CHAPTER II:
REVIEW OF LITERATURE

Computer Assisted Language Learning (CALL)

Technological and pedagogical development of CALL

According to Warschauer and Healey (1998), “computers have been used for language teaching since the 1960s” (p.1). This 40 year-period can be divided into three main stages: Behaviorist CALL, communicative CALL, and integrative CALL (Warschauer and Healey, 1998), or structural CALL, cognitive CALL, and sociocognitive CALL (Kern & Warschauer, 2000). During these three phases, the development of technology from mainframe computers to personal computers to networked computers paralleled in many ways the development of language teaching and learning theories (Kern & Warschauer, 2000).

Behaviorist CALL, or structural CALL was introduced in the 1960s and 1970s. At this period in time, computers were still room-sized and their disks were as big as the diameter of automobile wheels (Sanders, 1995). The programs used for language teaching were designed to teach through repetition and to check learners’ responses to grammatical, vocabulary, or testing exercises and provide them with instant feedback on their answers. According to Kern & Warschauer, this is “consistent with the structuralist approach, which emphasized that repeated drilling on the same materials was beneficial or
even essential to learning” (p.8). The best example of this is the PLATO tutorial system at the University of Illinois, Urbana Champaign, which was mainly used for grammar instruction, vocabulary drilling, and translation testing (Ahmed, Corbett, and Sussex, 1985).

Communicative CALL, or cognitive CALL was introduced in the 1970s and 1980s. In this era, mainframe computers were replaced by personal computers. Programs based on behaviorist learning theories were rejected for they generally failed to provide language learners with authentic communication. New programs that facilitated communication such as “SimCity” or “Where in the World is Carmen San Diego” were used. This approach was in line with the communicative language approach, which views language as a system of communication. However, the game nature of some of these programs was considered a potential problem.

The current stage is integrative CALL, or sociocognitive CALL, which started in the 1990s. This phase emphasizes the use of language in authentic language social contexts. According to Warschauer (1996), this stage is “based on two technological developments of the last decade—multimedia computers and the Internet.” (p.7) Warschauer points out that the multimedia technology represented by the CD-ROM allows the combination of various media such as sound, graphics,
text, and video on one machine, which facilitates the integration of all four language skills.

The advent of the Internet expanded the use of the computer into a medium for information processing as well as a medium for communication. Communicating via the computer can be either synchronous (e.g. chatting, conferencing, etc.), or asynchronous (e.g. email messages’ bulletin boards). Synchronous communication, as Warschauer and Healey point out, can be achieved using specific software programs such as Daedalus or CommonSpace for local area networks (LAN), or via the Internet using various programs such as the Internet Relay Chat (IRC), MSN Messenger, PalTalk, Freetel, or other various chat media. Synchronous communication has been used for teaching foreign languages and English composition classes. Research in this area shows that synchronous communication often helps reluctant students to overcome their shyness and more fully participate in discussions. Sullivan (1998) describes how computer assisted discussions helped minority students who often felt dominated by Anglo professors and Anglo students at the University of Texas, Austin. Electronic discussions helped these minority students to develop a discourse community within their English composition class. She conducted a study of seven African American, six Hispanic, and six Anglo students’ communication with each
other in a networked computer classroom. The result showed Hispanic and African Americans dominating the discussions at the beginning of the semester, but by the end of the semester, a more equal participation by the three groups was achieved. The Anglo students, however, remained the least active online of the three groups, which is not necessarily the case in face-to-face communication. In another study, Warschauer (1996) looked at groups of ESL students comparing electronic and face-to-face discussion. Similar to the results of Sullivan’s study, Warschauer’s study shows more balance participation in the electronic discussions. Some of the students dominating the discussions in face-to-face communication started to listen to their peers in the electronic mode. By the same token, students who generally participated less in face-to-face discussions became more active participants and shared more of their ideas with their peers in electronic discussions. As for language use, electronic discussions were found to be lexically and syntactically more complex than face-to-face discussions. Warschauer attributes this to the fact that students have more time to plan what they want to say before they say it in electronic communication. These studies suggest that synchronous communication can provide more equal participation in the classroom.
Asynchronous communication, on the other hand, can be achieved through email, bulletin boards, newsgroups, and web-based conferencing systems (Warschauer & Healey, 1998). Nevertheless, email is the most frequently used medium for asynchronous communication. Many foreign language teachers have used email in their classrooms to provide their students with authentic communication and carry out collaborative projects. Research in this area is at a beginning stage. For example, a study by Wang (1998) comparing electronic and pen and pencil dialogues has shown that students using electronic mail “communicate more frequently, ask more questions, and use greater variety of language function” (Graus, 1999, p.16).

Computer Applications in CALL

Computer applications in CALL include:

1) Instructional applications in which learner and computer are directly involved in the learning process, and 2) general or non-instructional applications in which the computer is used as a technical assistant for: a) word processing, b) data managing, or c) researching into language learning or teaching (Kenning & Kenning, 1983). Both applications can be employed to improve learner and instructor control over the learning and teaching process in EFL. Shreck & Shreck (1991) listed some of the computer applications in CALL:
1. Interactive tutorials: Computer-based tutorials are used to deliver new information to the learner in a way similar to that of a teacher. Like any other types of CALL software, tutorials programs can be of good or poor quality. Good quality tutorials dictate that that the learner should be engaged throughout the instructional presentation in a series of questions, answers, and feedback. Poor quality tutorials are those that have an extremely limited form of interaction. In such circumstances, the lack of interactivity causes the learner to abandon the tutorial or to be in a passive role. The common kinds of tutorials are the ones of question and answer routines. These types, as indicated by Last (1992) are most effective when designed “in the form of a template program which can then be applied to a very large range of database” (p.234).

2- Drill and Practice: The early EFL/ESL software programs are of the drill and practice types. The very limited memory of computers and the simple design format of these programs were the reasons for their early appearance and widespread in EFL instruction. These software programs “are intended to provide practice opportunities that help the learner become more proficient in recognizing, recalling, or applying information that has been previously introduced” (Schreck & Schreck, 1991:474). Students are usually provided
“with questions or options and, following the student’s response, the computer provides feedback or help until the student arrives at the correct solution” (Salaberry, 2000:15).

3- **Text-Building Applications:** Text-building applications involve a number of activities in which the learner’s primary role is to reconstruct, generate, or modify text. A good example of text reconstruction application is the Storyboard, a classical text reconstruction program where the teacher enters the text, and learners rebuild it by guessing the missing words or sentences. Another program is the MacReader, which has a sentence jumble exercise meant for reading comprehension. It automatically mixes up the sentences from any paragraph that the student selects. The student must put sentences back into the correct order. The paragraph either comes included in the software or is authored by the teacher beforehand. The computer creates the jumble of sentences automatically and randomly (AlKahtani & Abalhassan, 1999).

In other text-building applications students may generate their own text or make modification to an existing text. Learners can be encouraged to produce and edit their own writing samples using the computer’s word processing. Another text generation CALL application is electronic mail or electronic bulletin board. Students
can communicate with their peers, instructor, or even their key pals using these electronic mediums. “The text of these messages are usually informal and, although perhaps initially written as part of a classroom exercise, they generally become increasingly spontaneous as learners become more accustomed to the ease with which they can send and receive information” (Schreck & Schreck, 1991:476).

The computer’s word processing can also be used for text modification. The learners, as Schreck & Schreck indicate, might use the word processing to “punctuate text, change the tenses of verbs, rearrange random sentences into a coherent paragraphs, or edit writing samples” (p.475).

4- Simulations and games: A computer simulation can imitate or simulate imaginary or real situations that are impossible to present in the classroom such as dangerous experiments, flight training, or space traveling. The learners, in these simulations, play active roles by discussing the problem, simulating the experiment, and coming up with solutions.

As for the games, there are two types of computer games: 1) entertaining games and 2) educational games. The first have no goals other than entertainment and passing time. The latter have particular educational goals and use a game-like approach in achieving their
objectives. It is obvious that some ESL/EFL professionals use commercially sold games to encourage their students to practice particular language skills. Depending on the quality and design of games, they could truly motivate or demotivate students to practice or abandon the assigned language skills. Like the drill and practice applications, simulations or games use drill and practice routines, but present them in more interesting and motivating ways because of the inclusion of video and audio capabilities. Schreck & Schreck (1991) stress that “any game that has real value for CALL/ESOL should require the learner to use English rather than to manipulate nonlinguistic icons and should contain vocabulary that the learner will be able to use in real life situations” (P.475).

5- Intelligent CALL Applications: Intelligent CALL programs as pointed out by Salaberry (2000) are completely “different from typical CALL programs, because they incorporate a Natural Language Processor that is capable of analyzing students’ responses, comparing them to an analysis of the target grammar rules, and identifying problematic areas in the response” (p.22). Salaberry cited Nagata’s experimental study in which she claimed that the human feedback “maybe as good as the Intelligent feedback for helping learners to correct word-level errors (e.g., vocabulary and conjugation
errors), while the Intelligent feedback may be more helpful for understanding and correcting sentence-level errors (e.g., particle errors)” (p.23). However, Salaberry warns us to take Nagata’s conclusions with caution because of methodological and theoretical problems with her analysis. He is also doubtful about the feedback Intelligent CALL may be able to provide as compared to that provided by humans. Until the computer is endowed with natural language-processing ability, it would not be able to mimic the highly contextualized human feedback (Salaberry).

5- Interactive Multimedia Applications: Use of Interactive Multimedia or Hypermedia (with these terms often used synonymously) applications in CALL “represents both a new medium for developing instructional programs, providing immediate access to multimedia resources, and a new communication medium in its own right” (Ashworth, 1996:94). Ashworth distinguishes three basic uses of hypermedia in CALL:

1) Reference: It allows language learners and instructors to access and interact with information such as in electronic dictionaries and encyclopedias.

2) Instruction: It incorporates learning/instructional constituents and links various resources to support reading, speaking
or listening in a foreign/second language. For example, a text “can be glossed in pop-up windows, the text can be pronounced in digitized voice; and meaning can be illustrated with pop-up graphics, animated sequences, and video clips” (p.86). Klassen & Milton (1999) evaluated the effectiveness of an interactive multimedia CD-ROM in an English language-learning curriculum at the University of Hong Kong. Results of their study indicate that students who used the interactive multimedia showed significant improvement in listening when compared to students in the traditional classroom mode. The study also showed that interactive multimedia developed positive attitude to using computers and CALL.

3) Research: Some Hypermedia Programs can both log and play back the interaction between the learner and the computer. This makes it easy for the researcher to study what the student has exactly done to identify specific areas of progress and difficulty. For example, a student can be given a reading assignment, which he/she reads on the screen, and has access to other online resources such as electronic dictionaries and thesauruses to help his/her
reading comprehension. The computer, in this case, can log the learner’s reading and word look-up behaviors and save them for later playback and analysis (Ashworth).

With the advent of the Internet, the web is beginning to change from text and photographs into an interactive multimedia medium, as it can now “incorporate audio and video into a graphical presentation system” (Carrier, 1997: 295). The spread of fiber optic cables and Internet satellite dishes will make it possible to store multimedia applications on servers on the Internet rather than on traditional CD-ROMS (Ashworth). However, the downloading of such applications will be very slow in countries that do not have the fiber optic cabling systems.

It is worth making the point that each of the aforementioned computer applications follows the development of language learning and teaching theories. Early CALL applications such as tutorial, drill and practice programs are based on the behaviorist-learning model where computers were viewed as tutorial machines where students are presented with questions and are then given feedback on their responses.

Text-based and computer game programs are based on problem solving approach where students are placed in problematic situations in which they must locate and
solve the problem. CALL programs in line with this paradigm require critical thinking abilities as well as active involvement of students.

Interactive multimedia and the Internet applications in EFL are based on what Warschauer (1996) called “integrative CALL”. He argues that the integrative approaches to CALL were based on two technological advancements: The multimedia and the Internet. The use of integrative CALL allows variety of media (text, graphics, animation, sound, video) to be accessed on one machine, which facilitates the integration of all four skills within the framework of using language for communication.

Factors Affecting the Integration of CALL

Some may believe that the availability of computers in language schools is the key to making faculty adopt the use of computers in their teaching. Studies on computer use by teachers such as those of Sheingold and Hadley (1990), Marcinkiewicz (1994), Fabry & Higgs (1997), Levy (1997), and Yerrick & Hoving (1999) indicate that the availability of computers does not guarantee the integration of computers in classes by teachers. Many teachers in these studies reported they were not using computers even though they were available in good quantities at their schools. Despite this fact, it is believed that computers can improve teaching and learning
(Marcinkiewicz, 1994). To understand this phenomenon and to have greater integration of computers into our institutions, Marcinkiewicz suggests that we need to study computers and what makes teachers want to - or need to- use them. This kind of research will result in compromise or modification for both parties. If reconciliation does not occur, then a series of propositions emerges: (a) the integration of computers into teaching may not be possible; (b) the selection of training of teachers must be restructured in order to integrate computers into teaching, or (c), as Fullan (1990) suggests, the school must be restructured because the restructuring is a perquisite to accommodate any significant innovation. (p.234)

The availability of computers, however, is not the be all and end all of integrating CALL into language programs. Other factors such as the type of access, resistance to change, lack of time and training, lack of suitable software and lack of information sharing must be taken into consideration as well (Graus, 1999).