet similar in meaning, to resonate with each other, hence achieving intersubjectivity. I will provide a description of the function of Chinese modal particles in *Identity Construction* below.

In the next excerpt, the conversation took place between lulu (Amy's nickname) and a chatmate in an English chat room which is located in China.

Excerpt 5 (from Amy's chat in the chat room)



The chat room, called Wang Wang English Chat Room, is well-known and popular among Chinese English learners, and can contain as many as three hundred people. Everyone is entitled to chat in this room (after giving himself/herself a nickname and a password), and is required to obey the rules (e.g., coarse language is not allowed). The upper part of the screen was scrolling to display the ongoing chat among the other chatters while the lower part was not scrolling and reserved by clicking Div (diving) for lulu and the particular chatmate she wanted to chat with. This was the first time that lulu had met gaia_186 in the chat room. lulu was curious about the name gaia, as shown in her question, “gaia, not an english name *ba*”, in which *ba* is a Chinese modal particle transforming an affirmative statement into an interrogative here (see *Identity Construction* below for further information). Gaia asked lulu to “guess *ba*”. *ba* in this

context indicates a polite suggestion. Chinese modal particles can convey different meanings in different contexts. *ba*, which occurs twice in this conversation, is a case in point. Being unable to or not bothering to guess whether or not gaia was an English name, lulu shifted to Romanized Chinese “*bu shuo jiu suan le*” (It is all right if you don’t want to tell me). lulu’s response suggests her unwillingness to continue to guess. Maybe lulu became impatient, or she wanted to give gaia a chance to save her face, because she thought she may have asked gaia an intrusive question. lulu chose to switch to Romanized Chinese due to her inadequate knowledge of English sentence patterns. In the interview, when we discussed this code-switching, Amy (lulu) said she chose to switch because she did not know the corresponding English sentence structure. Meanwhile, she was employing her L1 to express her mood which was reflected by the particle *le* at the end, which signifies that she intended to stop guessing. Hoping to maintain the flow of the conversation, gaia provided the information about her name “not an english name, just a name fo myself”. Without gaia’s attempt to establish this intersubjectivity, the conversation might have broken down. Hence, code-switching served as a mediating tool to promote interaction among the chat participants in a context where Amy’s knowledge of English syntax proved insufficient to maintain the conversational flow.

An examination of the artifacts tended to indicate that Baillie and Cynthia both shifted to ideographic Chinese characters when English syntax difficulties emerged, whereas Amy did not exhibit this tendency of using Chinese characters but was more likely to switch to Pinyin. Although Amy realized that Chinese characters were more

expressive, she is young and said that she did not want to bother to employ Chinese characters. It is also possible that Amy is less literate in written Chinese than Baillie and Cynthia and therefore, switching to Chinese characters is complex and difficult for her, especially given the time pressure of synchronous chatrooms. It is interesting to note that when they code-switched due to a structure gap, they tended not to negotiate. Exchanges of comprehensible input and modified output were nearly absent. Very likely it was because the Chinese sentence (whether in characters or Pinyin) clarified the meaning sufficiently that further negotiations were not needed to achieve understanding. Code-switching was employed as a communicative device to maintain the flow of the conversation by establishing shared perspectives on the topic they were engaged in. By filling in the structural gap, L1 facilitated communication when speakers interacted with individuals of similar backgrounds.

Identity construction. Language that functions to mediate human activities on the interpsychological plane takes the form of social speech (Anton & DiCamilla, 1998). In this study, the switch to Chinese, overwhelmingly to Chinese modal particles, manifested the use of L1 by the chat participants as a mediating tool to construct identity within the community of practice online. All three participants indicated in the interviews that they used Chinese modal particles or interjections when they engaged in online conversation. Analysis of the electronic artifacts showed that Amy and Baillie used sentence fillers such as the Romanized Chinese modal particles, *ba*, *la*, *de*, *ne*, and so forth, and interjections such as *aiya* and *heng*, extensively in their chat records. Although Cynthia stated in the interview she used such words in online chatting, the

chatting transcripts she provided showed she used such words less frequently than Amy and Baillie. A possible explanation for Cynthia's less frequent use of these sentence fillers may be that she is much more mature than Amy and Baillie, and adding too many of these words may sound naïve to her. Another possible explanation was that her chatmates did not use them as much. More often than not, among peers, people/chatters tend to respond in a similar way to how they are addressed.

Chinese modal particles are placed at the end of an utterance to indicate the mood of a speaker and to express emotions and attitudes, with little semantic content (Li & Thompson, 1981). In other words, they contain no concrete meaning unless used in conjunction with other words to form a meaningful sentence, which in turn helps the conversational partner to interpret appropriately the meaning of an interlocutor in ongoing discourse. Few of them exist in formal Chinese writing except in conversational styles of writing that resemble everyday speech. Through code-switching by using modal particles, chatters can either change the modality of an utterance, for example, from a command to a request, or simply alter the tone of an utterance without affecting its modality. Since these discourse markers are inserted at the end of an English utterance, minimal syntactic restrictions are placed on them, for they do not violate the syntactic rules (Romaine, 1995). Socially the Chinese modal particles function as a means by which speakers can “signal their awareness of and orientation to the recipient” (Lam, 2004, p.54).

On the other hand, Chinese interjections such as *aiya* and *eng* are words which express an exclamation, a call, or a response. Unlike the modal particles, they carry

meanings, and tend to appear at the beginning of an utterance without having to be used in conjunction with other words to form a sentence. As with modal particles, inserting these words does not violate English syntactic rules. Both modal particles and interjections have been labeled “sentence fillers” by some linguists (Gumperz, 1982). Sentence fillers are defined as interjections in sentences (Gumperz, 1982). A case in point is the English fillers such as *you know*, *wow*, *phew*, and *eh*. Sentence fillers in CS serve as a discourse function (Gumperz, 1982). By the same token, Luke (1990) viewed these modal particles as “discourse markers” (pp. 263-287), which were defined as “sequentially dependent elements that bracket units of talk.” (Schiffrin, 1987, p. 31). These sentence fillers function to add details to the utterances. Many early researchers saw the electronic forms of communication as “simplified” or “degraded” because interactive written conversation lacked the paralinguistic information of tone of voice, emphasis, facial expression, and so forth which is present in F2F oral communication (Lapadat, 2002). Sentence fillers such as modal particles and emoticons both fill this pragmatic gap (Lapadat, 2002).

Insertion of the Romanized Chinese sentence fillers seemed to indicate that their function encompasses more than merely coordinating contextual meanings of an utterance. Asked why they inserted these Chinese sentence fillers, the participants came up with more or less the same answer. Amy explained her usage, stating “I just follow suit when I noticed others using them this way.....I only use these Chinese words when I talk to my Chinese friends.” Baillie said, “It is a habit to adopt Chinese words like these in our circle.” Cynthia responded by saying, “I didn’t do this at the very beginning.

Later when I found others using these words frequently, I felt it fun, and started to follow the trend.....I do not use these words when I talk to Canadians. I usually avoid a difficult topic, or use some other simple way to express myself when talking to Canadians.” Their remarks suggest that the chatters attempt to conform to the norm of their social network within their ethnic group, and negotiate relationships with each other, thereby constructing their ethnic identity. Conforming to the norm of their ethnic group is equivalent to a way of saying “I am like you; I am Chinese”.

The following excerpts will further illustrate the contexts in which the participants inserted these sentence fillers and what identities or relationships they were constructing by this means.

The next excerpt is a conversation between Baillie (寻找松本欄—Looking for Song Ben Run) and her friend (黑田君—Hei Tian Jun).

Excerpt 6. (from Baillie’s MSN chat)

1. 寻找松本欄 (Looking for Song Ben Run) says:

good. i haven't met you for a year

2. 寻找松本欄 (Looking for Song Ben Run) says:

how's london?

3. 黑田君 (Hei Tian Jun) says:

damn cold *la* (*la* is a neutral softner)

4. 黑田君 (Hei Tian Jun) says:

but i think spring is coming

5. 寻找松本欄 (Looking for Song Ben Run) says:

canada is colder *ne* (*ne* indicates what the speaker said is true, without a doubt)

6. 黑田君 (Hei Tian Jun) says:

no doubt

7. 寻找松本欄 (Looking for Song Ben Run)says:

i'm gonna learn japanese in September *la* (*la* is a neutral softner)

8. 黑田君 (Hei Tian Jun) says:

i can teach

9. 寻找松本欄 (Looking for Song Ben Run)says:

so my japanese will be better than you by then

10. 黑田君 (Hei Tian Jun) says:

impossible *ba* (*ba* indicates that the speaker does not fully believe the proceeding statement.)

11. 黑田君 (Hei Tian Jun) says:

i'm professional

12. 寻找松本欄 (Looking for Song Ben Run) says:

wait and see *ma* (*ma* indicates that something is obvious)

In this chat excerpt, the two chat participants introduced Romanized Chinese particles pervasively into an otherwise English dialogue. I provided an explanation of the Chinese particles and their functions in the sentences in the brackets. Of the particles used here, *la* in lines 3 and 7 serves as a tone-softner, *ne* in line 5 indicates that what the speaker said is true, without a doubt, and *ma* in line 12 indicates that something is obvious, while *ba* in line 10 transforms an affirmative statement into an interrogative,

hence changing the modality of the utterance. Nevertheless, most of the particles in this excerpt do not change the modality of the utterances, and the overall meanings of the conversation remain intact. The particles change the tones of utterances, for example, from being matter-of-fact to playful and lively. The chat participants seemed to be echoing each other by choosing Chinese particles appropriate to the specific contexts to express their mood and attitude, therefore establishing rapport with each other (Crystal, 1987). This kind of code-switching enabled them to signal their orientation, negotiate relationships within their social network, and consequently create an ethnic identity in their community of practice.

These results are consistent with the cultural precepts of sociocultural theory (Vygotsky, 1978) and, in particular, the findings of studies of identity construction within this theoretical framework (Brown et al., 2006; Holmes & Meyerhoff, 1999; Lam, 2004; Lapadat, 2003; Nguyen & Kellogge, 2005). Holmes and Meyerhoff (1999) claim that any behavior in a community of practice is directly related to membership status, and that individuals learn to interact appropriately through the process of identity construction in specific social practices. In CMC contexts, where the chat participants cannot see each other and visually gain feedback from their chatmates, they become so self-aware that they make use of both material tools and psychological tools to mediate their communication between each other. In mediating the interaction, they code-switch and adopt the discourse markers such as Chinese sentence fillers to construct social relationships in their social network. In so doing, they achieved cultural and social acceptance in their community of practice online. Participants in my study seem to have

realized that code alternation between English and Mandarin is an accepted way to communicate online. Hence, code-switching helped build up their confidence to use English, and the opportunity to use more English within a supportive community may scaffold greater English fluency (Lam, 2004). These findings also resonate with the studies of identity construction by Spears and Lea (1992), Yates (1997), and Hodgson (2002) in which researchers found that participants in online activities establish their social identity by interacting with a group and becoming members of this group.

The three participants' primary motive for communicating online probably was for relationship building and identity development/expression rather than for improving English language proficiency. Although Emma, Amy's mother, said that she encourages Amy to communicate in English online for the purpose of improving Amy's English, Amy's artifacts seemed to indicate that she was involved in the fun she derived from communicating with people online. Language learning appears to take place during the process of their socializing and identity building.

Effective communication. Mutual understanding is essential to L2 learners who interact in CMC contexts, where no visual feedback is available and misunderstanding is a potential threat to online interaction. In order to avoid misunderstanding, code-switching is utilized as a strategy to facilitate mutual understanding or to establish intersubjectivity. The process of creating intersubjectivity involves negotiation for meaning. The three participants in this study were confronted with some difficulties while engaged in online communication. One conventional strategy they adopted was to use their L1 to cope with the difficulties. They all indicated in their interviews that they

made code choices for better communication. Amy described code-switching as “a good way to make myself understood..... (I) can express myself more vividly”. Baillie suggested one of her motivations of code-switching was to express herself more accurately in conversation. She said, “(code-switching like adding particles) sounds like you are talking to someone face-to-face, not typing words.” Cynthia depicted her purpose in code-switching as primarily for mutual understanding. Code-switching in specific contexts allowed the chat participants to express their emotions, thus giving rise to negotiation of meaning and driving the interaction forward. The ongoing interaction created new comprehensible input and modified output, as reflected in the following excerpt. From the sociocultural perspectives, shared context knowledge was established through the interaction and collaboration of both speaker and addressee.

In the next excerpt, lulu (Amy’s nickname) was chatting with apple_422 in a chatroom.

Excerpt 7 (from Amy’s chat record in the chat room)

1. (13:24:44) *lulu* says to *apple_422*: I miss Chinese food very much
2. (13:25:03) *apple_422* says to *lulu*: 有得必有失. I have good Chinese food

(When you get something, you lose
something else at the same time.)
3. (13:25:06) *apple_422* says to *lulu*: every day
4. (13:25:26) *lulu* says to *apple_422*: *heng*, want to *qi* me (*heng* indicates that she

feigns that she is annoyed. *qi* means annoy)
5. (13:25:47) *apple_422* says to *lulu*: haha, r u angry

6. (13:26:18) *apple_422* says to *lulu*: I don't want to make a little girl unhappy.

7. (13:26:29) *lulu* says to *apple_422*: u air 4 me le. (you annoyed me to death)

8. (13:26:40) *lulu* says to *apple_422*: no. I just wanna go to Chinese *fanguan*

(restaurant)

9. (13:26:59) *apple_422* says to *lulu*: so r there any Chinese resturant

10. (13:27:15) *apple_422* says to *lulu*: restaurants in

11. (13:27:19) *apple_422* says to *lulu*: which city do u live

Code-switching occurred frequently in this chat excerpt. *lulu* said she missed Chinese food, then *apple_422* employed an idiomatic Chinese expression in the second line to convey her meaning “when you get something, you lose something else at the same time”. In line 4, *lulu* uttered a Chinese interjection *heng* to show she was just feigning that she was unhappy about being unable to have good Chinese food everyday, and added “want to *qi* me” (you want to make me annoyed), switching to Chinese *qi* (annoy) due to a lexical gap. The Chinese interjection *heng* played an instrumental role in conveying *lulu*'s mood vividly. Since there is no such English equivalent, *lulu* shifted to her native language to mediate the interaction. Judging from this interjection, *apple_422* was able to interpret fully and exactly how *lulu* was feeling, and then in lines 5 and 6, she said in a teasing tone “haha, r u (are you) angry” “I don't want to make a little girl unhappy”. Because *apple_422* shared the linguistic and cultural knowledge with *lulu*, she could identify with *lulu* and interpret the subtle meaning transmitted by the Chinese interjection *heng*. Ultimately, L1 precluded any likely misunderstanding from occurring, and assisted the construction of mutual understanding and a shared

communicative context. In line 7, lulu continued to show her feigned annoyance, which was indicated by her playful use of Chinese and English. Lulu uttered “you *air 4 me le*” (you annoyed me to death), where the literal Chinese translation of the English word *air* also means to annoy, the pronunciation of 4 in Chinese is similar to death in Chinese, and *le* is a Chinese particle. This imaginative use of language will be discussed in detail in the following section. The subsequent exchanges were concerned with the lexical gap. In line 8, due to the gap, lulu used *fanguan*, a Chinese word for restaurant. Then, in lines 9 and 10, apple_422 replied, and code-switching and meaning negotiation occurred again. In this negotiation, apple_422 modified her input by correcting her misspelling of restaurant, which was also beneficial to lulu’s vocabulary development within her ZPD (Vygotsky, 1978). The feature of text-based synchronous online chat has enabled the chat participant to notice visually the form of the target language, and modify his/her output accordingly. This interaction in the chat room provides support for Blake’s (2000) study which reported that in CMC contexts, L2 learners use “apperceived input” (p.131) or input they noticed, to modify and improve their vocabulary. Effective communication, therefore, is instrumental to negotiation of meaning, which in turn facilitates SLA (Long, 1985; Swain, 1995).

Rhetorical Effect. Language learners tended to play with languages in order to have fun or inject humour. The seemingly fun or humour-oriented language play made learners notice their output production which in turn made them more aware of gaps in their linguistic knowledge (Swain, 1994), and aided the consolidation of existing

knowledge. Apart from negotiating meaning, language play also served to mediate the relations between the speaker and the chat partner.

The interviews demonstrated that the three participants utilized numbers for rhetorical purposes, in addition to deploying this strategy to construct group membership within the online community, as Amy explained,

When I noticed others doing this (using these numbers), I felt it funny, and did it the same way. It is fun doing this..... A lively atmosphere would be created.

This linguistic behavior Baillie said “is the habit of our circle, and it is fun too”.

Cynthia stated one of her motivations to switch codes was “to create a humorous atmosphere when chatting.” These rhetorical elements are illustrated in the excerpts below.

Excerpt 8 (Amy’s chat record in the chat room)

1. (13:25:26) *lulu* says to *apple_422*: *heng*, want to *qi* me (*heng* signals her feigned annoyance. *qi* means annoy)
2. (13:25:47) *apple_422* says to *lulu*: haha, r u angry
3. (13:26:18) *apple_422* says to *lulu*: I don’t want to make a little girl unhappy.
4. (13:26:29) *lulu* says to *apple_422*: u air 4 me le. (you annoyed me to death)
5. (13:26:40) *lulu* says to *apple_422*: no. I just wanna go to Chinese *fanguan* (restaurant)
6. (13:26:59) *apple_422* says to *lulu*: so r there any Chinese resturant
7. (13:27:15) *apple_422* says to *lulu*: restaurants in
8. (13:27:19) *apple_422* says to *lulu*: which city do u live

Here, in the 4th line, the Chinese pronunciation of number 4 (*si*) sounds similar to the word for *death* or *die* in Chinese. When one wants to express extreme feelings about something, one uses *si* (4); it is a popular and idiomatic word in spoken Chinese. Lulu was also playing with the English word *air*, the translated Chinese character of which is polysemous, also meaning *annoy*. *Le* is a tone softener. Producing this playful utterance in the 4th line was still beyond her current competency, according to what lulu said in the follow-up inquiry, and lulu noticed the linguistic gap in her English repertoire. She was aware of the English sentence structure that the verb was placed before the object *me*, although the word *air* was used incorrectly in terms of both parts of speech and semantic meaning. On the other hand, just this incorrectness added humour to her utterance and situated her identity in this chat room. Meanwhile, her imaginative use of languages negotiated her relationship with the chat partner in the sense that they were chatting as members of this chat room within a very relaxing environment in a familiar way accepted by both of them.

4 was found to be also used in the artifacts to replace the English word *for*—for example “wait 4 me”, meaning “wait for me”. Since 4 was adopted in this case as a homophony with an English word, it was excluded from the instances of CS. However, it is worth noting that both partners in this exchange also have adopted several of the common short forms used in English chatrooms, such as 4 as *for*, *r* as *are*, and *u* as *you*, suggesting that the loosening of conventions in the written conversations of chatrooms may also be facilitative of the cross linguistic code-switching. In a sense, the playful use of language in online environments gives permission to code-switch.

In addition to 4, 8 is another number frequently used in chat exchanges.

Excerpt 9 (Baillie's MSN chat)

寻找松本欄 says:

talk to you next time

黑田君 says:

88~~

寻找松本欄 says:

88

In this excerpt, the number 8 signaled *bye-bye*. 8 (ba) is pronounced in Chinese in a similar way to *bye* in English. It is a convention to use 8 to replace *bye* within this circle. They used this number from the outset when they perceived the use of it as humorous, and then became accustomed to its use in this circle.

According to the participants, an idiomatic saying in Chinese was expressed with a combination of English words and numbers to create a lively, humorous atmosphere or make the conversation funny. Some numbers chosen for their homophony with Chinese words were used as part of phrasal expressions. As suggested by Danet, Ruedenberg-Wright and Rosenbaum-Tamari (1995), the playful use of language for entertainment frequently occurs in online environments, where fun often is the primary attraction. Humour and language play, therefore, are valued and have become conventional in chat interaction. In my view, the chatters play with languages not only because humour and language play are valued in chat interaction, but also because they have to use language playfully since there are no visual elements as an aid for effective communication. Humour and language play has become an essential part of the chatters' communication. The chat records of the three participants showed that Amy (age 13)

played with numbers more frequently than Baillie and Cynthia. Additionally, Amy also playfully used *air* for *annoy*. Compared to Amy's playful use of numbers 4, 8, and some other homophonies, the playful use of language by Baillie(19) and Cynthia (25) was limited only to the application of number 8 in the situation where they said goodbye to their chatmates.

Lantolf (1997) asserts that play as rehearsal enables learners to compare their existing interlanguage with newly acquired linguistic information in a low-pressure situation. Code switching may occur both during and after the interlanguage phase. This comparison between their interlanguage and new linguistic information can make learners aware of their problems, and therefore they adopt corresponding strategies to connect, converse, have a relationship, and express themselves, as a result of which their cognitive/linguistic development can take place. Through the imaginative use of language in the chat room, they all negotiated not only meaning but also the relations between speakers, addressees, medium, and contexts (Warner, 2004).

This difference regarding the extent to which language was used playfully seemed to provide evidence for Kristiansen's study (1993, noted by Jørgensen, 2003) which holds that non-adult language use, including creative expressions, is first and foremost a tool in the negotiation of social relations. Kristiansen points out that expressivity and creativity in language use are seen in the light of their role in group and identity formation processes, and the young people use language expressively and creatively in order to create their own social identity. Compared to Baillie and Cynthia, Amy was younger and prone to construct her identity through creating a unique format of language.

In addition, Cynthia was the one who used the fewest Chinese modal particles or interjections, according to the analysis of their artifacts. Among the three of them, it seemed that the older one was, and the higher one's English proficiency, the less frequently one employed Chinese modal particles, interjections or numbers to construct her identity. These differences could also be related to personality or other factors rather than age and English language proficiency. Amy, the youngest, may be more creative because she is more of a digital native, rather than because she is less proficient at English.

These mixed-code expressions generate a humorous effect with a jumble of linguistic and number signs and also reflected idiomatic ways of speaking in the Chinese language. The seemingly playful use of the language reflects how social relations are established and solidarity achieved in the Chinese culture. Conforming to the norms of the community of practice through appropriate tools indicates the person wants to maintain socially situated identities (Gee, 1996).

Findings also indicate that language is dynamic—these individuals were not just passively acquiring a static, pre-determined code, but actually engaging in the language and constructing the language anew, both cognitively and as a social entity/process. Each of Amy's, Baillie's and Cynthia's cognitive models of English will be different, depending on their experience, and the social, shared common practices of English will vary for each circle of chatters. Their language play and code-switching actually changes the language itself. English is now different from it used to be, as it now has some new symbols and meanings that can be utilized, (e.g., 88 for bye-bye; 4 to speak of death; *le*

or *la* to modify the tone), even though only a subset of English speakers may use this at this time in a CMC context.

Topic change. Among the three participants, Cynthia was the only one that explicitly indicated in the interview that she made code choices according to the topic of the conversation. She recounted her experiences as follows:

Sometimes we change languages when the topic changes. Which language is used will depend on which language is appropriate to that topic. For some topics, it is very hard to express clearly our ideas in English. For example, when we talk about cooking, we completely switch to Chinese.

Her remarks and an examination of her chat records demonstrated that the conversation topic affected CS. The following excerpts will illustrate this point.

In the excerpt that follows, Cynthia was asking Sean, (a graduate student in Canada), for help with a math problem.

Excerpt 9 (from Cynthia's chat record at MSN)

- | | |
|--|---|
| 1. Sissy-早睡早起, 精神百倍
!(Go to bed early and get up early, and you will feel full of vigour) | help help!!!! |
| 2. Sissy-早睡早起, 精神百倍! | $dC=(k_2 - k_1 C)dt$, $t=0$ 时 $C=C_0$, k_1 和 k_2 是常数, 解这个方程(if $C = C_0$ at $t = 0$ and k_1 and k_2 are constant, solve the differential equation.) |
| 3. Sean... | OMG |
| 4. Sissy-早睡早起, 精神百倍! | 哭 (an emoticon of a crying expression) |
| 5. Sean... | is this ur assignment? |
| 6. Sissy-早睡早起, 精神百倍! | 恩 (an emoticon of a nodding expression) |

- | | |
|-----------------------|--|
| 7. Sean... | which course is this? |
| 8. Sean... | let me ask some math guy |
| 9. Sissy-早睡早起, 精神百倍! | modeling |
| 10. Sissy-早睡早起, 精神百倍! | 好 (an emoticon of approval expression) |
| 11. Sean... | jinrong says: I don't know, man... the question is poorly written. |
| 12. Sean... | give me a more clear description |
| 13. Sean... | jinrong says: tell her to type the question exactly what it says on the book. I might be able to help then |
| 14. Sissy-早睡早起, 精神百倍! | , if $C = C_0$ at $t = 0$ and k_1 and k_2 are constant, solve the differential equation. |
| 15. Sissy-早睡早起, 精神百倍! | wait
Sissy-早睡早起, 精神百倍! sends
C:\Documents and Settings\A\Desktop\if C.doc
Transfer of "if C.doc" is complete. |
| 16. Sissy-早睡早起, 精神百倍! | 要详细过程阿 (let me know the detailed procedure) |

In this excerpt, the Chinese characters that follow Sissy was part of Cynthia's nickname, meaning "Go to bed early and get up early, and you will feel full of vigour". Sissy was asking Sean for help in Chinese, " $dC=(k_2- k_1C)dt$, $t=0$ 时 $C=C_0$, k_1 和 k_2 是常数, 解这个方程" (if $C = C_0$ at $t = 0$ and k_1 and k_2 are constant, solve the differential equation). However, the subsequent chat revealed she knew how to articulate this math problem in English. Asked in the follow-up inquiry why she employed Chinese to convey her ideas in a scenario where expressing herself in English did not pose an obstacle, she explained:

We are talking about some academic stuff, like math problems. Solving a math equation is a rigorous process. I wanted my chatmate to have a clear understanding of my question. The clearer my question, the better. I also know how to say 要详细过程阿 (let me know the detailed procedure) in English. So I did it in order to express myself accurately.

Code-switching here was no longer a matter of linguistic deficiency in the target language. Non-linguistic factors affected a bilingual speaker's code choice. In analyzing this excerpt, I found that the established theoretical framework in this study failed in accounting adequately for this code-switching strategy. Neither the input-output hypotheses nor the process of achieving intersubjectivity discussed in sociocultural perspectives can present an accurate and complete explanation as to what triggered the code-switching in this context. Re-examination of this strategy showed that Cynthia's code-switching behavior was entwined with socio-psychological factors and the immediate situation in which this behavior occurred. Lines 1 and 2 suggested that Cynthia was in urgent need of help with a math equation, and was well aware of her situation. Finding a solution to this equation was important to her, and in lines 1 and 16, she resorted to Chinese to express this math problem, because she felt psychologically and linguistically secure in expressing herself in her native language. After taking into account the potential risks and benefits possibly brought about by using two languages, she may have shifted to Chinese to minimize costs and maximize benefits, on the basis of cost-and-benefit calculation (Myers-Scotton, 1983). Lines 8 and 11 suggested that Sean could not help Sissy with this math equation, and then sent Sissy's Chinese problem to jinrong, a math student from Taiwan for help. Jinrong indicated in lines 11, 12 and 13 that he preferred a math problem phrased in English before he could offer

help. The implication was that he did not comprehend Cynthia's Chinese explanation of the math problem, perhaps because written Chinese in mainland China is different from that in Taiwan. Simplified Chinese characters are used in mainland China while traditional Chinese characters are used in Taiwan, and the way of conveying ideas in the two places also differs. Therefore, Sissy reverted to English for clarification of the math problem in line 14. However, line 14 is only a partial restatement of the question—it is incomplete, and cannot be solved as written. She omitted the part: $dc=(k_2-k_1)dt$. Probably the C.doc attachment that she sent states the full question. At this point, Sissy enacted a repair move by code-switching to L2 and sending the document. Switching to L2, however, is not the focus of the study.

Cynthia was the only one who switched languages according to the topic. Amy and Baillie developed their code-switching strategies at their relatively low English level primarily to keep the conversation flowing and for identity construction. Cynthia, with a higher English level and some fluency, exploited some additional code-switching strategies. Another possible explanation is that Amy and Baillie had not had a chance to discuss academic or very complicated things online, and therefore, it did not occur to them that they would employ this kind of code-switching strategy.

Informal situations. Formal situations require formal use of language, and informal situations entail use of more informal language. Cynthia did not use code-switching in formal situations, such as when she sent emails to her Chinese supervisor. In the Chinese culture, students are supposed to pay deference to their teachers in every possible way, including in their communications by email. An analysis

of Cynthia's interviews indicated that she oriented to rules and shared views with her supervisor about her actions as a member of the community of practice (Wenger, 1998). Both Cynthia and her supervisor are from mainland China and have similar cultural backgrounds and values. As a member of the small local Chinese community, Cynthia adheres to the rule of teacher vs. student in the Chinese culture. As a member of the graduate students' community in a Canadian university, Cynthia uses English to communicate with her supervisor. Cynthia's supervisor can understand the cultural implication that Cynthia's formal English emails may carry.

Among the three participants, Cynthia was the only one who explicitly pointed to the exclusion of code-switching strategies in formal situations. This is consistent with the statement by Gumperz (1982) that code-switching is most frequently found in informal speech of minority groups. Cynthia explained in the interview the situations in which she mixed language codes and in which she did not:

.....the persons I email are either foreigners or my Chinese supervisor. I don't code-switch in my emails to foreigners, because they don't understand Chinese. When emailing my Chinese supervisor in English, I dare not use Chinese to replace the English words I don't know. I want to show my respect to him. So I don't mix languages when emailing my supervisor. For one reason, it is impolite; for another, it will look informal. It is different from chatting on MSN. Everyone is chatting freely, feeling relaxed.

Baillie expressed the same idea that she code-switched when engaged in chat online.

Amy recounted the contexts she mixed codes as in chat online, emails to her classmates, or on the webpage under construction for her own entertainment. Nevertheless, Baillie and Amy did not mention any formal situations in which they would limit themselves to using one language only. Perhaps due to their age, they had not encountered any formal

situations which required them to adhere to English only. They were mostly using MSN to chat with others rather than asynchronous communication such as emails. Baillie said that she seldom sends emails to her Chinese friends, and if she does, she mostly uses Chinese. Although Amy sometimes writes English emails, the receivers of her English emails are her former classmates in China.

Synchronous communication such as MSN takes place in real time and requires speed both in reading the messages others send, and in composing and sending one's own messages (Lapadat, 2002). In contrast, asynchronous medium relieves conversationalists of the constraints of communicating in real time (Lapadat, 2002). As a result, conversationalists have adequate time to compose their messages. Such being the case, another possible explanation was that Cynthia's English proficiency enabled her to avoid using certain English words or constructions that present some complexity and to select alternative ways of getting her message across to her supervisor because composing an email entails sufficient time for choice of words or sentence patterns.

As both a member of the Chinese community in Northernlight and a student pursuing studies at a Canadian university, Cynthia obliged herself to conform to the conventions of the community by adhering to one language to show respect for her supervisor on the one hand and to employ English as the formal communication language at the university on the other. In so doing, she positioned herself as an English-speaking student under the supervision of a Chinese professor, thus establishing her situated identity. However, when she communicated in informal situations with Chinese English-speaking peers, she used code-switching, because she was conforming

to the norms of the community of her and her Chinese peers. Cynthia, therefore, constructed her different identities within different communities of practice.

English Language Development

This theme explored the relevance of code-switching to the three participants' English language development. They said that they perceived benefits in terms of vocabulary, writing, speaking, listening comprehension, and grammar.

Vocabulary. There was a consensus among the three participants that their vocabulary had been enlarged as a result of code-switching. Amy expressed the following idea when asked how she found code-switching related to her English study. She said,

When I chat or sent email in English, I will come across new words. I use Pinyin or Chinese characters to replace them first. Afterwards, I look them up in the dictionary. This way, I can memorize more English words.

Baillie described code-switching as something which can “increase my vocabulary”.

Cynthia explained,

It (code-switching) also increases my vocabulary. I will look up the words I don't know later, especially the nouns and set phrases.

Their electronic artifacts were also indicative of how they acquired new words during negotiation of meaning. Among the linguistic skills, the three participants perceived strengthened vocabulary development as most observable.

Writing. All three participants perceived that their writing skills were enhanced. They said that code-switching freed them from worrying about making errors or feeling frustrated about being unable to express themselves fully and quickly on the

Internet. When they switched to Chinese due to linguistic deficiency, they realized there was a linguistic gap in their English repertoire. As long as they eventually acquaint themselves with these English words or sentences, then they will improve their English. Baillie expressed her view on code-switching, stating: “I learn how to use these words or sentences (English words or sentences). I will be able to use them in writing”. Cynthia said that “it helps organize my sentence. It does good to my writing”. Amy recounted her experiences of this linguistic behavior as: “With more English words and sentences in my mind, I can write faster, and write better English”.

Speaking. All three participants agreed that their speaking was improved.

Cynthia explained,

When I am familiar with the English equivalents of the Chinese words or sentences I don't know, it can come out directly when I need to say that sentence, since there is already a concept in my mind. It is beneficial to my speaking.

Baillie said that after learning English words or sentences she previously did not know, she would be able to use them in daily life when necessary. Amy described her use of Chinese particles as related to her English speaking in her own way:

With more English words and sentences in my mind,I can speak more and understand others better. Adding *ma, le, ne* to the end of a sentence can create a lively atmosphere among us chatters. With such an atmosphere, I want to talk more. The more I talk, the more English I use, I think the better my English will be.

Listening comprehension. Among the three participants, Amy was the only one who considered code-switching to be related to improvement in English listening comprehension. She explicated the reason for thinking so:

.....my vocabulary is increased and I can learn more sentence patterns for speaking or writing. I become more sensitive to these words or sentences patterns.....My listening has been improved too, because I know what the others are talking about when they use such words or patterns. I can also use them when I talk to my classmates.

A possible explanation for Amy's perception was that her English proficiency was relatively low compared to that of Baillie and Cynthia. She had a smaller vocabulary and fewer sentence patterns in her English repertoire. When she obtained more knowledge about English, however, the progress she perceived in her English was more obvious. Another possible explanation was that, according to the electronic artifacts she provided, she tended to chat with those who were older, which facilitated her English development in her ZPD (Vygotsky, 1934/1978).

Grammar. Baillie was the only one of the three participants who declared that her English grammar was improved by the use of code-switching in online communication. In her opinion, chatting in English mixed with Chinese on the Internet in her social network increased her vocabulary and enhanced her motivation to write in English. She explained that "writing in English can increase my vocabulary, and I learn how to use grammar flexibly." The mixed-code writing has exerted an influence on how she should organize her writing in a grammatically correct way. Her particular perception about the relevance of CS to grammar may demonstrate that individual differences may play a role. Some researchers have found that individual differences in terms of affective variables, such as attitudes towards writing with computers, or personality, may affect learner performance and achievement in CMC (Beauvois & Eledge, 1996; Sullivan & Pratt, 1996).

Comparison of Computer-related Activities

The students and the parent participant all perceived computers to be an important part of the students' lives after school. They all took advantage of the computer and the Internet to engage in activities relevant to English study, such as chatting online in English, sending English emails, or designing an English webpage. The two adult students' multiliteracy activities associated with English mainly focused on chatting online, while the elementary school girl engaged in more varieties of practices in English on the Internet, such as sending emails, and designing a webpage, in addition to chatting online. Although the two adult students also had their own webpages, these were constructed in Chinese when they were still in China. They seldom sent emails to their Chinese friends or classmates. They would rather communicate with them by chatting on MSN. While emails served as one of their communication means, they were composed in English targeting a few Canadian peers or a Chinese supervisor.

Amy took up more electronic multiliteracy activities in English, under the encouragement and supervision of her mother. As a new arrival in Canada, she still had not totally immersed herself in the new school life. She wished to chat with her classmates in China at QQ, a chatting site in China. However, the heavy homework load and a highly competitive school life in Chinese schools did not allow her friends to chat frequently with her. Once she arrived in Canada, she had more time online. She turned to her elder cousin for a chat on MSN or entered the chat room to chat with those Chinese people she did not know as well, which she claimed also brought her great pleasure. The mother encouraged her daughter to chat online in English, to compose English emails to

her classmates in China, and to learn to design her webpage in English. The parent and the student participants all took a positive attitude towards the use of computers in their activities after school, with a view that these activities increased their communication with friends or classmates, added pleasure to their life, and facilitated their English skills.

Comparison of the Code-switching Strategies

A comparison of the three student participants' interviews and electronic artifacts indicated that code-switching was more than idiosyncratic behavior. The participants used code-switching strategically for specific communicative purposes. The code-switching strategies they employed exhibited some similarities and differences. Comments from the participants indicated that they all switched to Chinese when they had trouble expressing themselves in English when engaged in online conversations. The remarks in the interviews and artifacts provided showed that Amy (13) and Cynthia (25) both used Chinese characters and Pinyin--Romanized Chinese, to switch codes.

Although Baillie (19) said in the interviews that her means of code-switching was to use Chinese characters, the artifacts she provided revealed that she also did adopt Romanized Chinese modal particles in her English online exchanges with her Chinese peers. This discrepancy could be explained that Baillie saw the use of Romanized Chinese modal particles as a conversational style rather than as code-switching, and this use has become a common practice in her social network. According to the interviews and artifacts, Amy was the only one, among the three, who used a graphic as means of conveying her emotions, on which she composed sentences in English mixed with

Chinese. This unique code-switching behaviour may be due to her age, personality or the fact that she is artistically-inclined. As well, this code-switching behaviour tends to indicate that younger people are on the leading edge of using a more multimodal form of literacy.

As far as contexts of code-switching were concerned, both the interviews and the artifacts indicated that Amy, Baillie and Cynthia all employed a code alternation strategy when linguistic difficulties arose. As agreed by all three participants, they switched codes when they wished to convey their meanings effectively and accurately, but perceived their English repertoire to be inadequate to enable them to do so. The frequent occurrence of code-switching in the interaction online showed that the chat participants deployed their L1 not only as a mechanism to fill in linguistic gaps, but also as a mediating tool to establish intersubjectivity to maintain the conversation flow.

Code-switching was not a strategy for purposes of filling in linguistic gaps only; it also served social communicative functions. According to the interviews, all three participants added Chinese modal particles or interjections to otherwise completely English sentences to conform to the norms of their social network. By so doing, they acquired a sense of their own identity in their community of practice. The accepted way of using English, namely, a mixed code variety on the Internet, facilitated a sense of fluency and confidence in speaking English (Lam, 2004). However, an examination of the artifacts indicated that Amy and Baillie used many Chinese particles, whereas Cynthia did not employ them as much in the chat transcripts she offered to me. Possible reasons were that she was older and more mature than Amy and Baillie, or that she had a

higher level of proficiency in English, or that her chat partners did not initiate use of these particles, and she was trying to use a conversational style that converged with that of her chat partner. Whether use of Chinese particles was related to her age or chat partners cannot be disambiguated within this study.

The three student participants all reported that one of their purposes in code-switching was to create fun or humorous effect by combining Chinese particles, interjections, and numbers with their English message. In CMC contexts where chat participants cannot view each other's facial expressions or feedback, they employed this jumble of words for rhetorical purposes. The playful use of language is indicative of how social relations are established and group solidarity is earned in the Chinese culture.

According to the interviews and the electronic artifacts, Cynthia, the university student, was the only one among the three participants who shifted to Chinese from English for specific topics of conversation. Her relatively higher English proficiency compared with Amy's and Baillie's offered her the flexibility to make transitions between the two languages in order to minimize risks and maximize benefits code-switching may bring about.

Cynthia was the only one who explicitly specified that she did not alternate languages in formal situations, such as when she sent emails to her Chinese supervisor. There were three possible explanations for this difference. The first was that Amy and Baillie had not experienced such a formal situation; the second was that I just did not happen to see any example of this with Amy and Baillie because of the limited subset I saw of their online behaviour, or the topic did not come up; the third was that Cynthia's

English proficiency enabled her to get her message across in English to her supervisor in other ways, if some English expressions presented problems for her. In so doing, she conformed to the conventions of the community of practice (graduate students in an English-speaking university) and established her situated identity.

All three participants commented that use of English mixed with Chinese was conducive to their English literacy development, and they perceived their English skills to be improved to varying extents. A consensus existed that their vocabulary had been expanded, writing skills facilitated, and speaking improved. Their comments and artifacts showed that text-based online activities made them more aware of their language production, and motivated them to concentrate on the English words absent in their vocabulary repertoire while negotiation of meaning was going on. The established mixing of codes between English and Chinese within their online community of practice consciously or subconsciously encouraged them to practice writing in English, which in turn built up their confidence in using English, and subsequently helped them to develop a greater sense of fluency. Amy was the only one among the three participants who reported that her listening comprehension also was improved, and Baillie was the only one who considered her grammar to be improved. Whether this improvement was connected with age, or English proficiency, or personality was a matter worth further investigation.

Summary

Code-switching is deeply embedded in its contexts and complicated in that linguistic and extralinguistic factors are involved in triggering code-switching for the

participant in this study. It functioned not only as a mechanism to compensate for deficiencies in L2, but also as a strategy to fulfill social, psychological or discursive purposes. Code-switching was likely affected by one's age and English proficiency. In terms of similarities, all three participants exploited code-switching strategies as a fallback method when their knowledge of L2 failed them, and for social functions that contextualized the interactional meaning of their utterances. Cynthia, with a better English proficiency and older age, made code choices more for social purposes, and knew better when to maximize benefits in socializing and interacting with other interlocutors. Amy, a teenager with a relatively low English proficiency, is aware of her own language production to an extent to which the code choice is conscious (Bialystok, 1990). Her code-switching was triggered either by lack of English proficiency or by the need to conform to her community of practice online. On the other hand, Cynthia, an adult participant with a better English competence, consciously used code-switching strategies to signal something quite different than a lack of English proficiency.

Chapter Five Conclusions

In order to gain a better understanding of the implications that findings in this study have for the practice of teaching ESL students, it is important to re-examine the

role computers play in ESL students' home literacy practices. Specifically, my area of focus has been on the linguistic strategies involving code-switching that the Chinese students employ to cope with language deficiency or to serve social functions while engaged in communicating in computer-mediated communication, and how this relates to English language development.

After school, all three participants actively engage in activities afforded by computers. The Internet provides them with a free space, where they construct their particular social network and distinctive way of using English. In an electronic environment, they communicate with friends and people with whom they share a common cultural background or to whom they feel close. Being ESL speakers, they code-switch, when in trouble with English expressions, without worrying about being laughed at for their language deficiency, thereby creating on the Internet a mixed-code variety of language including varying degrees of code-switching (from predominately English to predominately Chinese). As group members in a community of practice, they accept this distinctive way of using English or take it for granted. As Cynthia expressed in the interview, "We can understand each other by [code-switching]. It is funny. It is like Chinese people speaking English in their way". This mixed-code of language occurred not only as a result of deficiency of the second language of the interlocutors, but also was deployed for social, psychological and discursive purposes. Through this linguistic behavior, they constructed their social, cultural, and psychological position with other members of their community of practice in the online environment. The ease with which they adopted this mixed code of language created a

psychologically relaxing language learning environment, which in turn developed in them a sense of fluency and confidence in speaking or writing in English.

Consequently, they all perceived that their linguistic skills were facilitated in some aspects.

In analyzing code-switching, I discovered that this study's theoretical framework applied to most of the contexts in which code-switching arose. I analyzed the participants' code-switching behaviour using interactionist and sociocultural approaches. Nevertheless, this framework could not act as an umbrella to cover every circumstance under which code-switching occurred. The framework was developed following a literature review of code-switching in second language acquisition and CMC contexts, and was used basically as guide for this study. The framework was not meant to preclude other theories emerging from the analysis of the data. Rather, the framework was expanded to fit with certain findings that emerged from the data, thereby broadening the research perspective. For example, Meyers-Scotton's (1983) Markedness Modal was included to account for Cynthia's code-switching triggered by a specific topic. It is in this sense that this study was inductive because it was aimed at theory building, and deductive because the initial theoretical framework was confronted with an emerging framework as a form of theoretical validation. On this level, this study resembles Yin's (1993) approach. In his view, the "good use of theory will help delimit a case study inquiry to its most effective design" (p. 4). Yin (1993) also asserts that in case study research "theory development as part of the design phase is essential, whether the ensuing case study's purpose is to develop or to test theory"

(p. 27).

Contributions of the study

The present study made contributions to the literature in the following aspects.

First, using a multiple case study approach, this study, for the first time, examined how Chinese ESL students utilized different Chinese writing systems afforded by computers to code-switch for different communicative and social purposes.

Second, unlike previous studies which focus either on code-switching by fluent bilinguals or on the use of L1 by L2 learners in carrying out learning tasks in the classroom setting, this study holistically investigated the contexts of code-switching by Chinese ESL students in the natural learning environment at home, specifically within the increasingly popular CMC environment, and compared the similarities and differences in code-switching by three participants who differed in age and English level. Research on code-switching from a sociolinguistic perspective has failed to explain how code-switching assists in the process of L2 learners' second language acquisition. On the other hand, by focusing on the role L1 plays in facilitating the accomplishment of L2 learning tasks, research on use of L1 in L2 classrooms has neglected the sociopsychological effects L1 exerts upon L2 learners in natural learning environments. This study has taken into account the various factors involved in triggering code-switching and the functions code-switching may serve in assisting English language development. Findings of the study have thrown light on a seemingly simple linguistic behavior, and suggested that code-switching was triggered by multiple factors, ranging from age-related to cultural, social, psychological ones.

Applying one theory to the interpretation of code-switching tends to oversimplify this phenomenon, hence failure in recognizing the significance code-switching has for the language learning of ESL students. By extension, code-switching has implications for teaching ESL learners as well.

Implications for Practice

This section addresses the implications that findings in this study have for ESL teaching practice. The implications and my recommendations for improvement will be addressed in three key areas: integration of computer-mediated activities into classroom teaching, a better understanding of code-switching among ESL students by ESL teachers, and design for ESL students of learning activities conducive to second language acquisition.

Integration of Computer-mediated Activities into Classroom Teaching

It is clear from findings in this study that computers have become a significant element in the participants' activities after school, and that their home multiliteracy practices are dynamic and responsive to technological advances. Technological developments already have impacted upon these students in a way that has extended and diversified their literacy and language practices. All of the participants in this study engaged in a variety of activities on the Internet, such as chatting online, sending emails, or constructing their webpages. These were carried out sometimes in Chinese and sometimes in English. The participants began utilizing communication technologies to create a network of friendship or socialize in their network that is either immediate or linked across space and time. They all spent a couple of hours each day at

the computer communicating through chat rooms with friends or classmates. The Internet has put them in touch with Chinese-speaking peers or chatmates within and beyond Canada, as a result of which their computer-mediated literacy practices have become a social practice in the context of global social and technological change. For these Chinese ESL students in Canada, engaging in such a social practice developed in them a sense of belonging and an ethnic identity within their community of practice online. As a result, I believe they benefited from this novel form of literacy practice linguistically as well as socio-psychologically.

On the other hand, there exist differences in literacy practices between home and school, as discussed by Lapadat (2003) and Wells (2001). Cruickshank (2004) attributes the mismatch to the ways in which school personnel understand and interpret home and school literacy practices. According to his study, schools tend to view the literacy practices of students from minority groups as traditional and insufficient. This view is one-sided, and one of the consequences it may cause would be to set up a barrier between school literacy and home literacy, eventually limiting the ability of school literacy itself to change and adapt to modern society (Cruickshank, 2004). This concern that non-school literacies are viewed as inferior is expressed by Street (1995) as well. A study by Cairney and Ruge (1998) reported that the most academically successful students are those whose home literacy practices can reproduce school literacy practices. It thus can be seen that educators' mindsets about minority students' literacy practices at home need to be changed or adjusted to the current era when traditional literacy has evolved into multiliteracy practices. The necessity for schools to

adapt to technological changes has become more salient at a time when ESL students' literacy practices at home have proved effective in improving their English language development, and classrooms which have incorporated computed-mediated language learning tasks have boosted social dynamics and motivation, which in turn augments language learning. As asserted by Warschauer (1998a, 1998b), computer technology is no longer a mere tool but rather an essential new medium of language and literacy practices alongside face-to-face communication and the printed page. In contrast, a survey conducted by Turbull and Lawrence (2002) has demonstrated that a sizable number of Canadian French-as-a-Second-Language teachers have never used computer technology in their classes. The mismatch applies to school teachers who lack knowledge of computers and school or provincial administrations that fail in providing support for teacher professional development (Lapadat, 2003).

On the part of schools, there are three ways to address this issue. The first one is to provide support for teachers' professional development in an attempt to update their knowledge about new technologies and instructional innovations. As well, schools should ensure that teacher education program for new teachers incorporate state-of-the-art technologies and views of literacy. Without updated knowledge, educational innovations become an unlikely endeavor. The second one is to conduct research to examine ESL students' home literacy practices, and the third is to develop research that explores the nature of school literacy practices. These programs of research would be aimed at mutually recognizing these practices on both sides, and incorporating aspects of ESL students' home literacy practices into classroom learning

tasks, with a view to ensuring ESL students' greater involvement in and motivation for English language learning.

Understanding of Code-switching by ESL Teachers

According to the definition of code-switching used in my study, code-switching is an interlinguistic phenomenon specific to bilingual or developing bilingual speakers. ESL teachers who inevitably deal with this linguistic behavior in the instructional context should have a better understanding as to why it occurs and what role it plays in the developing bilingual students' English language development. Allowing students to switch codes in learning the second language was considered counter-productive until recently. For example, Walz (1996) points out that code-switching to one's L1 is often regarded as unacceptable among classroom teachers. Even today, many instructors are reluctant to permit students to switch to their L1 in the L2 classroom (Thoms et al, 2005).

However, findings of this study demonstrate that code-switching is not a mere display of deficient language knowledge. Rather it is a behavior through which its users express a range of meanings as well as a strategy for aiding L2 learning. In this study, these Chinese ESL students exploited code-switching strategies to fill a linguistic gap as well as to fulfill social and discourse-related functions. Although code-switching during a conversation may interfere with the addressee's comprehension when the speaker switches codes due to an inability to express herself, code-switching does prompt negotiation of meaning which is beneficial to second language development, as also evidenced by the three participants' electronic artifacts. In this sense,

code-switching does not cause interference with language learning; on the contrary, it provides continuity in communication and an opportunity to access more comprehensible input and generate comprehensible output. The social functions identified in the three participants' data further evidenced code-switching as a means of communicating identity, solidarity and affiliation to a particular social group. It is on this basis that code-switching should be viewed as a tool for communicative, social purposes and a supplement to speech. The old view of code-switching as a random process that potentially interferes with L2 learning should be reconceptualized; rather, code-switching is a communication strategy (Corder, 1981) related to second language acquisition. Heller (1992) suggests "the absence of code-switching can be as significant as the presence of it" (p.124). Because code-switching happens naturally in the communication process of bilingual speakers or developing bilinguals, it is reasonable to conclude that it serves important functions.

There is a great need for educators, ESL teachers in particular, to view code-switching in a positive light. Based on this understanding, students who exhibit code-switching behaviors should not be discriminated against by schools or teachers. Allowing bilingual or developing bilingual students to utilize their linguistic and cultural resources supports their learning needs (Laliberty & Berzins, 2000). However, it is still rare to find L2 classrooms that allow the use of L1 (Levine, 2003).

Perhaps one reason that many ESL teachers are uncomfortable with their students' use of L1 is that few ESL teachers understand all of the languages spoken by their students. Consequently, when the students speak their first language, these

teachers may not understand and therefore fear that they will lose control of the class or that their authority will be undermined. When ESL teachers understand this linguistic behavior as a resource for L2 acquisition, they will be able to identify pedagogically meaningful uses of L1 to facilitate L2 acquisition, and help ESL students enhance their language proficiency through using their own linguistic “funds of knowledge” (Moll, 1992). For these reasons, it is essential for schools to design professional development plans for ESL teachers which are intended to keep the teachers acquainted with the latest research studies in SLA. New information will assist teachers in gaining a better understanding of students and teaching per se, hence broadening their perspectives and possibly bringing about their endeavors for pedagogical innovations.

Design of Online Collaborative Learning Tasks

Findings of the study suggest that, rather than viewing code-switching as counter-productive or pedagogically unacceptable, ESL teachers should consider code-switching beneficial for certain linguistic or communicative functions. Ellis (1984) and Krashen (1985) emphasize that learners should receive a maximum of input in their L2 in order for acquisition to occur, but the results of the study indicate that L1 serves particular functions in the L2 learning environment. It is clear that the three participants in this study all made code choices, and used their linguistic skills as a mediating tool to maintain the flow of conversation. The process involved not only negotiation of meaning but also social functions the L2 learners need to fulfill in a CMC environment. It is also evident from the excerpts analyzed in this study and other instances of code-switching in the data that effective communication between the chat

participants online entails collaboration between speakers and their interlocutors. Whenever a signal occurred that communication might break down due to a linguistic gap, the chat participants resorted to their L1 to maintain the flow of their conversations. Even when language difficulties did not pose an obstacle, they still inserted sentence fillers of their L1 to conform collaboratively to the norms of their online community. As pointed out by Vygotsky (1978), meaning-making and knowledge is co-constructed through social interaction. Without collaboration in social interaction, negotiation of meaning and socializing among the chat participants within their community cannot be achieved.

It is important for ESL teachers to realize that the fundamental purpose of talk is to communicate, not to learn a language purposefully—learning occurs as a byproduct of the communicative process. Therefore, the creation of engaging opportunities to communicate frequently and meaningfully with peers, friends and colleagues in L2 will be more successful than mere language lessons and drills. Computer-mediated communication provides just this context, and, as findings of this study demonstrated, this communicative context has the added benefits of being a supportive community of practice (e.g., fear of making mistakes is decreased), and scaffolding is often provided. The focus of the participants' online interaction is on achieving shared meaning and building interpersonal relationships, during which learning naturally takes place.

If incorporating computer-mediated learning activities into classrooms has become a necessity in schools, ESL teachers unexceptionally need to consider what kind of online learning tasks should be designed to create an environment conducive to

L2 learning. The results of this study suggest that collaborative learning tasks which involve use of students' L1 are appropriate for ESL classrooms.

Some studies have examined the kinds of tasks used in the L2 learning environment. The kind of task designed for learners can affect the way learners collaborate, negotiate meaning, use their L2, and make use of their L1 in face-to-face communication in the classroom (Smith, 2003). Research has suggested that collaborative tasks such as information-gap and jigsaw tasks facilitate L2 acquisition (Pica, Kanagy & Falodun, 1993). Blake (2000) has examined the effect of task type on learners in their L2 environment, as well as how and when students negotiate for meaning in a conversation in the L2 within the medium of CMC (see also Fernández-García & Martínez-Arbelaiz, 2002). He notes that allowing learners to work in pairs on collaborative tasks promotes negotiation, because each partner has to share his/her respective part to complete the tasks. While completing the communication task, learners encounter lexical, grammatical, or other linguistic problems that, in turn, require negotiation between them. He further reports that learners continue to negotiate for meaning in ways similar to those found in face-to-face communication.

The new medium of CMC, compared to the traditional foreign language (FL) classroom, "can provide many of the alleged benefits ascribed to [Long's] Interaction Hypothesis, but with greatly increased possibilities for access outside of the classroom environment" (Blake, 2000, p. 120). Therefore, CMC gives learners more opportunities to interact with their peers (Blake, 2000; Fernández-García & Martínez-Arbelaiz, 2002). As well, computer-mediated communication as an interactive written medium

has an impact on its users' ability to write (Lapadat, 2002). The participants in this study communicated with others online by reading and typing text in real time. As typing is slower than speaking, the participants looked for ways, such as using the simplified electronic forms of language and code-switching, to speed up their writing in order to be able to take part in the conversation. Although the language they produced in the synchronous chatrooms was brief, informal, even grammatically wrong, with mixed codes, they were trying to formulate an idea and construct a personal meaning in English along with the written texts. As a result of the text-based chatting online, they all perceived that their writing ability has been improved.

Findings of the present study, therefore, can inform ESL teachers of the possibility of designing collaborative learning tasks such as writing tasks in CMC contexts. However, presumably not all collaborative tasks are equally beneficial (Wells, 1998). ESL teachers need to determine their choice of collaborative tasks in which code-switching is allowed. For example, teachers can design an online collaborative composition of a written text. Such a learning task requires the students to deal with all aspects of the target language and a written text enables students to revise, evaluate, and improve the text. When students collaboratively work on the composition, they should be allowed to employ their L1 to scaffold their accomplishment of the task. However, the final written product should be in L2.

Kotter (2003) recommends online tandem learning activities like that he observed in which German students of English teamed up with American students of German for a project in MOO (Multiple-User Domains). He notes that when these

teams of learners with differing commands of English and German respectively were engaged in the online exchanges, they were able to utilize the bilingual format to complete projects of their choice and to benefit from their partners' expertise as native speakers of their respective L1s. Kotter warns, however, that allowing every student to use the target language as much as possible would violate the tandem principle of reciprocity because it would decrease the chance for the students to derive much authentic input in their L2 from their partners. On the other hand, randomly making language choice results in less effective L2 learning in that neither of the codes is used long enough to allow students to gain sufficient grammatical, semantic and pragmatic information about their L2. Hence judicious use of both languages is necessary in order for the desired outcome to occur, and the decision lies with the classroom ESL teacher as to what extent code-switching is allowed in these tasks to ensure students' L2 improvement.

Informed by previous research studies and knowledge about code-switching, ESL teachers can also organize similar tandem learning tasks on line for their students. At the same time, they can explicitly teach the students how to employ code-switching strategies as part of the acquisition process. Furthermore, Kotter (2003) also found that use of on-line chat in the L2 classroom, employing a synchronous text-based communication tool, can be one of the choices. Properly designed online chat can render language learning both fun and productive. The significance of such online activities lies in two aspects. First, the function of online communication is not limited to a single use, such as a tool with which teachers construct collaborative tasks to

enhance L2. Second, it is potentially a transformative tool that each student can use to construct an identity as a user of L2 in and beyond the classroom. Another advantage is that most students are highly motivated to engage in online chatting.

On the other hand, designing collaborative online tasks that allows L1's use may present a challenge to ESL teachers in Canada. Studies that have examined the use of L1 in the L2 classroom focus on students who share a first language and therefore language teachers have encountered little difficulty in organizing collaborative learning tasks. When language students who share a first language engage in collaborative tasks, their potential to utilize scaffolding is maximized (Anton & DiCamilla, 1998; Wells, 1998). Given that L2 classrooms in Canada are composed of students with diverse ethnic backgrounds, ESL teachers will face challenges in organizing online collaborative learning tasks which can benefit every ESL student. Therefore, ESL teachers need to take into account the composition of the class and design collaborative online tasks accordingly, or look beyond the classroom for communicative partners.

Designing online collaborative learning tasks requires ESL teachers to take into account students' L1 use in the L2 classroom. Another important element teachers should consider is the unique possibilities of computer-mediated communication for code-switching. In the electronic age, multimodal texts incorporate a variety of modes, including spoken, visual, auditory and written (Jewitt & Kress, 2003). Users create their unique avenues through almost limitless possibilities for reading and constructing texts (Brown et al. 2006). Writing, talk, and visual images are combined and expressed as multimodal hybrids (Dyson, 2001). Amy, the youngest participant, utilized graphics

as part of her communication, which involved code alternation between English and Chinese. Her graphic as shown in Figure 3 reflects the multimodal nature of literacy among computer-using young people and the sophistication of the humour created in that the graphic uses classical art, contemporary film images and two languages. Amy took advantage of the multimodality of electronic communication to facilitate her code-switching and communication with others. This fits with Lapadat's (2003) hypothesis that the nature of literacy is changing to become more multimodal in nature, and that this change is particularly occurring among young people (Lapadat, 2003), who are growing up as *digital natives* (Prensky, 2000). For these reasons, in designing online learning tasks, it is important for ESL teachers not to lose sight of the value of the unique potential of these computers' affordances which can help students to express themselves multimodally.

Limitations of the Study

This study is limited in three ways. First, due to the lack of Mandarin-speaking Chinese ESL students residing in the community of Northernlight, the number of participants in my study was few. In particular, I had no participant who was a student at the secondary school level. Therefore, the range of student participants was narrow. There were three student participants in this study, attending respectively elementary school, college, and university. They differed in age and English proficiency and were recent arrivals within one year in Canada. If a student from secondary school had been available to participate in this study, more aspects of code-switching could have been compared. For example, Amy (13) played with languages more than did Baillie (19)

and Cynthia (25). If one more teenager were added to the participants, comparison could have been made with regard to whether teenagers played with languages more imaginatively than the two adult participants in this study. Similarly, if I had been able to observe more than one student at each age level or proficiency level, these additional participants could have allowed a more detailed comparison of code-switching strategies by ESL students and perhaps enabled me to make stronger claims about the role of these factors in code-switching.

Second, the number of the artifacts the student participants provided to me differed: some offered more than others. This limitation rendered it difficult to use descriptive statistics to compare which participant deployed code-switching more frequently, or to compare what code-switching strategy was employed more or less frequently than others by each participant and across participants.

Third, this study was based on a small sample of three Chinese ESL students and one parent. Even though I selected a multiple case study as the design of my study in the hope of increasing the potential for generalization, the cases still cannot represent the code-switching strategies of all Chinese ESL students in computer-mediated communication. Many factors may contribute to code-switching, such as age level, level of study, English language proficiency, level of knowledge of Canadian culture, Chinese style of characters used, proficiency with Chinese writing, technical proficiency, personality factors and individual differences. As a result, this study's findings cannot be generalized to other ESL students of either Chinese ethnicity or other ethnicities. However, as a case study, future researchers, as well as ESL teachers

and students can compare their own experiences with those of the three participants and derive helpful pointers for their own practice.

Suggestions for Future Research

Conclusions about the contexts of code-switching by Chinese ESL students in CMC environments were based on analyzing two sets of interview responses by each of three student participants, which were approximately one-week apart, and on a one-time videotaping and the electronic artifacts. In addition, the parent of the youngest participant provided additional commentary. In future research, I would add at least one participant from secondary school, and take a longitudinal approach in which participants would be observed when they engage in online communication, and then interviewed at different stages of their L2 acquisition. Observation in the field would allow me to capture the exact moment when code-switching behavior takes place, and the interview subsequent to the observation would enable me to obtain first-hand information on what motivates code-switching. I would thus be able to compare the code-switching patterns by students differing in age and English proficiency, and gain more complete and in-depth knowledge about code-switching strategies the participants employ at different stages of L2 acquisition. Another way to extend the study would be to examine the code-switching artifacts of a far larger number of English Chinese bilingual and developing bilinguals, along with interviews of participants about their meanings and purposes associated with their code-switching episodes. In this way, I would hope to uncover a wider range of code-switching

strategies and styles, as well as more extensive evidence for the factors triggering and/or influencing code-switching.

In this study I adhered to maximum variation logic in selecting participants in an attempt to compare the similarities and differences of the contexts of code-switching among participants differing in age and English study level. In future research, I would conduct a multi-case study using replication logic (Yin, 1993). I would select participants who are similar in age, English proficiency and cultural background for the study, and take a longitudinal approach in which participants would be observed when they engage in online communication, and then interviewed at different stages. Since L2 proficiency has an impact on learners' code-switching behaviors, observations and interviews conducted at different stages in their L2 development would provide me with an opportunity to examine their corresponding code-switching strategies they would employ, and then compare the findings of different participants. Similar findings would uphold the theory whereas contradictory findings would demand theory modification (Yin, 1993).

Findings from this study illustrate the various contexts of code-switching among three Chinese ESL students. I also have traced the similarities and differences between them in what motivated them to switch codes. My conclusions were reached by analyzing their interview questions and the electronic artifacts they provided. Collecting more and equal numbers of electronic artifacts from the participants would allow more analysis of the frequency of code-switching across the participants, as well as the frequency of code-switching due to lexical gaps as opposed to code-switching

for other social or communicative purposes. More extensive data would also permit comparisons across participants of the different purposes for which interjections are used. I would break down the counts into sub-categories to allow more of the complexity to be apparent. The descriptive statistics would not be preferred over the qualitative analysis; rather they would add detail and support additional interpretive depth in the qualitative analysis.

Final Remarks

In this study, I investigated communication via the use of computers at home by Chinese ESL students, the contexts of code-switching they frequently utilized when engaged in computer-mediated online activities in English, and the ways in which mixed use of English and Chinese appeared to be related to English language development. The information provided by the participants was instrumental in understanding this linguistic behavior as developing bilingual students, and the factors that affected their code-switching strategies. Findings in this study indicate that code-switching acted as a psychological tool that enabled the ESL students to construct effective collaborative communication in a CMC environment. They used it not only to create a cognitive space, such as to negotiate for meaning by filling in linguistic gaps, but also to generate a social space. These social spaces were used to construct identity within their community of practice, and to negotiate a good atmosphere in which to maintain the flow and dynamics of the communication with verbal tones and non-verbal expression absent. In both spaces, the students were able to provide each other with help to develop their cognitive abilities and sociocultural competency. I

hope that the exploration of the code-switching strategies ESL students exploit will facilitate ESL teachers' endeavors to develop innovative instructional approaches aimed at accommodating ESL students' needs cognitively and socioculturally.

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Appendix A: Sample Interview Questions

Questions for Students

1. If I follow you through what you typically do after school at home, what would I see you doing?
2. If I were with you at the computer on a typical day after school at home, what would I see you doing?
3. How do you feel about your activity(ies) on the computer?
Please elaborate more on your feeling about the activity(ies).
4. What do you use the computer for? Give me some examples.
5. Who do you communicate with on the computer?
6. What language(s) do you use while communicating?
7. What do you do when you have trouble expressing yourself in English?
8. Describe to me the contexts that make you employ some strategies to cope with difficulty you have expressing yourself in English. Please elaborate.
9. What are the purposes of employing these strategies when you have difficulty expressing yourself in English? Please elaborate.
10. What is your opinion about these strategies as a way of expressing yourself?
11. How do you find these strategies are related to your English study?
12. In your opinion, what are the advantages of using the computer?
13. What are the disadvantages of using the computer?

Questions for the Parent

1. What does your daughter typically do after school at home?
2. If I were with your daughter at the computer on a typical day after school at home, what would I see her doing?
3. What does she use the computer for? Give me some examples.
4. Who does she communicate with on the computer?
5. What language(s) does she use while communicating?
6. What do you find she does when she has trouble expressing herself in English?
7. How do you find the use of computer is related to her English study?
Please elaborate.
8. In your opinion, what are the advantages of using the computer?
9. What are the disadvantages of using the computer?

Appendix B: Letters to Participants

Parent/Student Participants: Letter of Permission

Dear Parent/ Guardian and Student:

Thank you for your volunteering to participate in my study of Chinese English-as-a-Second-Language (ESL) students' code-switching while engaged in Computer-mediated Communication (CMC) at home. Code-switch refers to either alternating between two different styles of speech or dialects of the same language within the same conversation, or alternating between two or more languages within the same conversation. This letter explains the nature of my study and what is involved in participating should you agree to do so.

The purpose of my study is to explore how the Chinese ESL students' code-switching in CMC affects their English literacy development. This exploration is important in understanding their linguistic behaviour, specifically code-switching, the implied social meanings connected with code-switching, and how it is related to their English literacy development. This study is part of my university work towards a Master's degree in Education.

Your participation in my study is voluntary and the parent may choose to withdraw his/her child from participation at any time. As well, the student participant may withdraw his/her participation at any time. If the parent does withdraw his/her child, or the student chooses to withdraw, his/her contributions will not be used for this study. I will meet the student and the parent for two interview sessions, each lasting for about 30 minutes. Interview dates, time, and place will be agreed upon by the student, the parent, and me. I will also ask the parent to describe his/her child's use of the computer at home, and present the views regarding the impact of use of the computer at home upon his/her child's English literacy development. I will videotape the students' use of computers while they engage in CMC. I will also administer the Canadian Language Benchmark Assessments to determine the English proficiency of the student participants. The interviews, video-taping, and the test will be conducted in your home, so I do not anticipate any exploitation and harm to you in my study, and you will not be exposed to risks, either. Having taken into consideration all these aspects, for the time being, I do not

think there are anticipated risks from the study. There will be no material benefits for you. However, the findings of the study will help you realize that the linguistic behavior and its social and cultural meanings connected with the linguistic behavior are related to your English literacy development, and gain an understanding of their English language learning process. As a result, you will build up their confidence of learning English, which is crucial to second language acquisition.

During the interview, you are free to refuse to answer any questions that you may feel uncomfortable with. I will meet with you after the interviews to ensure the information that you provide is interpreted correctly, and only the information you are comfortable with will be reported in my study. I shall tape-record both interview sessions, transcribe and analyze the information for purposes of my thesis. During the second interview, I will bring out the transcripts of the first interview. You and I will review them so you can make sure I interpret your information correctly. We shall modify or remove information you may feel uncomfortable with. I shall also copy electronic products, such as emails, web pages, and MSN conversations. You are free to refuse to provide any electronic products you may feel uncomfortable with. Videotaped information and test results will be analyzed for purposes of my thesis as well. I will be the only person who has access to the taped-recorded and videotaped information, transcription, copies of electronic products, and the test results. They will be kept in a locked cabinet in a research lab during the study period. Strict confidentiality will be maintained in the handling of the data and reporting of the results. Code names will be used in all transcriptions, and oral and written reports to ensure your anonymity. Upon completion of the study, I shall keep the tapes for two years, and then will destroy them. I will present the findings from this study to my thesis committee members. The completed thesis report will be available in the university's library for access by the public. The report may also be published, observing the same guidelines on your anonymity as well as confidentiality in the handling of your data. I can provide you, if required, with a summary/copy of the study findings. I have obtained approval for this study from the University of Northern British Columbia Research Ethics Board, which ensures that the research is conducted within the university's research guidelines.

Should you have any questions or concerns regarding the study, please contact me at (250)-960-5889 or my thesis supervisor, Dr. Judith Lapadat at (250)-615-5578.

Complaints may be directed to the Office of Research, 960-5820 or email: officeofresearch@unbc.ca.

Please check the box if you wish to receive a summary/copy of the study's findings.

Sincerely,

Yanping Cui
M.Ed. Candidate

附件 B 致参加者的信

尊敬的家长/监护人/学生：

感谢您自愿参加我对以英语作为第二语言的中国学生进行的研究。此信将解释我的研究性质以及若您同意参加需要做什么。

该研究的目的是探讨中国学生在借助电脑用英语交际时如何进行语码转换的（语码转换通常指在两种语言或多种语言间的转换，比如在使用英语交际遇到语言障碍时，用汉语或其它方式代替，使交际继续进行）。这一探讨颇为重要，因为它不仅有助于了解双语学生的语码转换，而且还可以了解语码转换的社会内涵以及它与英语学习的关系。我还会征询家长的想法，因为他们决定是否给孩子在家中提供现代技术的使用。这一研究是我在大学学习攻读硕士学位的一部分。

我会与您面谈两次，每次大约 30 分钟。面谈的时间及地点有您和我共同商定。然而我们也会征求父母以及您的意见。在面谈过程中，我会请您描述在家中使用电脑对英语学习的影响。我将对我们的面谈录音，第二次面谈时，我会带来整理好的第一次的面谈记录请您查阅以确保我解释的正确。我们将修改或删除您感觉不舒服的信息。我还将在您使用电脑交际时录像，复制电子作品，如电子信件，网页，聊天室对话等。您可以拒绝提供不愿提供的电子作品。录像及录音信息，电子作品只用于论文中，只由我一人使用。面谈及录像在您家中进行，因此，到目前为止，我没有预料到您会遇到任何危险。参加该研究者没有物质报酬，但该研究结果会使您了解自己的语言行为及其社会文化含义与英语学习的关系，从而理解英语学习过程，增强学习英语的信心，这对语言学习者是十分重要的。

您的参与是自愿的。您可以随时退出。如选择退出，您提供的信息将不用于该研究。为保护您的隐私，在面谈文字材料及报告中，我将使用匿名。完成研究后，录音录像带将被锁在一个实验室的柜子里，两年后销毁。完成的论文将放在大学图书馆供公众借阅。研究报告也可能出版，同样要遵循上述匿名原则。如果您需要，我也可以给您一份我的研究报告。北不列颠哥伦比亚大学研究伦理委员会已批准了我的研究，我将遵循大学研究指导原则。

您如果对此研究有任何疑问，请与我（250-960-5889）或我的导师珠迪丝·拉伯达特（250-615-5578）联系。如有意见，还可以直接打电话给学校科研处（250-960-5820）或发电子邮件（officeofresearch@unbc.ca）。

如果您希望得到一份研究总结，请在框内打勾。□

崔彦萍
教育硕士候选人

Appendix C: Consent Forms

Parent's Consent Form

I _____ agree to participate, and give my permission for my child _____ to participate in the study of Chinese

English-as-a-Second-Language (ESL) students' code-switching while engaged in Computer-mediated Communication at home, and to take the test administered by Yanping Cui to determine the English proficiency of my child. The information in the attached letter regarding the nature of the study and participation responsibilities was

(choose one):

Read by myself read to me translated for me

I have understood the information and my signature below indicates my approval and my permission for my child to participate in the study and for these data to be used towards the completion of Yanping Cui's thesis report for a Master's degree in education, as described in the attached letter.

Signature _____ Date _____

Adult Participant's Consent Form

I _____ agree to participate in the study of Chinese English-as-a-Second-Language (ESL) students' code-switching while engaged in Computer-mediated Communication at home, and to take the test administered by Yanping Cui to determine my English proficiency. The information in the attached letter regarding the nature of the study and participation responsibilities was (choose one):

Read by myself read to me translated for me

I have understood the information and my signature below indicates my approval to participate in the study and for these data to be used towards the completion of Yanping Cui's thesis report for a Master's degree in education, as described in the attached letter.

Signature _____ Date _____

附件 C 同意表

家长同意表

我_____同意我及我的孩子_____参加对以英语作为第二语言的中国学生进行的在家中使用电脑交际时的语码转换与英语学习的关系的研究。对于附信中介绍的该研究的性质以及参加该研究的责任我是通过以下方式了解的:

我自己读了这封信 别人给我读的 别人翻译给我的

我明白我的以下签名意味着我, 以及我同意我的孩子参加此研究, 我们提供的数据只用于崔彦萍完成教育学硕士学位论文。

签名_____ 日期_____

学生同意表

我_____同意参加对以英语作为第二语言的中国学生进行的在家中使用电脑交际时的语码转换与英语学习的关系的研究。对于附信中介绍的该研究的性质以及参加该研究的责任我是通过以下方式了解的:

我自己读了这封信 别人给我读的 别人翻译给我的

我明白我的以下签名意味着我同意参加此研究, 我们提供的数据只用于崔彦萍完成教育学硕士学位论文。

签名_____ 日期_____