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The integration of CALL in EFL/ESL learning environment

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Abstract

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ABSTRACT

Much of the research on foreign language instruction shows that students can learn effectively by using a variety of approaches if the students' interest remains high. The serious problem now is that most of the students become discouraged and drop out of foreign language classes soon after they begin because they lost interest (Johnson & Osguthorpe, 1986). In order to solve this problem and inspire students, more and more language teachers focus their attention on the use of computers in foreign language learning. A number of studies have shown that learning through the use of computers is more efficient than traditional methods and arouse students motivation (Johnson & Osguthorpe, 1986; Jung, 1992). The purpose of this paper is to provide an overview of Computer-Assisted Instruction (CAI), to investigate the immense potential of Computer-Assisted Language Learning (CALL), and then to identify ways in which computers can be used to enhance foreign language learning. The implications of computers in foreign language teaching and learning are discussed.

CHAPTER 1

INTRODUCTION

Computers have developed rapidly over the past quarter century, and particularly over the past few years. Technological advances in both hardware and software continue to expand computers' capabilities, and make them more powerful, faster, smaller, easier to use, less expensive, and more convenient. Viewed as an ever-patient, individualized tool that increases and facilitates the learning process, the computer has fostered high expectations of more effective, more motivating, and more innovative learning experiences (Dalton, 1986; Rtischev, 1992; Schreck & Schreck, 1991). Also, the role of computers in education has expended from drill and practice machines to technologically advanced tools which offer sound, graphics, and interactive video capabilities (Huss, Lane, & Willetts, 1990; Jacoby, 1993). A number of studies have shown that learning with computers is more effective than traditional methods and boosts students' motivation (Beauvois, 1992; Chun & Brandl, 1992; Church, 1986; Dalton, 1986; Garrett, 1991; Huss et al., 1990; Jung, 1992; Kulik, Bangert, & Williams, 1983; Thrush & Thrush, 1984; Thuy, 1992).

Background about CAI and CALL

The term, Computer-Assisted Instruction (CAI), which refers to the use of a computer with the intention of improving students' knowledge, skill, or academic performance (Okolo, Bahr, & Rieth, 1993), emerged during the 1960's in the United States and become a recognized discipline in education. According to Kulik et al. (1983), CAI not only improves learner achievement, by as much as 50 percent, but that it can also reduce the amount of time necessary to accomplish the same amount of learning. In addition, CAI has had positive effect on improving the affective outcomes of instruction such as learner attitude and self-esteem (Dalton, 1986; Dalton & Hannafin, 1985). Then Computer-Assisted Language Learning (CALL) was developed in the mid-1980's and refers specifically to the use of the computers in language teaching and learning (Jung, 1992). Computers have been shown to be effective in English as Second Language/English as Foreign Language (ESL/EFL) environment (Chapelle & Jamieson, 1986; Garrett, 1991; Huss et al., 1990; Johnson & Osguthorpe, 1986; Kang & Dennis, 1995; Liou, 1992a; Thuy, 1992; Wilson, 1994; Wyatt, 1984b). Computers can act as teachers in one-on-one or small group settings and can be non-threatening if introduced in an appropriate manner. According to the

research studied by Thrush and Thrush (1984), foreign language teachers who have used computers to assist instruction report a variety of positive outcomes. These teachers conclude that CALL is very effective in discrete, or objectively testable areas such as grammar, spelling, vocabulary, and reading. In the comparison of traditional instruction and CALL, students working with computers have shown equal or better achievement in a shorter period of time, increased motivation, and reluctant students have become more active and interested in learning, and have more positive attitude toward school.

As Pierson (1987) claims, many aspects of language pedagogy are suitable subjects for information processing. The organization, description, storage, and classification of the units and structures of the language lend themselves to computer-assisted management.

Research Questions

This paper begins by considering the need to provide a learning environment to help students to learn and perfect their English using modern technology as the ideal vehicle to provide this type of learning environment. This paper is trying to answer the following 2 questions: why use computers in language learning, and how to use technology in language learning applications.

CHAPTER 2

REVIEW OF LITERATURE

Second/Foreign Language Acquisition

Researchers and linguists have suggested there are necessary conditions in second/foreign language development. First, language acquisition is a complex process which involves cognitive, affective and psychomotor aspects to learning. Therefore, ideal instruction should emphasize critical thinking, problem solving, social interaction, and provide the opportunity for students to think, feel, create, and control the learning process (Bermudez & Prater, 1990; Lapp & Flood, 1994).

Second, an encouraging learning environment for self-expression and deep personal involvement is crucial in the language classroom (Haverson, 1991; Lapp & Flood, 1994). Language teachers should try to encourage students' participation, decrease anxiety, promote confidence and satisfaction with the language, and provide a stress-free environment for learning (Riggenbach & Lazaraton, 1991; Whitley, 1993). Chamot and O'Malley (1987) indicate that language will be acquired more naturally when learners remove the anxiety associated with the learning of a new language. The more students are encouraged to try out the new language in a

positive environment, the more comfortable they will feel to do so (Krashen, 1982; Quisenberry, 1982; Riggenbach & Lazaraton, 1991).

Third, language is for communication, and for students to be able to interact freely with others. Therefore, a meaningful context must be provided for vocabulary and concept development (Palumbo & Bermudez, 1994; Whitley, 1993). As Newman (1985) indicates, whole language activities are those that support students in use of meaningful language. Quisenberry (1982) also states that the more meaningful the material to be learned, the better the student will learn and retain it. Whitley (1993) suggests that instruction should emphasize group/pair work, problem-solving, simulation, and provide sufficient opportunity for students to communicate meaning in realistic situations. In addition, listening, speaking, reading and writing practice must be provided concurrently in order to access to the learner's strongest learning modality (Haverson, 1991; Palumbo & Bermudez, 1994; Whitley, 1993).

Fourth, a number of research studies indicate that the learning occurs continuously and effectively in informal and input-rich learning environments (Kang & Dennis, 1995; Whitley, 1993). Palumbo and Bermudez (1994) urge that language teachers should integrate different

activities or media to provide various learning modalities for students.

The Advantages of CAI

To evaluate the effectiveness of CALL, it is important to understand the reason for having students practice English on the computer. Generally, there are several advantages to using CAI.

First, many of today's students already have experiences using computers (Church, 1986). With integrating the computer into curriculum, it helps to create an interesting learning environment, which in turn, increases the motivation of students, and makes them more willing to learn foreign languages (Church, 1986; Johnson & Osguthorpe, 1986; Saar, 1995).

Second, individualization is an advantage of CAI. The branching capabilities of the computer allows for truly individualized and self-paced learning which fits individual learner's needs (Church, 1986; Elsen, Deun, & Decoo, 1991). When computers are available to students, it is possible for extended practice outside of class at times when the teacher is unavailable (Church, 1986; Huss et al., 1990). In addition, students have the privacy to work at their own pace, and practice at their own convenience without concern (Church, 1986; Jacoby, 1993; Saar, 1995; Thrush & Thrush, 1984). Programmed properly,

the computer can diagnose students' learning weaknesses and provide appropriate practice materials. Slower students can receive remedial assistance, while quicker learners can work through material at a more rapid pace (Chapelle & Jamieson, 1986; Elsen et al., 1991; Thrush & Thrush, 1984; Wyatt, 1984b).

Third, the computer can act as a mentor with infinite patience, and provide consistency of attention and immediate feedback (Thrush & Thrush, 1984). Research suggests that feedback is an important design feature in any instruction, and students learn better when they have to answer questions and receive feedback about their answers (Chapelle & Jamieson, 1986; Sassenrath, 1975; Smith & Shen, 1992). As Kulik and Kulik (1988) indicate, immediate feedback is more effective than delayed feedback in actual classroom quizzes. CAI provides opportunities for effective practice, and repeat exercises for as long as the student needs or is willing to work.

Fourth, matching learning style with the design of instruction is important regarding both achievement and attitude (Saar, 1995). Language teachers have been aware of the fact that individual students prefer different modalities of learning: some learn best through

listening, and others through visuals (Rivers, 1981). Widdowson (1983) suggests that when teaching conforms to individual learning patterns, actual language acquisition is more likely to occur. The computer's ability to bring several media together such as text, graphics, sound, and animation enables language teachers to integrate various media into the classroom, and provide for diverse learning modalities, joined with strategies to fit the individual student's preferred learning style and need (Stevens, 1989).

Fifth, visual aids have been used in language teaching for a long time because visual imagery is instrumental to retention and recall (Arndt and Pesch, 1984; Quisenberry, 1982). Rubin (1984) also claims that multi-modal materials tend to attract and hold students' attention to a greater degree for increased learning. In the same vein, Shade and Watson (1987) indicate that children are likely to benefit especially from a complementary and abundant visual and auditory presentation. All of these studies suggest that computers' capability of controlling and integrating various forms of input can be exploited for language instruction. Computers now can be used to address multiple dimensions, such as integrating auditory and visual messages with sound, animation, and realistic

activities (Foelsche, 1990). These computer features are highly relevant to language learning models.

Sixth, computers can provide interactive learning to allow students to become active learners. In a typical classroom, a teacher has to interact with a large number of students, and it is not easy to retain the dynamics of learning (Kang & Dennis, 1995). The computer has the advantage of being able to work one-on-one with students interactively.

Seventh, the computer can collect data and store records of each student's performance, allowing the teacher to analyze the patterns of students' learning and suggest ways for improvement (Chapelle & Jamieson, 1986; Church, 1986; Wyatt, 1984b).

A number of studies indicate that CAI is usually a popular method of instruction, is typically effective, and may require less time on task for mastery of the target skills (Chapelle & Jamieson, 1985; Dalton & Hannafin, 1985; Johnson & Osguthorpe, 1986; Kang & Dennis, 1995; Kulik et al., 1983; Schreck & Schreck, 1991). In working with students who are acquiring a second/foreign language, it is important to encourage their participation and to provide a stress-free, trusting environment for successful learning (Lapp & Flood, 1994; Whitley, 1993). The computer provides an

emotionally safe and efficient learning environment in which students' natural, unconstrained ability to learn a language can be fully mobilized (Huss et al., 1990; Jacoby, 1993; Kang & Dennis, 1995).

The Applications of CALL

Interactive tutorials. Computer-delivered tutorials are used to deliver new information to the student. In CALL, the tutorial format is especially well suited for individualized reading comprehension and for improving study skills, particularly in special purpose content areas (Schreck & Schreck, 1991). As learners read through textual passages, the computer provides feedback and allows learners to continuously monitor and adjust their own understanding of the passages while they are reading. In Kang and Dennis' (1995) study, which applied HyperCard on a Macintosh computer, the experimental treatment combined definition, picture, and context conditions. The students proceeded through cycles of presentation of information followed by practice. They found that the context-embedded approach was most effective in promoting spontaneous use of vocabulary, listening comprehension, and recall of vocabulary definitions.

Drill and practice. According to Sassenrath (1975), students learn better when they have to answer questions and receive knowledge of the correct responses. Yet,

providing the proper opportunities for effective practice is one of the language teachers' most difficult tasks (Church, 1986). In CALL, drill and practice exercises are used primarily to provide practice opportunities that help the learner become more proficient in recognizing, recalling, or applying information that has been introduced. In CALL, drill and practice software has a role to play in reinforcing the learning of discrete language skills, especially grammar points and vocabulary items (Huss et al., 1990). In addition, many learners believe that practice is helpful in promoting certain aspects of language proficiency because quality computerized drill and practice sequences are capable of providing interactive individualized practice and surpasses what the learner encounters in conventional workbooks (Schreck & Schreck, 1991). For example, students who want to practice forming irregular plurals or the simple past tense, can proceed at their own pace through a designed set of items. If the answer is wrong, the program will provide students with a meaningful explanation as to why the answer is wrong and provide further remediation; when skills are mastered, students can go further to advanced exercises (Schreck & Schreck, 1991).

Simulations and games. Computer simulations or games present models of real or imaginary situations that allow the student to play an active role in determining the situation's outcome. These activities provide opportunities to learn a variety of procedures or problem-solving strategies. For example, simulations and games may involve only the learner and the computer. Or, they may include several participants, each with a particular role and set of choices. The repeat of the simulation and making different choices may produce entirely different results. According to Schreck and Schreck (1991), a popular phenomenon among some CALL professionals has been the attempt to use non-TESOL commercially sold computer games to encourage language practice. They indicate that any game that has real value for CALL 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.

Text-building applications. Text-building computer applications include a wide variety of learner-computer interactions where the student needs to create, change, or reconstruct text. These tasks require the learner to apply several types of linguistic knowledge at the same time, and to understand the meaning of the text (Schreck

& Schreck, 1991). In CALL text modification activities, the learner might punctuate text, change the tenses of verbs, rearrange random sentences or edit writing samples. For example, a word processor facilitates the task of writing; by using features such as "cut and paste", students can make any changes to their text without having to rewrite whole sections. In addition, a variety of grammar and style checker programs can help intermediate and advanced language learners to analyze and correct their writing (Huss et al., 1990). Students can be encouraged to experiment and edit their own writing samples, because mechanical changes in text can be accomplished so quickly and easily; thus, the student is free to focus attention more fully on textual meaning rather than on keeping track of isolated changes and rearrangements. In addition, by using electronic mail or electronic bulletin boards, students can communicate with anyone in the world who is linked to the same network. This kind of communication can also increase cultural awareness for students from different countries.

Multimedia applications. Multimedia can be described as the use of two or more media to present information (Tolhurst, 1995). The media that can be used include text, animated graphics, movie segments, sounds, and music (Kozma, 1991). Palumbo and Bermudez (1994) claim

that multimedia provides an opportunity to enhance virtual presentations with other modalities such as sound and animation. Therefore, language teachers are able to integrate the real world into the classroom and create input-rich learning environments.

According to Newman (1985), language instruction should support students in the development and use of meaningful language. Also, active engagement in the negotiation of meaning in the target language is believed to be the key to the successful acquisition of the language (Hatch, 1978; Palumbo & Bermudez, 1994; Meskill, 1993; Whitley, 1993). In this regard, video is recognized as an excellent resource for language instruction (Terrell, 1993). Within the rich context, video provides information in a more meaningful way to students and helps students retain information (Garrett, 1991; Herron & Hanley, 1992; Wyatt, 1984a). Videodisc-based material can even provide more motivating instruction for foreign language learning and it fits in well with modern theories of language acquisition (Garrett, 1991; Liou, 1993; Liou, 1992b; Schneider & Bennion, 1983; Smith & Shen, 1992). Many studies have indicated that Interactive Videodisc (IVD) is an effective medium especially in improving listening skills (Larson, 1984; Schitai, 1989; Tighe & Zufelt, 1988; Watts, 1989) because it presents

virtual examples and real-life situations which allow students to listen and observe the speaker's body language, facial expressions, and contextual environment (Smith & Shen, 1992).

In addition, with multimedia, language teachers now can create instruction that provides a variety of learning experiences to help match with individual learning styles and active student involvement. For visual learners, their eyes are a primary medium for gathering information; text, graphics and illustrations from multimedia can reinforce this approach to learning. For auditory learners, sound helps to retain information (Palumbo & Bermudez, 1994). Furthermore, the development of Compact Disk-Read Only Memory (CD-ROM), which is often associated with multi-media possibilities such as CD or interactive video, allows large amounts of aural and visual information to be stored and accessed (Thuy, 1992).

Conclusion

Technology has become an integral part of education, and the use of computers creates a new instructional environment. (Chapell & Jamieson, 1986; Church, 1986; Kulik et al., 1983; Schreck & Schreck, 1991; Thrush & Thrush, 1984). Generally, CAI provides students opportunities to work with enhanced instructional

materials and environments, personalized tutoring, automatically evaluated learning processes, and helps students feel better and more comfortable about learning. All of these features are not only highly relevant to second/foreign language acquisitional theory but indicates that CAI is an ideal tool in facilitating language learning process. In addition, the effectiveness of CALL approaches is largely dependent upon instructors to choose, adapt and use appropriate computer software (Huss et al., 1990). The advance of technology now can provide various types of computer programs, from tutorial, drill and practice, to multimedia applications, which allow instructors to integrate different programs and design appropriate instructional activities for language learners. As language teachers become aware of the capability of each program and the needs of learners, teachers can insure the greatest potential of computers for all language learners.

CHAPTER 3

THE MEDIA/METHODS IN WHICH CALL HAVE BEEN USED IN ESL/EFL LEARNING ENVIRONMENT

Pronunciation

Oral communication skills (pronunciation, listening, and speaking) are complex and multifaceted language process (Murphy, 1991). The acquisition of good pronunciation in second/foreign languages acquisition is considered to be the most difficult task in language learning. Learners must first be able to recognize a sound and discriminate the differences between similar sounds; while it is not easy because some of the sounds may not exist in learners' native language (Carruthers, 1987; Rawling, 1992; Smith & Shen, 1992). Poor pronunciation interferes with the learning of vocabulary, spelling, grammar, and makes communication unintelligible (Pennington & Richards, 1986; Rawling, 1992). Sorenson (1992) indicates that pronunciation drill is important for listening discrimination training; and listening proficiency is closely connected to speaking ability. Therefore, correct pronunciation is seen as a prerequisite to developing oral communication skills (Celce-Murcia & Goodwin, 1991). As language is for communication, the goal of teaching pronunciation is to enable learners to communicate intelligibly (Celce-Murcia

& Goodwin, 1991; Morley, 1991). According to Molholt (1988), language learners need practice in producing sounds correctly in isolation and in individual words before using them in connected speech.

Sound recognition technology. Computer's sound-recognition capabilities may assist in isolating, monitoring, and modifying individual speech characteristics (Rtischev, 1992). According to Loritz's study (as cited in Schreck & Schreck, 1991), when the learner vocally produces a sentence, the computer can visually display a graph of the learner's rising and falling pitch along with a graph of the same sentence produced by a native speaker. The learner can compare the speech signals and repeat the sentence with altered pitch until both graphs match. In the same vein, Molholt (1988) conducts a project which uses visual displays of speaking patterns in helping international students overcome pronunciation problems and improve communication skills. Molholt (1988) indicates that with the Speech Spectrographic Display (SSD) system, a computer can instantly display learner's speech signals and compare them with a native speaker's models. For example, when teaching the pronunciation of /r/ and /l/, the teacher first gives students a clear explanation of tongue placement followed by reinforcement from the graphics

display, students can compare the differences between their pronunciation and teacher's and focus their attention on the exact features that need to be improved. After four years of study, Molholt (1988) concludes that it is difficult for students to tell the difference between similar sounds at first, but with visual displays of the sounds, students definitely can feel it and see it on the screen. Gradually, students learn to associate the feelings with the sound, and finally they can make the sounds naturally in continuous speech. Molholt also suggests that with the beginning learner, the instruction should start from phoneme level to word level; while for more advanced students, it is better to start the program at sentence level and work on specific sound only when needed.

Boswell system. Boswell system is a phonics-based language teaching program based on interactive multi-sensory computer technology which includes auditory, visual and tactile stimuli (Rawling, 1992). The lessons begin with simple and move to complex levels with increasing phonemes which allows non-native English speakers to understand the phonetic structure as well as how the sound relates to spelling. Each lesson begins with the presentation of a phoneme in isolation and then within words. As the program moves from phrases and to

sentences followed by practice exercises, students have sufficient opportunity to review previous lessons and reinforce the new. After the nine-week test period which compare the performance of the experimental and the control groups, Rawling (1992) concludes that the Boswell system has the potential in increasing students' ability in recognizing phonemes, and students who used the program were generally positive about the system.

Pronunciation Picture Videotape. In language class, students usually have problems with particular sounds in the language and require individualized instruction. As Sorenson (1992) indicates, imitation is a part of pronunciation learning process, but students often need detailed explanations in order to learn correct pronunciation of the new language. In this regard, the Pronunciation Pictures Videotape project has been produced to present detailed instructions on individual phonemes of English, and provides remedial attention to students who find the pronunciation of a particular phoneme difficult (Sorenson, 1992). This project includes several features. First, animated pictures are applied in this project to indicate the position and the movement of the tongue, as well as explaining the phoneme and demonstrating the sound production process. Second, as minimal pairs (a pair of words that are identical except

where they differ in one distinctive sound) are useful in teaching individual phonemes, practicing sound discrimination, and oral production (Carruthers, 1987; Celce-Murcia & Goodwin, 1991; Sorenson, 1992), minimal pairs pronunciation practices are included in this project to provide repetition of both vocabulary and sentence practices. This gives students the opportunity to develop listening skills, pronunciation skills and extended vocabulary. Third, immediate practices for producing the problematic phoneme are important (Molholt, 1988; Sorenson, 1992). Each lesson in this project concludes with a homework assignments to allow sufficient practice after each presentation. Finally, Sorenson (1992) concludes that this technique has been researched and found effective in teaching pronunciation and can be used for students at the advanced beginner to intermediate level.

Listening/speaking

Listening comprehension is considered as a highly-complex, problem-solving activity and it is important in second language acquisition (Byrnes, 1984; Krasen, Terrell, Ehrman, & Herzon, 1984; Whitley, 1993). One of the most common causes to hinder listening comprehension is the fear of being unable to catch every word that the speaker said (Chastain, 1988). In addition, certain

English sounds that do not exist in learners' native language also makes it difficult to understand spoken English (Carruthers, 1987; Molholt, 1988; Rawling, 1992; Smith & Shen, 1992). According to Donaldson-Evans (1981), to increase the ability of listening, second language learners must first have sufficient cultural and linguistic knowledge about the target language. Second, vocabulary and idiomatic expressions are the key to comprehension, students must be able to recognize enough words to establish a context for making rational guesses.

Speaking provides students opportunities for improving oral fluency through interpersonal communication (Murphy, 1991). Speaking can be easily and usefully taught in conjunction with the other language skills such as listening, reading, and writing. A speech activity is a speaking opportunity for one student, while it is a listening activity for the rest of the class (Riggenbach & Lazaraton, 1991). Generally, the ability to speak coherently and intelligibly is considered as a necessary goal in language learning (Murphy, 1991). In addition, teachers should encourage the acquisition of communication skills and foster real communication in and out of the classroom (Riggenbach & Lazaraton, 1991).

Multimedia. Speech from cassettes now can be linked to computer programs, or connected with textual or visual

displays, to produce listening, speaking, and comprehension activities (Schreck & Schreck, 1991). As Rtischev (1992) indicates, speech recognition technology can be used in developing comprehension skills. For example, the system can present speech or a story with the combination of text and graphics, using native speakers to narrate. Then students are asked to interact with the computer by answering the related multiple choice questions and determine the progress of the story.

In addition, student-to-student interaction is considered an important component in language learning process (Johnson, Johnson, & Stanne, 1985; Webb, 1984). Meskill (1993) investigates the interaction of pairs of language students working with multimedia. The study involved six pairs of ESL students working cooperatively. As research indicates, pairing learners who speak different first languages in front of the computer helps to facilitate real communication in English, especially if group work or cooperative learning are used (Huss et al., 1990; Johnson & Johnson, 1986; Piper, 1986). However, the result of the study indicates that the ESL students appear to have some difficulty maintaining communication with their partner and with computer. Meskill (1993) suggests that instructor should provides assistance and guidance to help students maintain

communication with each other. In addition, the selection of appropriate software should focus on more open-ended and less computer-driven courseware (Young, 1988).

IVD technology. According to Herron and Hanley (1992), real-life cultural situations and a meaningful classroom environment are important in the foreign language classroom. However, there is always a gap between simulation and reality. As Liou (1992b) indicates, interactive and realistic settings for verbal communication are crucial for effective teaching and learning. The ability to integrate various media under computer's control enables IVD to provide complicated types of visual information as well as presents rich and authentic language input for practice, and which in turns, provides a highly motivating language learning experience (Foelsche, 1990; Liou, 1993; Smith & Shen, 1992; Watts, 1989). In this regard, Smith and Shen (1992) investigated the effect of captioning on listening comprehension of English in a computer-based IVD system. In this program, captioning was designed to used as Knowledge of Results Feedback (KR) during listening comprehension practice. The ability to integrate computer to the context rich environment provided by the video allows the system to provide very specific feedback about the learner's performance. Learners were encouraged to

actively interpret captioning in order to improve listening comprehension. They conclude that IVD technology has the potential to encourage learners to examine new vocabulary, idiomatic expressions and their usage; it also provides a friendly environment and reduce students' anxiety and embarrassment.

In addition, Liou (1993) at The National Tsing Hua University in Taiwan, R. O. C. develops an EFL IVD courseware with the intention of bringing the learner to a realistic conversational situation, exposing the learner to the culture of the language, as well as helping the learner to develop reading, listening, and speaking skills in English. The movie, *Ghostbusters*, and the novel that written by the original playwright (Milne, 1984) was included to provide native speakers' input and real-life conversation. The courseware contains four main units: the first unit provides a short introduction about the movie and an explanation of related vocabulary. The purpose of this unit is to help students learn English through reading textual information, viewing the action in the film, and develop listening comprehension skills. The second unit adopts hypertext (provides information in a nonlinear way) for an information presentation which enables learners to read for comprehension and increase vocabulary acquisition. Learners can check the unfamiliar

vocabulary by clicking on the bolded words or by typing the unknown item and access the Chinese definition. The third unit allows learners full control over all the content. Learners can click the "HELP" button which will provide English script, Chinese script, idiom search, word search, and repetition of the sentences. The fourth unit was designed to provide direct instruction for language learning by providing extra information or asking students to do a variety of exercises. As Liou (1993) concludes, the courseware can be integrated into curriculum for reading, listening, speaking, and even writing class. Furthermore, although IVD has its strength in individualized instruction, it can be used for cooperative learning so that students can learn from both CALL and their partners.

Vocabulary

In second language learning, vocabulary growth is vital from the start (Whitley, 1993). Dictionary definitions are the main source of vocabulary learning. Most of the time, second language learners use vocabulary knowledge in tests or examinations, and these approaches are not enough for learners to deal with real and communicative situations (Kang & Dennis, 1995). According to Elsen et al. (1991), the words and expressions which are most often used in everyday communication should be

given priority on EFL vocabulary learning. In addition, Rivers (1981) indicates that vocabulary learning is not the learning of isolated facts. Instead, vocabulary learning should be viewed as the learning of ways that a word can be combined with other words to express meaningful concepts. As Allen (1996) claims, it is important to build English vocabulary in combination with realistic situations, and the software that mimics the real world can really help students improve their vocabulary proficiency.

Semantic-network based approach. Liu (1993) conducts a program that investigates the effect of hypermedia on enhancing vocabulary learning among non-native English speakers. This program consist of five sections, followed by a posttest and retention test. The learners are put in an enriched multidimensional cultural context, such as history, art, and cultural customs. Liu (1993) indicates that the combination of different media such as sound, graphics, animation, and text in hypermedia provides a realistic situation and makes language learning natural and intuitive. For example, in a hypermedia environment, information can be linked together to form a network, and helps enable learners to construct their own knowledge by making meaningful connections among the ideas they learned. When the vocabulary words to be learned are

meaningfully linked to a cultural context, semantic-network-based hypermedia facilitates the integration of new information to existing knowledge, and therefore increases the vocabulary acquisition.

Content-embedded approach. In order to examine how computer-based interactive materials can help vocabulary acquisition for beginning second language learners, Kang and Dennis (1995) conducted a study which applies HyperCard on Macintosh computers in an elementary school in Seoul, Korea. This courseware included three parts, each part contained an interactive tutorial and practice section where the visual, aural, and sentence contexts are provided. After each presentation, students are placed in a simulated real-world situation so that they had the chance to use the vocabulary in a new and appropriate situation. Kang and Dennis (1995) concluded that the content-embedded approach is effective in helping vocabulary acquisition, but merely exposing learners to a multi-modalities environment which is rich in sound, pictures, and text will not yield better learning. The most important thing is how the different modalities are integrated to produce an authentic language learning environment that can have an impact on learning.

Wordchip. Wordchip is an English vocabulary program for training and teaching a basic EFL vocabulary. According to Elsen et al. (1991), external versatility is a key concept which refers to a richness in both contents and strategies and makes the courseware program better adapted to the individual and specific needs of a wide range of potential end users. In addition, CALL design should always meet the maxim of external versatility in order to be an efficient and effective teaching and learning courseware. The study conducted by Elsen and associates (1991) illustrates the externally versatile design of Wordchip. There are three characteristics of it. First, the content of Wordchip includes 5000 words and common expressions in English. Ten different exercises with a growing degree of difficulty are included for learners to work on their own level and pace. Learners will get immediate feedback on the quality of their inputs, and the final scores are provided at the end of each exercise. Second, Wordchip includes a selection system that allows learners devote their attention to a particular category of words, one which precisely meets their linguistic needs. Third, the multi-environment and unlinear program design allow learners to select several environments in this program freely. For example, learners can switch from a training to an error-

analysis section or go back to previous section to correct their previous errors. As Elsen et al. (1991) conclude, the combination of a selection system with well-structured contents in a multi-environment model makes Wordchip an efficient and effective CALL courseware.

Reading

Reading is a highly individual process; even students with the same reading level in the classroom, reading speeds and comprehension abilities tend to vary widely. Therefore, the reading class almost demands a more individualized, student-centered instruction (Haverson, 1991; Wyatt, 1984b). As Clarke (1986) indicates, computer's capacity for maximum user choices makes it advantageous for assisting reading instruction. According to Roblyer, Edwards, and Havriluk (1997), the ideal software should be able to analyze text readability levels to help teachers assign appropriate reading materials for students. For example, students can touch the keyboard when beginning and finishing the first passage so that the computer will automatically time the reading and then provide just the right amount of challenge for the next exercise. In addition, a serious problem for readers in ESL/EFL is the excessive use of the dictionary. As Wyatt (1984b) indicates, any

dictionary use tends to slow down readers in which it is crucial to establish the meaning to each context before moving to the next. Computers can relieve this problem by acting as rapid reference tools that allow readers to get information by just clicking on parts of pictures or on the text (Hulstijn, 1993).

CD-ROM. According to Goodman, reading, writing, listening, and speaking are not learned in isolation; they are the components of a communication system and should be presented together (as cited in Haverson, 1991). As Lopez and Mclester (1994) indicate, CD-ROM is an excellent tool for helping ESL/EFL students explore the English language. With the ability to combine graphics, animation, text, music, and speech in one software program, CD-ROM are appropriate in presenting integrated and real-life contexts for vocabulary, grammar, pronunciation, and cultural lessons, engaging students in whole language activities for listening, speaking, reading, and writing. The designs that allow students to switch between English and a second language also makes CD-ROM well to be used in the bilingual or ESL classroom.

Meaning-enhancing CALL. According to Whitley (1993), language is for communication; the negotiation of meaning over an information gap is important. Haverson (1991)

also indicates that the language activities must be meaningful, purposeful and relevant to the learners. In addition, Chun and Brandl (1992) state that CALL software should centered on meaning that enables students to enter whole sentences instead of common one-word answers. With the intention of creating a meaningful context for language learners, Chun and Brandl (1992) developed Communicative Gap Exercise software which requires learners to uncover or discover the missing information in the context. The package contains five exercises, each starts with a brief dialogue combining illustrations, text, and questions displayed on the screen. Then the user's response to the questions is followed by the dialogue. An on-line dictionary, detailed grammatical review, and error-checking function are included to allow users to look up any vocabulary used in the program and receive grammatical feedback. As Chun and Brandl (1992) conclude, the exercises enable learners to share in the problem-solving process and to learn how to negotiate information by asking questions and making statements which require students to apply appropriate linguistic knowledge to deal with a particular situation.

Writing/grammar

English grammar is essential in written communication. Poor grammar skills contribute to

ineffective communication by creating misunderstanding and misinterpretations (Lundgren, 1985). In other words, grammar is regarded as an essential resource for writers in communicating their messages accurately. In this regard, grammar instruction should be integrated with various writing activities, not just for error correction but to convey meaning efficiently (Frodesen, 1991).

Automatic text-analysis project. In language teaching, writing teachers often spend a lot of time in correcting grammatical mistakes and revising students' composition. If a computer program could be used to detect or correct grammatical mistakes in students' writing, that may reduce the revision process, and leave more time for teachers to work on higher-level writing instruction. In this regard, Dalgish (1991) uses a database in analysis of writing errors of Swedish university students. Dalgish indicates that students from different first language backgrounds have different needs; different groups need to emphasize different aspects of each grammatical category. These differences should be considered in the design of the courseware, so that the appropriate degree of individualization can be included.

In the same vein, Liou (1992a) developed an automatic English grammar text-analysis program for

Chinese students in Taiwan to help the writing revision process. In this project, 135 writing samples were collected and 1762 errors were found, which were classified into 15 major types. Also, two kinds of electronic dictionaries (word dictionary and idiom dictionary) were included to enhance the text analysis program. In addition, a parser was constructed to analyze the text. After 15 months of study, Liou concluded that the text-analysis program has the potential in helping the writing revision processes.

Grammatical CALL. In foreign language learning, students tend to be affected by their first language due to lack of native speakers' input and sufficient opportunities to practice English in the classroom (Liou, Wang, & Hung-yeh, 1992). In order to facilitate the learning process as well as alleviate language teachers' burden in correcting students' grammatical mistakes, Liou et al. (1992) conducted a project which used CALL to enhance writing instruction, specially to correct recurrent grammatical weaknesses for Chinese EFL learners. The courseware was designed in a drill and practice format and implemented on an IBM personal computer platform. The courseware contained ten lessons and each lesson with ten questions. There were four features in the program. First, it was based on error

analysis of common mistakes in Chinese EFL students' composition. Second, as phrases of single-letter input helps to reinforce the learning of discrete language, the courseware was designed with sentence-level input which includes three kinds of exercise: Chinese-to-English translation, English sentence correction, and English sentence combination. Third, the design of answer judgment and remedial practice were included to provide immediate feedback and remediation for students. Fourth, the design of record keeping was included to record students' CALL learning history. After one year of study, Liou et al. concluded that when combined with classroom writing instruction, grammatical CALL is helpful for writing performance.

Computer-Assisted Classroom Discussion. Beauvois (1992) explored an innovative use of CALL on a local area network (LAN) for synchronous discussion in foreign language classroom. The Computer-Assisted Classroom Discussion (CACD) program allowed students at individual stations to send messages concurrently to one another and to their teacher. This provided a unique environment for student-to-student and student-to-teacher interaction. Roblyer et al. (1997) claim that LAN technology has shown potential to facilitate communication in foreign language instruction. According to Beauvois, one of the greatest

advantages of this program is that no one dominates the discussion. Students are encouraged to feel free to express their ideas by composing their thoughts privately on the computer screens, and then sending the messages to the whole class. As Bump (1990) indicates, the nonthreatening atmosphere in the networked computer classroom enables anxious or shy learners to be more willing to participate in the discussion than in the regular classroom. As Beauvois concludes, the synchronous whole-class discussion on the computer encourages students to read, think, and write at the same time, and therefore has the potential to enhance communication skills in language learning.

CHAPTER 4

CONCLUSION

Statistically and anecdotally, students who used the CALL programs experienced greater improvement than students who used print-based materials. However, CALL used in language learning must still be coupled with a great deal of human-to-human interaction (Thuy, 1992). Generally, with a good instructional design, language learners can now take advantage of rich, diverse learning resources of the computers. It is clear that the computer can play a crucial and extensive role in the development of language skills, but we also need to remember that computer is just a tool; the quality of instruction depends on how people use the tool (Bruce, 1985). In other words, a computer should be used in such a way that its potential can be fully realized by educators (Kang & Dennis, 1995). And when educators realize the potential benefits of the technology and come to understand its strengths and weakness, then they will be able to rely on their experience and creativity in designing a new generation of interactive CALL applications.

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