COMPUTER-MEDIATED COMMUNICATION:
PEDAGOGICAL AND LANGUAGE LEARNING IMPLICATIONS

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ABSTRACT

Computer has become an inseparable part of everyday life. Since the introduction of electronic media in general and the Internet in particular, more and more people have been using the Internet to communicate as a quick and reliable means of information transfer. Alongside the ever-increasing interest in electronic media, the Internet has been gaining ground to fulfill a variety of purposes not only as an intra- and inter-personal communication medium but also as a pedagogical tool facilitating language learning and teaching. Therefore, the purpose of this study is to provide an account of the benefits and positive contributions found in previous studies which text-based Computer-Mediated Communication (CMC) has to offer in language learning and teaching. This study also provides an overview on CMC, its modes, and relevant definitions. The impact of CMC on language education and language development will be dealt with as well.

Key Words: Computer-Mediated Communication, Synchronous CMC, Asynchronous CMC, the Internet, E-mail.

INTRODUCTION

The development of computers alongside the widespread use of the Internet has turned CMC into a very important communication media which has been used wildly and effectively to cover a variety of purposes including interpersonal communication, information transfer, pedagogical ends, etc. The integration of technology into educational environments can be expected to have a myriad of positive effects on language learning and teaching. It has been proved that Internet-based communication will have a significant motivational effect on the students (Meunier, 1996; Warschauer, 1996) resulting in the improvement of their communicative skills both orally and in the written form. According to Quan-Hasse, Cothrel, and Wellman (2005), computer technologies have enabled learners to communicate ideas, information, and their feelings without any limit on time and space. Similarly, Zhao (2006) refers to the application of the Internet and states that the Internet is the first major medium of communication that allows people to establish new social contacts outside the face-to-face (FtF) context as well as to maintain existing ties formed in corporeal contexts. According to Fey (1998) and Boone (2001), technology-based language learning has revolutionized the world of education and made it possible to transcend boundaries of classroom walls and to learn in new ways. Therefore, there is a need to further explore the advantages and potentials that this media has to offer.

Computer-Mediated Communication

According to Nguyen (2008), "CMC has been extensively researched from various disciplinary and methodological perspectives. This form of communication, with a broad scope of processes and tool-use, facilitates information design and delivery, and human-human and human-machine interactions with structural, cognitive and sociocognitive implications" (p. 23).

In order to gain insight into the nature of CMC, various definitions have been proposed from a wide range of perspectives. The term CMC was first coined and introduced by Hiltz and Turoff (1978) while experimenting on computer conferencing on the Internet. They viewed CMC as a medium for creating, perceiving, transmitting, decoding, and encoding messages. This definition has been endorsed by various researchers. Barnes (2002)

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defines CMC as a wide range of technologies that paves the way for human interaction and sharing of information through interconnected networks of computers including e-mail, discussion groups, newsgroups, and real-time chat. December (1997) also states that CMC is a process of human communication via computers, involving people, situated in particular contexts, engaging in processes to shape media for a variety of purposes. Similarly, According to Warschauer (2001), CMC or "on-line communication refers to reading, writing and communication via networked computers" (p. 207).

However, over the past few decades, along with the fast-changing CMC technologies themselves, the definitions have changed to reflect the current view on language learning. In general, CMC can be viewed both as intermediary tools and as a communication process. When viewed as tools, CMC is examined from technological aspects that provide the medium for communication. Other aspects are revealed when CMC is perceived as a communication process, which includes the message, the sender, and the receiver. It is therefore human factors with their sociocultural, historical, and pedagogical background that play significant roles during the interaction process through electronic media.

Synchronous and Asynchronous CMC
It is conventional to divide CMC into two modes including synchronous (SCMC) and asynchronous (ACMC) (Luppicini, 2007; Pfaffman, 2008). Accordingly, Warschauer (2001) defines different modes of CMC as:
   a) Synchronous computer-mediated communication, whereby people communicate in real time via chat or discussion software, with all participants at their computers at the same time;
   b) (b) Asynchronous computer-mediated communication, whereby people communicate in a delayed fashion by computer, e.g. by e-mail; and
   c) The reading and writing of on-line documents via the internet. (p. 207) .

SCMC discussions allow learners to communicate similar to FtF contexts (Lee, 2001), and, at the same time, provides them with the opportunity to monitor their language use (Sykes, 2005). On the other hand, ACMC provides mediated media of communication which allows learners to deliberate, review, revise or even cancel the stream of communication before sending the information to the recipient (Heisler & Crabill, 2006). This valuable property of ACMC helps learners learn how to reflect on the content of what they are going to convey and be critical of what they have in mind before communicating it to others. Therefore, asynchronous technologies can deeply involve learners in the processes of critical thinking (Lee, 2004) and problem solving (Jonassen & Kwon, 2001) by demanding more focused and purposeful communication.

Pedagogical implications of ACMC and SCMC technologies have been extensively researched and positive results have been reported. With regard to ACMC, Warschauer (1995) emphasizes the role of e-mail and says that e-mail is one of the most important applications regarding the Internet. Sotillo (2000) also maintains that because of the delayed nature of e-mail, learners have more opportunities to produce syntactically complex language resulting in a significant improvement in their accuracy.

Regarding SCMC, reported evidence suggests that real-time, conversational exchange via text may indirectly develop L2 speaking ability (Abrams, 2003; Beauvois, 1997; Payne & Whitney, 2002). Researchers have also compared SCMC and FtF discussion on a number of dimensions including the investigation of the effectiveness of SCMC as a preliminary activity for FtF discussions. These studies have been cross-sectional in nature, frequently comparing the quantity and nature of linguistic output during one chat session as compared with FtF discussion. Findings from these studies endorse the effectiveness of SCMC both over FtF discussions and in promoting FtF.

According to Nguyen (2008), "Another widely-accepted classification of CMC is whether it is text-based or audio/video-based" (p. 27). Text-based CMC reflects the current view in educational environments and "has been the subject of research in many disciplines from general education to language studies" (p. 27). Nguyen (2008:27) summarizes this concept in the following figure:
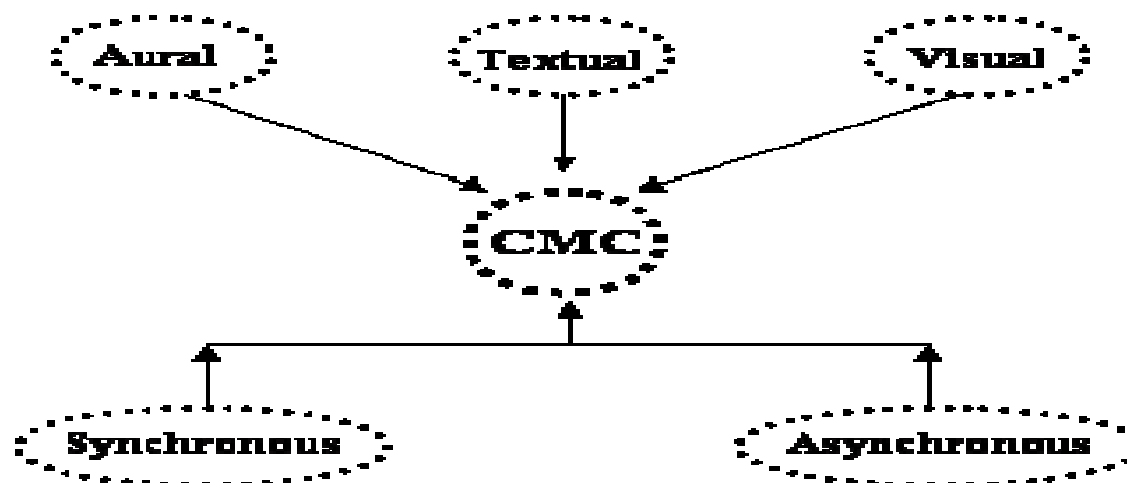
Fig 1: Modes of CMC

Nonetheless, information technology in general and CMC in particular have been developing so rapidly that not only do they encompass educational contexts but they have also taken one step forward to include Wikis, Blogs, to Podcasting and Gaming. Blogs and Wikis can be used either synchronously or asynchronously depending mainly on the participants' preferences, objectives, pedagogical, and cultural and socio-cultural traits.

In summary, alongside ACMC which has already gained its place in both daily communication and educational environments, "using SCMC for learning and practicing a target language now seems like the most natural thing in the world" (O'Rourke, 2008:227). SCMC and ACMC with their peculiar characteristics, complement each other (Honeycutt, 2001). Nguyen (2008) refers to Ingram and Hathorn (2004) and states that "while synchronous discussions may be best suited for brainstorming and quickly sharing ideas during interaction, asynchronous exchanges allow more time for considered opinions and are more effective for deeper discussion of ideas" (p. 28). A combination of synchronous and asynchronous experiences seems to be necessary to promote the kind of engagement and depth required in collaborative learning. In line with the current communicative, sociocognitive trends in education, both synchronous and asynchronous CMC offer numerous opportunities for language learners in terms of collaborative learning and are now a significant ground for investigation in applied linguistics.

CMC and Pedagogical Implications
According to Nguyen (2008), CMC has proved to be influential in promoting educational conditions and "is believed to offer a number of pedagogical applications. Numerous primary and secondary studies on didactic characteristics of both SCMC and ACMC have been reported, through which educators are gradually realizing their educational potential to the learning context" (p. 29). CMC in educational contexts are mainly based on the fundamental tenet of connecting students to one another with the aim of meaningful communication via computers in or out of the classroom (Hirvela, 2006). One of the advantages of computer-based communication, as stated by Hirvela (2006), is "the positive 'distancing effect' afforded by electronic communication which lends itself to increased student empowerment and increased desire to express oneself in the target language because the computer seems to minimize the risks involved in communication in a foreign language" (p. 234).

Research on the use of CMC regarding language learning has mainly focused on the learners' active engagement in target language, language usage, and their writing skills (Warschauer & Healey, 1998). Payne and Whitney (2002) also identified three themes regarding the research findings on CMC as following:
    a) Students tend to produce more complex language in chatrooms than in face-to-face settings . . .
    b) participation increases online with 'quieter' students participating as much or even more than those individuals who normally dominate classroom discussion . . .
    c) attitudes toward the target language were reported to improve. (p. 14)

Kamhi-Stein (2000) also found some advantages regarding CMC in reducing anxiety, social distance between students and their instructor, and increasing social knowledge of individuals. CMC has also proved to have an advantage over traditional learning conditions (Bikowski & Kessler, 2002) by allowing collaborative learning (Meskil & Mossop, 2003), encouraging students to be actively involved in target language communication (Bikowski & Kessler, 2002), allowing participants to have control over the learning process (Bikowski & Kessler, 2002), and facilitating negotiation of meaning (Blake, 2000). According to Ellis (1999), negotiation of meaning takes place "when interlocutors seek to prevent a communicative impasse occurring or to remedy an actual impasse that has arisen" (p. 3). Blake (2000) also notes that negotiation of meaning also happens in CMC which further facilitates meaningful communication in target language.

Similarly, computer technologies can help learners increase their opportunities to use target language (e.g., Barson, Frommer, & Schwartz, 1993). Thus, these opportunities result in the improvement of the quality of written and spoken language (Sotillo, 2000) and negotiation of meaning (Blake, 2000).

Regarding the domain of language education, according to Nguyen (2008), numerous studies have been conducted investigating positive effects of CMC on motivation, active learning, reflective learning, learner autonomy, and collaborative learning. Beauvois (1998) found that learners' motivation positively improved in the CMC context rather than in FtF communication. Interaction with native speakers of the language via computer may also increase learners' motivation in the future use of CMC (Lee, 2004).

Regarding active learning, it has been stated that learning takes place when learners are actively involved in the learning process (Lee, 2005; Warschauer, 1996). Nguyen (2008) also refers to White (2007) and notes that "active learning is one of the crucial elements creating a successful online learner-centred language learning environment" (p. 31). Nguyen (2008) further reiterates Egbert's (2001) claim in that "CMC can often make it easier to develop meaningful tasks during which language learners of any language level are active and have opportunities to interact" (P. 31).

Similarly, reflective learning has also been proved to benefit from CMC. Reflective learning involves learners in "evaluating their experiences, and is a trend in language leaning" (Nguyen, 2008:31). Nguyen (2008) refers to Jonassen (2004) and Weasenforth, Biesenbach-Lucas, and Meloni (2002) and points out:
CMC, especially ACMC, allows more time for reflection and referring to other electronic sources of information. Moreover, the asynchronous nature of the CMC medium not only allows learners to prepare their messages more carefully in a word processor but also is believed to invite quiet students to play more active roles since their more reflective learning styles are easily accommodated (p.31) .

Learner autonomy is another crucial notion regarding computer-mediated learning (White, 2003). Nguyen (2008) refers to Sinclair (2000) and defines learner autonomy "as the notion of taking responsibility for one's own learning and also associated with a number of other terms, such as learner independence, independent learning, lifelong learning, learning to learn, thinking skills" (P. 32). Chapelle (2001) also refers to the efficacy of CMC applications in giving learners more control and autonomy over their own learning.

According to Nguyen (2008), collaborative learning via CMC has also been broadly researched (e.g., Suthers, Vatrapu, Medina, Joseph, & Dwyer, 2008). According to Harasim (2007), collaboration through CMC paves the way for better interaction among learners and their instructors resulting in better learning.

Nguyen (2008:30) summarizes various studies on the benefits of CMC in language education in the following table:

Table 1: Pedagogical Features of CMC

Pedagogical features of CMC	Sample research publications	Mode of CMC	
		SCMC	ACMC
Increase motivation	Lee, 2004; Schwienhorst, 2004; Smith, 2003	√	
	Sotillo, 2000	√	√
	Weasenforth, Biesenbach-Lucas, & Meloni, 2002		√
Support active learning	Warschauer, 1996	√	
	Lee, 2005	√	√
	Bikowski & Kessler, 2002		√
Promote reflective learning	Swaffar, Romano, Markley, & Arens, 1998	√	√
	Jonassen, 2004; Weasenforth, Biesenbach-Lucas, & Meloni, 2002		√
Enhance learner autonomy	Arnold, 2002; Payne & Whitney, 2002; Warschauer, 1996	√	
	Beauvois, 1995; Schwienhorst, 2004	√	√
	Chiu, 2008		√
Foster collaborative learning	Darhower, 2002; Leahy, 2008; Warschauer, 1997	√	√
	Abrams, 2005; Savignon & Roithmeier, 2004; Weasenforth et al., 2002		√

CMC and Language Development

According to Nguyen (2008), numerous studies have been carried out to investigate the effectiveness of CMC in language development. These studies take into account concepts such as (a) metalinguistic aspects including negotiation of meaning, sociolinguistic environment, and intercultural and intracultural competence; (b) language components and areas including grammar, vocabulary, and pronunciation; and (c) language skills developments including writing, reading, speaking, and listening.

According to Chun (2008), negotiation of meaning in CMC has also been thoroughly investigated. As stated earlier, some studies have endorsed the facilitation of negotiation of meaning through CMC (e.g., Blake, 2000; Pellettieri, 2000; Sotillo, 2005). CMC has also proved to be effective in advancing sociolinguistic ends. According to Nguyen (2008), CMC is also known for providing a beneficial environment for sociolinguistic development (Kitade, 2000; Smith, 2003). Learners display less anxiety and increase self-esteem; thereby, enabling students reluctant in oral discussions to contribute more actively in electronic discussions (Al-Sa'di & Hamdan, 2005).

Many studies regarding intercultural and intracultural issues within CMC have been conducted and positive results have been reported (e.g., Chun, 2008; Abrams, 2006).

Summary of previous studies on metalinguistic aspects has been shown in the following table proposed by Nguyen (2008:34):

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Table 2: Benefits of CMC in metalinguistic aspects

Metalinguistic aspects	Sample research publications	Mode of CMC	
		SCMC	ACMC
Negotiation of meaning	Blake, 2000; O'Rourke, 2005; Pellettieri, 2000; Shekary & Tahririan, 2006; Sotillo, 2005; Tudini, 2003; Wang, 2006	√	
	Sotillo, 2000; Toyoda & Harrison, 2002	√	√
	Kitade, 2006		√
Sociolinguistic environment	Kern, 1995; Kitade, 2000; Warschauer, 1996	√	
	Schwienhorst, 2004	√	√
Intercultural & intracultural competence	Kramsch, A'Ness, & Lam, 2000; Sotillo, 2005; Thorne, 2003	√	
	Abrams, 2006; Chun & Wade, 2004; Kramsch & Thorne, 2002; Thorne, 2003	√	√
	Itakura, 2004; O'Dowd, 2003; Ware & Kramsch, 2005; Ware & O'Dowd, 2008		√

A number of studies have also investigated the role of CMC in components and areas of language. Among those, Kern (1995) found that learners produced more language in CMC contexts than in FtF interaction. Kern (1995) also revealed that grammatical accuracy of learners dramatically improved in CMC environments. Faghih and Hosseini's (2012) and Hosseini's (2012, 2013) findings also endorsed the effectiveness of CMC in improving certain aspects of grammar for learners.

Nguyen (2008) also refers to numerous studies conducted on vocabulary learning and pronunciation improvement through CMC (e.g., Fitze, 2006; Fuente, 2003; Li, 2000; & Jepson, 2005).

The following table summarizes some previous studies on the benefits of CMC in language components proposed by Nguyen (2008:35):

Table 3: Benefits of CMC in language areas or components

Language areas or components	Sample research publications	Mode of CMC	
		SCMC	ACMC
Grammar	Bax, 2003; Fiori, 2005; Fitze, 2006; Kern, 1995; Lee, 2006; Salaberry, 2000; Sotillo, 2005; Van Deusen-Scholl, Frei, & Dixon, 2005	√	
	Abrams, 2003; Dussias, 2006; Honeycutt, 2001; Sotillo, 2000	√	√
	Gonzalez-Bueno & Perez, 2000; Li, 2000; Shang, 2007		√
Vocabulary	Fitze, 2006; Fuente, 2003; Toyoda & Harrison, 2002	√	
	Fotos, 2004; Li, 2000		√
Pronunciation	Jepson, 2005	√	

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Regarding language skills, Nguyen (2008) refers to Levy and Stockwell (2006) and states that "there is a common tendency to associate CMC with the development of specific language skills" (p. 35).

According to Davis and Thiede (2000), text-based nature of CMC helps learners improve their writing skills as they have more time to deliberate on the content of their writing, resulting in more accurate and grammatically complex content. Nguyen (2008) also refers to Shang (2007) and Sotillo (2000) in that the application of CMC "promoted written accuracy and sentence complexity. In addition, previous studies also indicate that the delayed nature of ACMC exchanges appears to give learner more chances than SCMC to produce complex language"   (p. 35).

As stated by Levy and Stockwell (2006), reading abilities can also improve while interacting in the context mediated by computers.

In order to substantiate the efficacy of CMC in improving speaking skills, Nguyen (2008) cites Payne and Whitney (2002) for their study on the effectiveness of CMC on speaking and mentions that "participants in a chatroom have a significantly higher oral proficiency than those just spending time in traditional oral classes" (p. 36). In another study, Dussias (2006) supported oral production improvement in CMC context.

Volle (2005) has also endorsed the role of electronic media in improving listening skills of the learners. Nguyen (2008:36) summarizes previous studies regarding the benefits CMC and language skills in the following table:

Table 4: Benefits of CMC in language skills development

Language skills	Sample research publications	Mode of CMC	
		SCMC	ACMC
Writing	Li, 2000	√	
	Blake, 2000	√	√
	Davis & Thiede, 2000; Meunier, 1998		√
Reading	Godwin-Jones, 2008; Greenfield, 2003	√	
	Fotos, 2004; Gruber-Miller & Benton, 2001	√	√
Speaking	Stockwell, 2003	√	
	Chun, 2003; Jepson, 2005; Payne & Whitney, 2002; Tudini, 2005	√	√
	Abrams, 2003; Dussias, 2006		√
Listening	Volle, 2005	√	

In general, the text-based nature of CMC brings with it great possibilities for both learners and teachers to experience reinforced learning as well as an opportunity to produce syntactically complex language especially in written form and through a less stressful learning environment (Blake, 2000; Hampel & Hauck, 2004).

In conclusion, technology can remarkably enhance learning conditions not only in but also out of classroom by eliminating both physical and psychological barriers which might hinder learning.

CONCLUSION

The present discussion has shown that CMC with its particular characteristics, types, and scopes holds beneficial applications for language learning and development, from metalinguistic aspects to language components and skills. This article will hopefully draw an overall picture of the potential advantages of integrating computer technologies into pedagogical environments with the aim of facilitating comprehension, analysis, and production of language. However, with respect to social aspects, the prospect of integrating CMC into language education in all contexts is not a "cure-all" approach to language learning and teaching. This paves the way for more inquiry for language practitioners and researchers. In other words, more

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comprehensive studies about the introduction and application of CMC into language learning and teaching in different sociocultural, institutional, and individual contexts are required in order to gain deeper insight into the advantages of this fast-growing learning tool in pedagogical environments. regarding cooperative approaches to foreign language learning via technology, there are still areas left unexplored including the impact of CMC with regard to collaborative learning, social activities required of online students in collaborative environments, different forms of collaboration applicable in CMC environments, the role of learners in the process of online collaboration, the role of teachers in organizing online courses, learners' attitude towards CMC collaborative processes, the role of effective collaboration in CMC contributing to language development, the impact of learners' sociocultural backgrounds on the learning process, the amalgamation of SCMC and ACMC in enhancing collaboration, And most importantly, the effective ways of integrating technology in a way acceptable by and less threatening to students. As a result, further research on authentic online collaborative learning is merited as there is much more to gain regarding this promising and pristine area of language learning and research.

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