

Second Language Acquisition and Synchronous Computer Mediated Communication

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Introduction

Before personal computers became popular, social scientists had discussed the potential effects of new forms of computer-mediated communication (CMC) on society. Hiltz and Turoff (1978) claimed that computerized conferencing would exert a dramatic psychological and sociological influence on various types of group communication in the future. They correctly predicted that computers and the Internet have become a necessity for daily life, and they have greatly changed our lives during just the last decade or so.

Computers play a significant role in teaching and learning today. The use of computers in the classroom is becoming ever more popular in first language (L1) acquisition settings and in content-based classrooms. While computers are not seen as a substitute for the teacher, they are considered a new medium that has profoundly changed the ways in which we write, read, and in some cases, even the way we think (Selfe, 1989). Computer Assisted Language Learning (CALL) has received a great deal of attention in the field of second language acquisition (SLA), and every year an increasing number of teachers are using computers in their second language (L2) and foreign language classrooms.

In the 1980s, people started using computer conferencing in academic and business settings. Since then, interaction through computers has steadily gained popularity. The many

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ways in which L2 learners can interact using computers in a classroom can be divided up into two broad categories: asynchronous forms (e.g., e-mail and bulletin boards) and synchronous forms (e.g., real-time discussion via online channels such as chat systems). In both cases, CMC can be used inside and outside of the classroom in a coordinated fashion, which is one of its major benefits. Using Local Area Network (LAN) technology, all students in a classroom can be connected via networked computers, and whole-class or small-group discussions can be held within such a class setting over a LAN.

There are several reasons why some teachers would want to incorporate computers into their classrooms. First, it motivates students to interact more in their target language (TL) (Kern, 1995; Schwienhorst, 2004; Warschauer, 1996). Second, students feel less intimidated about using the TL by CMC (Hiltz & Turoff, 1978) and so they can express themselves more freely, comfortably, and creatively during CMC (Warschauer, 1996). Warschauer added that CMC helped increase students' thinking ability, and students felt less stressed while communicating via CMC. Third, CMC can enable learners to interact with other speakers of the TL without being in close geographical proximity. Currently, computers are being used for research on language use not only in classroom settings, but also in the context of e-mail and internet chat as it has become more widespread. Interaction between two or more speakers using online chat (i.e., synchronous CMC) has received a considerable amount of attention as well. With the advent of CMC, it has become a simple and inexpensive matter to create language learning groups all over a country and around the world (Ingram, Hathorn, & Evans, 2000). Even if CMC cannot be used in a classroom setting (due to local shortages of computers or networking technology, for example), L2 learners can still be exposed to and use CMC via the Internet.

The purpose of this paper is to compile the most current research available on synchronous CMC. This paper will primarily focus on the ways in which synchronous CMC facilitates interaction for L2 learners, discussing sociolinguistic issues as well as grammatical and lexical acquisition via synchronous CMC. This paper will also present implications for future research on synchronous CMC in the field of SLA. The research questions for this paper are as follows:

- (1) Does synchronous CMC facilitate L2 acquisition?
- (2) If synchronous CMC facilitates L2 acquisition, how does it do so?
- (3) What other research on synchronous CMC is needed in this field?

What Is Synchronous CMC?

The term CMC was first used by Hiltz and Turoff (1978). In their study of computer conferencing, they used it as a mode of electronic communication. Different researchers have used different definitions for CMC, some of which include e-mail and bulletin board communication, and others of which include only messages between individuals or groups. In this paper, the definition used by Murray (2000) will be adopted. According to Murray, synchronous CMC occurs in real time (i.e., in a manner similar to face-to-face conversation, in which interlocutors can expect immediate responses from one another), in such contexts as IRC MOOs (Internet Relay Chat, Multi-Object Oriented), internet chatrooms, and other online chat systems. In asynchronous CMC, conversational participants do not have to communicate with one another in real time—for example, in such contexts as e-mail and bulletin boards.

L2 researchers first began to pay attention to synchronous CMC as learners typically have easy access to synchronous CMC. Several significant advantages of CMC compared to face-to-face interaction both inside and outside of the classroom were noted. For instance, one of

the greatest advantages observed was that learners tended to produce more TL output in CMC than in normal classroom settings. Even quiet students who did not usually speak up much in class generally participated more in a synchronous CMC setting, leading to more balanced participation in the TL (Warschauer, 1996).

Synchronous CMC has also received attention in recent years as a new type of interaction, both between nonnative speakers (NNSs) and native speakers (NSs) and among only NNSs of the TL. This type of interaction is unprecedented—some researchers claim that the processes involved in synchronous CMC are distinct from reading and writing (Blake, 2000; Kitade, 2000). Although synchronous CMC clearly involves both reading and writing, participants' output in CMC is considered to have combined characteristics of speaking and writing (Smith, 2003). Smith states that synchronous CMC is similar to speaking in that the TL output takes place in real time, as in the case of normal face-to-face speech, and the stress on particular words and phrases can be indicated by using italicized or boldfaced text; but at the same time, it is also similar to writing in that it produces a relatively permanent record of the discourse, and makes use of punctuation and other devices that are used to form text. Synchronous CMC is thus characterized by: (a) its similarity to spoken/written language, (b) its use of simplified registers, (c) its organizational structure, and (d) its mechanisms for maintaining topic cohesion (Murray, 2000).

Second Language Classrooms and Synchronous CMC

Synchronous CMC was initially adapted for use in the second/foreign language classroom following its successful implementation with deaf children who studied English as a second language (ESL). Synchronous CMC led to increased motivation in deaf students, and foreign language educators started to use CMC to see if it would be applicable to other types of

language acquisition and teaching. Research has shown that communicating in an L2 through synchronous CMC leads to a significant motivational increase in students (Warschauer, 1996). CMC may also elicit more learner participation than face-to-face communication (Kern, 1995) and higher-quality spoken output (Kern, 1995; Warschauer, 1996).

Another example of an effective application of synchronous CMC is the use of computers in certain situations such as in the learning of English as a foreign language (EFL) or of any other language in places where the TL is not the primary means of communication. In such settings, L2 learners typically have restricted and/or infrequent opportunities to use the TL outside the classroom. E-mail and chat gives NNSs more chances to interact with other speakers of the TL (comprising both NSs and NNSs) outside of the classroom. Recent research has also shown that computers help to increase the amount of interaction between learners, leading to greater use of the TL (Barson, Frommer, & Schwartz, 1993). The use of synchronous CMC has increased greatly in recent years, thanks to the ready availability of free software for connecting to web-based chat domains such as AOL Instant Messenger and Yahoo Messenger (Smith, 2003).

SLA, Interaction, and CMC

When second and foreign language teachers began to incorporate computers into language teaching in the 1980s, their rationale was the same as for incorporating computers into L1 teaching. However, it became evident that there were even more reasons for CMC to be incorporated into L2 teaching. Teachers could use CMC to give their students opportunities to interact with NSs of the TL and thereby enhance their understanding through cultural interchange. This would also give the students better opportunities to learn despite being in a

foreign language setting. As teachers came to regard synchronous CMC positively, researchers started to investigate how synchronous CMC is related to SLA theories.

According to the Interaction Hypothesis (Gass, 1997; Long, 1996) learners' efforts to resolve miscommunication facilitate their acquisition of the L2, as the interaction involved leads to more exposure to comprehensible input and modified output. This type of interaction is known as *negotiation of meaning*, which Pica (1994) defines as "modification and restructuring of interaction that occurs when learners and their interlocutors anticipate, perceive, or experience difficulties in message comprehensibility" (p.495). Recasts, reformulations, repetition, comprehension checks, confirmation checks and clarification checks are included in modification and restructuring (Long, 1996).

SLA research has demonstrated that input is necessary but not sufficient to acquire an L2. According to Swain's (1985) output hypothesis, "pushed output" is also needed to promote acquisition. Such output may include writing or speaking exercises to develop grammatical features that do not seem to have been fully acquired from the input provided alone. For these opportunities to produce output, the use of computers and synchronous CMC seem to provide the necessary means of producing output as indicated by Swain's output hypothesis (Sotillo, 2000). Some research has shown features of corrective feedback in synchronous CMC situations (Sotillo, 2005) leading to modified output (Pellettieri, 2000). Through negotiation of meaning, learners receive input and produce a type of output that is facilitative and perhaps even necessary for grammatical competence to develop in oral interaction.

Although interaction may facilitate SLA, the amount of teacher-learner and learner-learner interaction is still quite restricted within the classroom setting, as indicated by Kitade (2000). Only certain grammar features that have been taught are actually used by the learners,

and the range of contexts in which they are used is limited. Another issue is how the patterns of interaction in the classroom are not always authentic and may not prepare learners for the situations they are likely to face in the “real” world. CMC may help address this problem, since it can provide learners with more opportunities to interact with NSs and other NNSs all over the world.

Since synchronous CMC differs somewhat from ordinary writing and speaking, it represents a new type of interaction that may be of benefit to L2 learners. This is the case since the written mode of CMC allows learners to reflect upon the form and content of messages while interacting with someone in a manner approaching face-to-face verbal communication (Smith, 2003). This is the most beneficial aspect of synchronous CMC from the interactionist perspective, because if learners can feel as if they are talking with another person face-to-face, “learners elicit modified input from one another, are pushed to modify their own linguistic output, and receive important feedback on their TL use, thus potentially focusing their attention on their problematic utterances” (Smith, 2003, p. 39). Pica, Lincoln-Porter, Paninos, & Linnell (1996) found that the modified interaction and the feedback observed between L1 Japanese NNSs of English was comparable in quality and quantity to that observed in other NS-NNS interactions. In the next section, current research on synchronous CMC will be introduced and discussed to investigate whether CMC is truly effective in promoting interaction and negotiation of meaning.

Negotiation of Meaning and CMC

A number of research studies have been conducted on negotiation of meaning and CMC (Blake, 2000; Fernández-García & Martínez-Arbelaiz, 2002; Kitade, 2000; Pellettieri, 2000; Smith, 2003). In general, most of the research has shown that synchronous CMC does facilitate

negotiation of meaning interaction. However, each study has a different focus and a distinct set of research questions. Details of each study will be discussed below.

Comparing Face-to-Face Interaction and CMC

According to Lee (2001), synchronous CMC is a new form of discourse that is different from writing and speaking. Some researchers believe that CMC differs from reading and writing (Blake, 2000; Kitade, 2000), while others disagree (Smith, 2003). Although synchronous CMC has some characteristics in common with speech and writing, synchronous CMC also has unique traits that do not normally occur in speech or writing. Such characteristics of synchronous CMC include simplified register and syntax, abbreviations, and the use of symbols to express emotions (Smith, 2003). Openings and closings during the interaction have been reported to be optional in CMC in cases where they would be expected in face-to-face communication (Murray, 2000). According to currently available research, learners negotiate for meaning in ways that are both similar to and different from those found in the traditional classroom (Blake, 2000; Fernández-García & Martínez-Arbelaiz, 2002; Pellettieri, 1990).

Lee (2001) conducted research on 40 university students in New England who were mostly intermediate students studying Spanish. The setting was a private chatroom using a program named ParaChat., in which only class members could participate in the discussion. Discussion topics such as the role of men and women in modern society, L2 study at university, and occasionally, seasonally-themed topics (e.g., Halloween) were provided to the students by the teacher. The teacher did not participate in the discussions, and no particular instructions were given to the students except not to use a dictionary.

As in most studies, Lee's (2001) study showed synchronous CMC to have positive effects. Lee observed that the strategies the subjects used during synchronous CMC were similar

to those used in face-to-face interaction, and that clarification checks, requests, and self-corrections were the strategies used most in this particular study. Another interesting finding was how feedback was effective in this study, as the subjects tried to use different vocabulary and grammatical structures to understand each other. With respect to linguistic accuracy, the learners tended to ignore each other's mistakes, as they were focusing more on meaning than on form during the conversation. In daily conversation, people also tend not to focus on others' mistakes as much as on the meaning of what is being said. This could be a similarity between face-to-face interaction and synchronous CMC.

However, face-to-face interaction and synchronous CMC also have significant differences. In CMC, speakers do not receive visual paralinguistic and nonverbal clues when interacting (Murray, 2000). Additionally, greetings and closures are not always needed in CMC, as the computer screen identifies who is talking. Again, this is a significant difference from face-to-face interaction and synchronous CMC. It would be useful to consider the differences between face-to-face interaction and synchronous CMC as they may affect L2 learners' language in a variety of ways, depending on the language used and grammatical structures used during the communication.

Task Types and CMC

Current research on synchronous CMC has been conducted with large groups discussing topics such as world politics or current events in short opinion-centered discussions. However, research has demonstrated that conversations are quantitatively and qualitatively affected, by the type of task in which the NNSs interact (Pica et al., 1989). It has also shown that negotiation of meaning is facilitated more when the tasks are goal-oriented and task-based than when they are oriented towards casual conversation (Pellettieri, 2000). For example, Pica et al. (1993) stated

that jigsaw assembly task types brought about a high rate of learning, and that decision-making task types came near the end of the list. This was the rationale for choosing the task types in Smith's (2003) study. Smith used 12 NNS-NNS dyads from the database of two tasks to measure the amount of interaction that occurred observing how task types affected learners' negotiation of meaning. In current research, only a certain number of studies have focused on task-based CMC interaction.

Smith's (2003) study showed that learners negotiated meaning when problems arose during task-based CMC. This may have been the case due to the subjects' difficulties in dealing with the new lexical items that Smith presented to them. This is in accordance with the findings in the interactionist studies of other researchers such as Blake (2000) and Fernández-García & Martínez-Arbelaiz (2002). Smith concluded that the two task types seemed to have different effects on the amount of negotiation. In this study, the jigsaw tasks lead to more incidental negotiation, and the decision making tasks resulted in more negotiation sequences compared to jigsaw tasks. Ingram et al. (2000) examined the potentially problematic influence of task type on the effectiveness of synchronous CMC. To give an example, they found that instructing students to discuss a topic online may give way to unrelated, superficial conversations that may not necessarily be of educational value. Ingram et al. concluded that although synchronous CMC may be useful for some discussion tasks, asynchronous CMC may be more effective for others.

A synchronous chat program called Remote Technical Assistance (RTA) developed at University of California at Davis was used in Blake (2000). This program differs from other chat programs such as WebCT and Daedalus Interchange in several ways. For example, RTA permits learners to participate in point-to-point (one-on-one) and multipoint/group chat, which is not always possible with other chatting systems. Another important feature of the RTA was that it

recorded all of the interactions between the learners in a chat window and also allowed them to do collaborative writing at the same time in a separate window labeled “Textpad”. Fifty NSs of English at the intermediate level in Spanish had to accomplish a given task by conversing with one another in a chat window, and used the Textpad window to summarize their results. The RTA chat window enabled the learners to interact in a manner resembling oral interaction. In contrast, the Textpad window only allowed one subject to have control of either the cursor or the stylus at a time, and therefore it more closely resembled a formal take-home writing assignment. 1-way and 2-way information gap tasks and jigsaw tasks were used in this study.

Based on the results of Blake’s (2000) study, jigsaw tasks were superior to other tasks in the amount of interaction that was produced (e.g. information gap, decision-making and learner discussions) and the jigsaw task seemed to facilitate students’ noticing of gaps in the lexicon of their interlanguage. As also shown in Smith (2003), lexical confusion was the most common precursor for negotiation occurring in the learner-learner interactions. Phonological, morphological, and syntactic errors also led to miscommunication, followed by negotiation of meaning, but much less often than lexical confusion did. Blake also stated that it would be interesting to see whether this would still be the case for learners studying a non-Romance language, such as Japanese.

Smith (2004) conducted another study following up on Smith (2003) focusing on computer-mediated negotiated interaction for lexical acquisition. This study was the first to focus on lexical acquisition in the context of CMC. 24 ESL learners from different L1 backgrounds participated, and a program named ChatNet was used. As in Smith’s (2003) study, two tasks were used: jigsaw tasks and decision-making tasks. Smith’s (2004) study showed again that although the subjects had the completion of the assigned tasks as their overarching goal, one-

third of the interaction was based on negotiation of meaning and how learners helped their partners to learn new words. However, Smith did not compare the amount of interaction between the two task types in this study.

So far, research on synchronous CMC and task type has not arrived at any definitive conclusions. Results are contradictory in regards to whether task-type has an affect on SLA. Smith (2003) concluded that task types influenced different factors such as incidental negotiation and negotiation sequences. In comparison, Blake (2000) resulted that the jigsaw task led to more negotiation of meaning. However, in both Smith and Blake's study, lexical confusions led to an increase of negotiation of meaning. More research on task-types and lexical difficulty is needed to investigate the potentials of synchronous CMC.

Problematic Issues in Negotiation of Meaning and CMC

Fernández-García and Martínez-Arbelaiz (2002) conducted a study with NSs of English in their third year of studying Spanish as their L2. The students received several content-focused questions to discuss in advance of the study. After an online discussion task, the students were asked to write a summary about reading using pencil and paper. In this study, the Open Transport (OT) chat group format on Macintosh computers was used as a medium of synchronous discussion. Using this chat system, participants were able to chat with one other person or several others at the same time.

Fernández-García and Martínez-Arbelaiz (2002) also provided evidence of negotiation of meaning. According to Fernández-García and Martínez-Arbelaiz, synchronous CMC in the L2 classroom not only gives learners opportunities to negotiate for meaning, but it also enables them to do so at their own pace. However, some of the types of prompts for output used in the synchronous CMC differed from the ones used in oral interaction. A major problem in this study

was that some of the subjects started using their native language of English when they encountered difficulties expressing themselves in Spanish, despite having been specifically instructed not to use their L1.

As teachers have less control over the language used in online discussion than they do in traditional classroom discussions, the variability of language use may become an issue for using synchronous CMC in L2 classrooms. In addition, text-based harassment incidents have been reported in studies (Hall, 1996). Although most of the current research studies on synchronous CMC have yielded positive findings and synchronous CMC offers certain advantages for eliciting output from quiet, shy students, women and minorities, other issues need to be clarified and addressed before CMC is used in the classroom.

Research on Sociolinguistic Aspects of CMC in SLA

SLA researchers have focused on synchronous CMC not only in consideration of the interaction hypothesis, but also to investigate the potential sociolinguistic dimensions. Current research has shown positive effects when it comes to the sociolinguistic aspects of synchronous CMC (Hiltz & Turoff, 1978; Kern, 1995; Kitade, 2000; Schweinhorst, 2004; Smith, 2003; Warschauer, 1996). For example, some studies measured the amount of interaction between learners via synchronous CMC quantitatively, and compared it with face-to-face interaction (Kern, 1995; Schweinhorst, 2004; Warschauer, 1996). Other researchers focusing on the sociolinguistic aspects have looked at the language used during synchronous CMC and grammatical features have also been examined (Warschauer, 1996). Details of these studies will be discussed below.

The Amount of Interaction within a Synchronous CMC Context

Schweinhorst (2004) conducted research on bilingual conversations that arose in “Multiple-User Domain (MUD), Object-Oriented” (MOO) online contexts and compared the data with that obtained in face-to-face NS-NNS discourse. In this study, the Irish learners were at an intermediate level of proficiency in German, and the German learners were at an advanced level of proficiency in English. Both groups met for one hour each week in a text-based synchronous CMC environment, which was a Center for Language and Communication Studies (CLCS) campus MOO for a total of eight class sessions. The teachers focused on four tasks that were partially computer-related in a bilingual speaking environment in the MOO. Hyperlinks to authentic text and image resources relevant to the four tasks were also given to the students.

Although the Irish and German groups differed in proficiency in their respective TLs, the results showed that in their foreigner talk discourse (FTD) both in English and in German, the rate of topic initiation was found to be more equally balanced between NSs and NNSs than in research on face-to-face FTD (Long, 1981). Unfortunately, there was no control group comprising NSs only or NNSs only in this study to serve as a baseline for comparison. For further research on NNSs’ rates of topic initiation in electronic discourse, ideally, three groups would be needed: a NS-NNS group, a NNS-NNS group and a NS-NS group.

Research comparing synchronous CMC and face-to-face interaction has also suggested that quiet speakers are more expressive in CMC (Kitade, 2000), and additionally that the balance of contribution to the discourse as a function of socioeconomic or gender roles may be altered or reversed in CMC (McGuire, Kiesler & Siegel, 1987). McGuire et al. found that men were five times as likely to put proposals forward in face-to-face discussion. In comparison, in networked decision-making experiments women offered proposals just as often as men did. Warschauer (1996) also observed that during synchronous CMC, students who seldom took the floor in class

spoke up more, and students who often took the floor in class spent more time listening to others. Since input and output are both essential for L2 acquisition, synchronous CMC may force those learners who tend to speak up more to listen and receive more input, while helping those learners who tend to speak less to contribute more and produce more output.

Kern (1995) conducted research on differential rates of participation in a French class at a university during CMC and face-to-face interaction. There turned out to be a difference between the two classes even though they were held for the same amount of time. All students participated in the whole-class CMC. However, only five students dominated in the face-to-face discussion, and four did not participate in the face-to-face discussion at all.

Whereas Kern's (1995) research focused on discussion at the whole-class level, Warschauer (1996) conducted research with smaller groups, investigating differences in the amount of CMC and face-to-face interaction that occurred among 20 advanced learners of ESL. Warschauer's study was one of the first to focus on small groups within the class in comparing the rates of participation in CMC and face-to-face interaction. The subjects in Warschauer's study comprised five Filipinos, five Japanese, four Chinese and two Vietnamese, who were divided into four groups of four that were heterogeneous in terms of L1 background. The Daedalus InterChange program was used for the electronic discussion. In general, there was a tendency for more interaction in CMC than in face-to-face discussion. However, the rates of participation did not differ significantly between CMC and face-to-face discussion in the group that had no Japanese speakers (all of the other three groups included at least one Japanese student). This happened as three out of the four Japanese students did not speak up often in the face-to-face interaction but participated in the computer mode, and their low participation rate skewed the results significantly.

The quiet Japanese students of the face-to-face discussion increased their rates of participation in the synchronous CMC from 1.8% to 17.3%. This increase was significant, thus, the four Japanese students went from near silence to a level of participation that was more proportionate to their numbers in each group. Before the experiment, all subjects were assessed on reading and writing with the Secondary Level English Proficiency Test (SLEPT). Interestingly, this was correlated with the amount of individual increase in participation in the computer mode. As can be inferred from the results, the NSs of Japanese experienced disproportionate difficulty speaking up during the face-to-face interaction, which Warschauer (1996) noted could be as a cultural issue. However, Warschauer also pointed out that in addition to shyness, limited comprehension of the discussion at hand may lead students to keep quiet during the face-to-face interaction and speak up only in the CMC discussion. Not only is the fact that students do not speak up during class because they cannot understand the content a separate issue from shyness, but it is crucial to consider in the L2 classroom. Before coming to any conclusions about cultural differences, more research must be conducted with different TLs and different cultural backgrounds.

Another important point made by Warschauer (1996) is that the language in the electronic discussion was more formal and complex than the face-to-face interaction. Synchronous CMC may benefit learners by providing an ideal environment in which to practice using language that is formal and complex, lexically and syntactically. However, a problem that cropped up in the electronic discussion was that it lacked the features of face-to-face discussion—such as questioning, recasting, confirmation checks and paraphrasing—that are important for language learning. Again, more research is needed to confirm the advantages and disadvantages of CMC identified by Warschauer.

Kitade (2000) conducted research on American university students studying Japanese as a foreign language and obtained results indicating that synchronous CMC provides potential benefits for learning by facilitating comprehensible and contextualized interaction, promoting self-correction by learners, and creating a collaborative learning environment. Furthermore, Kitade's study is important as it discussed the acquisition of L2 pragmatics and phonology through synchronous CMC. As it was impossible for the learners to overlap or interrupt each other, turn-taking competition did not become a problem in this study. However, according to Smith (2003), turn-taking overlaps occurred more frequently in general in synchronous CMC compared to face-to-face interaction.

The body of current research on the sociolinguistic aspects of CMC seem to indicate that synchronous CMC is effective for most situations. However, there is clearly a need for more research as there are relatively few studies on this topic and their findings have frequently been inconclusive. For example, in Warschauer (1996), it was Japanese learners who tended to be quieter in face-to-face interaction, and their participation increased greatly in synchronous CMC. However, it is uncertain whether this implies that CMC is more effective for learners from a certain L1 or cultural background. In general, though, synchronous CMC seems to provide more input and output for different groups of learners in a manner appropriate to their respective needs. Moreover, synchronous CMC's positive effects were not limited to Japanese learners but were also observed to spill over into the normal classroom, where the amount of participation and number of NSs-NNSs interaction increased overall (Schweinhorst, 2004).

Grammatical Competence, Corrective Feedback, and CMC

Few studies have focused on grammatical competence within the synchronous CMC setting. Kern (1995) was one of the few studies that investigated the effects of synchronous CMC

on grammatical competence. Kern focused his study on L2 acquisition by the same learners via oral (i.e., face-to-face) and synchronous CMC. Kern claimed that increased participation in the electronic discussion lead to proportionately greater TL production with a wider variety of verb forms and clause types. The increased amount of the TL could have influenced learners' attention on grammatical accuracy. However, Kern also noted the disadvantages of Network Based Communication (NBC) as "discourse mediated by networked computers bears linguistic consequences...details fall by the wayside: Orthographic accents are often missing, verb conjugations are simplified" (p. 459).

Pellettieri (2000) included 20 students who were NSs of English and intermediate learners of Spanish in his study, using a UNIX program known as "ytalk" to enable the students to participate in the NBC. The subjects participated in five communication tasks ranging from open conversations to jigsaw-type activities. According to Pellettieri's study, synchronous NBC (SNBC) did lead to negotiation of meaning and form-focused interaction due to the corrective feedback they provided each other. An interesting observation from this study was how the subjects were not only correcting each others' speech, but they were going back to their own typed speech and correcting their own speech as well. In some cases, the subjects self repaired their own speech into a more advanced syntax. Pellettieri concluded that because the learners were able to watch their speech on the screen as they typed it out, they "monitored" their speech, which in turn led to higher-quality speech than in face-to-face interaction contexts. In face-to-face interaction, it is difficult or almost impossible to self correct an ungrammatical sentence that a learner produced a few minutes ago or a while ago. This is an advantage of synchronous CMC, as users of most chatting systems users can record their interaction with others. L2 learners can review the language used in their previous conversations, examine their errors and see whether

any corrective feedback was provided by their conversation partner(s). This can be advantageous to learners, and it may be a better means of data collection for researchers as it is not as intrusive as recording face-to-face interaction (Smith, 2003).

Sotillo's (2005) study focused on learner errors, examining learners' grammatical errors and corrective feedback provided by the learner's conversation partners in response to the errors. Yahoo! Instant Messenger was used, and web cameras and microphones were also used so that learners could see and hear their partners during their conversations. Some conversations took place in NS-NNS pairs and others in NNS-NNS pairs. The errors fell into four categories: grammatical, lexical, mechanical (spelling) and phonological. In Sotillo's study, 47% of the errors in the L2 learners' output consisted of grammatical (morphosyntactic) errors. For example, some learners omitted third person singular, past participles and used past-tense forms of irregular verbs. Notably, Sotillo discovered through comparison of the errors and corrective feedback that occurred in NS-NNS and NNS-NNS pairings that NNSs corrected their partners' English more often if the partner was also an NNS, and that NNSs tended to correct their partners' mistakes more than NSs. Another interesting observation was that NNSs tended to provide more explicit feedback on their partners' errors than NSs did. This is an interesting observation and leads to some questions to be addressed in future research.

Discussion and Implications for Future Research

The currently available research on synchronous CMC suggests that it has positive effects on SLA (Blake, 2000; Fernández-García & Martínez-Arbelaiz 2000; Kitade, 2000; Pellettieri, 2000; Smith, 2003). First, as research has shown, synchronous CMC increases the amount of learner participation in discourse relative to face-to-face interaction (Kern, 1995; Warschauer, 1996). Synchronous CMC seems to motivate negotiation of meaning, which facilitates language

learning according to widely accepted SLA theories (e.g., Ellis, 1985; Gass, 1997; Long, 1996; Swain, 1993).

Recent studies have indicated that teachers tend to spend less time engaged in teacher talk when synchronous CMC is conducted (Kern, 1995). As for language learning, classrooms have generally shifted away from being teacher-centered towards being more student-centered, with the help of certain implementations of technology (Warschauer & Healey, 1998). If the use of CMC steers teachers away from spending time producing teacher talk, this may again affect L2 acquisition as students will have more time to generate TL output. Studies have shown that students who are normally quiet during class tend to speak up more during synchronous CMC interactions, which could have to do with synchronous CMC's ability to lower the affective filter that can impede learners' L2 output in normal classroom settings and in face-to-face interaction (Warschauer, 1996). It is also important to note that synchronous CMC may give rise to better quality speech (Kern, 1995; Warschauer, 1996)

A problem that has been encountered in conducting research on synchronous CMC is that most studies on the subject have been conducted using different computer programs in a wide variety of settings. In order to produce results that are readily interpretable and comparable to those obtained in future research, the instruments and means of synchronous CMC should have properties that are similar enough to compensate for variation in the results arising from differences between subtler features of the programs and technologies being used. Despite this, different chat programs have been used in recent studies (i.e., ytalk, Yahoo! Instant Messenger and MOO's), and the results may also vary depending on the operating system being used (i.e., Linux vs. Mac OS vs. Windows) as well as the physical environment in which the computers are being used. As research in this field continues to advance, it is not inconceivable that new

programs and paradigms for online chat that come into existence will have features so vastly different as to render the findings of currently available research inapplicable or irrelevant to future synchronous CMC contexts.

For example, Lee (2001) found students used symbols to express agreement, incomprehension, dislike, and confusion. These symbols were used during online chat as discourse markers which function similarly to facial expressions and gestures. Depending on the software being used, some systems have relatively few or many symbols with variation in their graphical presentation differing depending on factors such as the particular chat program, the operating system and which version of the chat program, just to name a few of the many variables. Also, the operating system as well as the user-controlled options that the individual has selected within the chat program and operating system may be different. Students may use the same symbols to represent different meanings, thus confounding researchers' attempts to analyze the conversation. Some students may have anywhere from little or no familiarity to extensive familiarity with synchronous CMC at the time of the study. This is another factor that needs to be considered in preparing to conduct future research. Although most researchers provide a tutorial to familiarize the participants with CMC before the experiment begins, prior experience with online chat may affect students' production and affective filter while using synchronous CMC.

Synchronous CMC may be especially useful for a classroom setting in which learners could benefit from spending more time contributing and listening to the discussion. CMC seems to have a positive impact on SLA by enabling learners to spend more time contributing to the discussion and listening to others in ways that seem to meet their respective needs (Kern, 1995; Warschauer, 1996). However, further research is needed to investigate the origins of these differential effects, as they may in fact be arising from individual and/or cultural differences.

Future research should involve different L1s and TLs but similar chatting situations to determine whether the current findings are comparable or generalizable to all of SLA. Also, it would be desirable to investigate whether pragmatics is teachable through synchronous CMC as Kitade (2000) found in her research. Depending on the results of such future studies, synchronous CMC may prove more effective for some L2s than others. As Kitade stated, CMC seems to be potentially beneficial for L2 learning, but the effects of CMC should be compared to those of other interactions (e.g. “interactional”, “text-based”, “not face-to-face”, etc.) before being implemented in the classroom.

Blake (2000) and Smith (2003) conducted research on task-based CMC, a topic that has not been researched thoroughly within the field of SLA. According to Blake and Smith, the task that was used during the study influenced L2 learners’ performance and production. However, the two studies yielded conflicting results as to which task types were more effective and the nature of their effects. Again, more research is needed to investigate whether task-based CMC facilitates SLA and which task types are most effective. Research on the effectiveness of various types of synchronous CMC may provide teachers with ideas about how to use synchronous CMC in the L2 classroom.

The main issue with synchronous CMC is that not enough research is available yet, so definitive conclusions may not be drawn. Based on the research that has been done, synchronous CMC seems to be effective in encouraging negotiation of meaning and in enriching the sociolinguistic environment. However, it is difficult to draw any definitive conclusions at this point due to the dearth of research on the topic as well as a large amount of variability across the existing studies. Another point that needs to be made is some of the current research compares data on CMC with literature on face-to-face communication. If only the amount of negotiation of

meaning in synchronous CMC is being measured, it may not be necessary or desirable to establish a control group. However, in comparing the amount of interaction via CMC and face-to-face interaction, there should be a control group to produce baseline results for comparison. To gain more evidence on the potential benefits of CMC, research needs to be conducted in similar settings and with a control group to provide baseline data. It would also be desirable to conduct research on patterns of interaction between the various combinations of NSs and NNSs of a TL. Ideally, research should be carried out involving all four possible combinations interacting via CMC and face-to-face communication, since doing so would yield a complete set of findings from which further research could be extended.

Conclusion

There are a number of studies on the topic of synchronous CMC which have demonstrated positive effects for this type of communication in SLA. Research has shown that CMC promotes negotiation of meaning and has various sociolinguistic effects. However, each study varies greatly from the next, and there are vastly differing sets of experimental conditions in each. At present, it is impossible to state conclusively that CMC is an effective tool for L2 teaching, due to the small number of studies and the many differences between the studies that have been conducted up until now. Additionally, research on different task types is needed to shed light on which tasks facilitate negotiation of meaning the most.

There also may be differences between NS-NNS and NNS-NNS interaction, but the trend in current research has been mainly to focus on one or the other, without making comparisons between the two. Again, researchers have begun to compare the characteristics of CMC interaction to those of face-to-face interaction, but a control group has not been included in most currently available studies, with findings from literature on face-to-face interaction being used as

a basis for comparison instead. To gain more results that have more validity, future studies need to be conducted involving a CMC group to yield baseline data, rather than comparing the CMC group with data from previous studies that did not consider interaction in the form of CMC.

The research available at present has shown that CMC is effective in facilitating SLA, especially by promoting negotiation of meaning. There are also sociolinguistic aspects of synchronous CMC that seem to be effective for L2 acquisition. For researchers and educators in the fields of SLA, second language education, and foreign language education, it has become increasingly apparent that attention needs to be paid to language use during synchronous CMC, due to the burgeoning popularity of computers and the Internet. As L2 learners use computers for communicative interaction all the more each day, we need to investigate how they can take advantage of such interaction towards the goal of SLA. While it may be too early to draw any conclusions or speculate about pedagogical implications, further research on synchronous CMC is certain to have positive effects on the field of SLA in near future.

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