

THE EFFECTIVENESS OF COMPUTER ASSISTED LANGUAGE LEARNING
(CALL) IN VOCABULARY INSTRUCTION TO TURKISH EFL STUDENTS

A THESIS PRESENTED BY
NAFIYE ÇİĞDEM KOÇAK
TO THE INSTITUTE OF ECONOMICS AND SOCIAL SCIENCES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ARTS
IN TEACHING ENGLISH AS A FOREIGN LANGUAGE

BILKENT UNIVERSITY

AUGUST 1997

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ABSTRACT

Title: The Effectiveness of Computer Assisted Language Learning (CALL) In Vocabulary Instruction to Turkish EFL Students

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CALL (Computer Assisted Language Learning) is the term most commonly used by teachers and students to describe the use of computers as part of a language course (Maley, 1989). This experimental study aimed at investigating the effectiveness of Computer Assisted Language Learning (CALL) on vocabulary teaching and learning. This study hypothesized that the computer has a potential to positively effect foreign language learning, particularly vocabulary instruction

This study was conducted to highlight some efficient and effective ways of vocabulary acquisition that can be part of the instructional program through the use of CALL capacities. There have been a number of research studies on various aspects of CALL application. However, few studies have compared the effectiveness of CALL versus textbook based approaches to vocabulary learning. The hypothesis was that students are more positively motivated to

use software materials than the usual textbook and that vocabulary development would be significantly better for the software (experimental) group than for the textbook (control) group of students.

The subjects of this research study were secondary school students, 13-14 years olds at METU (Middle East Technical University) College who have been studying English intensively for two years. The experimental group used the Longman Interactive English Dictionary CD in a computer lab under the instruction of the researcher, and the control group had traditional instruction using their textbook in the classroom under the instruction of their teacher. Both groups of students were given pretests and posttests in respect to 20 vocabulary items practiced in isolation and in context over a two session, four-hour treatment period. The results of mean scores were interpreted by using a t-test. The experimental group were also given a questionnaire to measure their attitudes towards using computers as a part of their courses. The results supported the hypothesis that the experimental group liked to work with computers and that they learned and retained more vocabulary than the control group.

BILKENT UNIVERSITY
INSTITUTE OF ECONOMICS AND SOCIAL SCIENCES
MA THESIS EXAMINATION RESULT FORM
AUGUST 1, 1997

The examining committee appointed by the Institute of Economics and Social
Sciences for the thesis examination of the MA TEFL student

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The committee has decided that the thesis of the student is satisfactory.


Thesis Title : The Effectiveness of Computer Assisted Language
Learning (CALL) in Vocabulary Instruction to Turkish
EFL Students

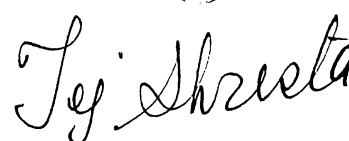
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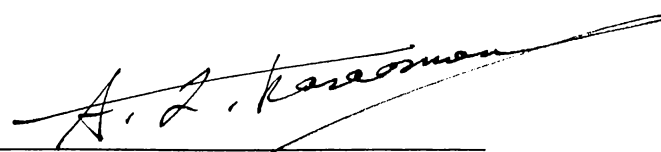
We certify that we have read this thesis and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts.


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ACKNOWLEDGMENTS

I would like to express my deepest gratitude to my thesis advisor, Dr. Theodore S. Rodgers for his invaluable guidance and support throughout this study. I am also very grateful to Dr. Bena G. Peker and Dr. Tej Shresta for their advice and suggestions on various aspects of this study. My special thanks is to Ms. Teresa Wise who offered her invaluable assistance where and when possible throughout my thesis.

I would like to thank the Chairperson of Foreign Languages Center (YADIM) of Çukurova University, Dr. Özden Ekmekçi, who gave me permission to attend the MA TEFL Program. I would also like to express my special thanks to Ms. Pat Bilikmen, the Director of the English Unit of METU College, who gave me permission to conduct this research study at METU College.

I also thank Meltem Koca, the computer instructor at METU College, who encouraged me in every step of my research study. My thanks goes to Serdar Ölmez, Longman ELT Division Representative, who supported me with his cooperation.

My thanks is extended to my special colleagues who participated in this program and who were with me throughout.

My greatest thanks is to my parents for their continuous support and understanding throughout this study. And my very special thanks is to Mustafa Aktekin, my future husband, for his moral support during the program; without him, I would not have made it.

To my parents

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CHAPTER 1 INTRODUCTION

Introduction

Vocabulary development is at the heart of all foreign language learning. As Krashen (1982) states vocabulary is basic to communication and the importance of learning vocabulary is an idea that both teachers and learners agree on (Allen, 1983). Communication can break down when learners lack the necessary words, so for most EFL learners vocabulary is one of their major problems. 'Without grammar very little can be conveyed, without vocabulary nothing can be conveyed' (Wilkins, 1972, p. 111, cited in Carter & McCarthy, 1988). Therefore, for most EFL learners, learning a language means primarily learning its vocabulary (Wallace, 1988).

To know the system of language (its grammar or structure) is an important aspect in teaching and learning a foreign language. One needs to know how to form a plural or how to signify past tense and the list goes on. It is possible to have a good knowledge of how the system of a language works and yet not be able to communicate in it; whereas "if we have the vocabulary we need it is usually possible to communicate" (Wallace, 1982, p. 9). Nourie and Davidson (1992) claim that although reading and writing are both skills that require more than knowledge of a number of word meanings, reading comprehension and the ability to write well are both related to a wide range of word knowledge.

There are many reasons for a systematic and principled approach to vocabulary learning by both teacher and learners. According to Nation (1990) one of the reasons to focus on the issue of vocabulary teaching is that both learners and researchers see vocabulary as being a very important, if not the most important, element in language learning. "Learners feel that many of their difficulties in both receptive and productive language use result from an inadequate vocabulary" (Nation, 1990). Research on readability (Chall, 1958; Klare, 1974-1975, cited in Nation, 1990) stresses the importance of vocabulary knowledge in reading, as does research on academic achievement (Saville-Troike, 1984, cited in Nation 1990).

Vocabulary learning is one of the most complex and time-consuming aspects of language learning. Learners seem to use different methods at different times and in different circumstances. In other words, different approaches work with different students under varying conditions. Traditionally, students have acquired new words through reading them in context, analyzing the structure of new words, or using the dictionary (Nourie & Davidson, 1992). More recently however; a variety of classroom techniques for second language vocabulary learning have been proposed. According to Weatherford (1990) these techniques include: role rehearsal; the use of visual aids; role-playing; vocabulary learning in a specific context; the root-word approach; and mnemonic techniques such as the keyword approach. Others include: pictorial schemata; definition, explanation, examples and anecdotes; and guessing meaning in context, (Celce-Murcia,

1991), word lists and use of semantic domains (Hatch & Brown, 1995).

Unless students are actively engaged in the learning process, drills in any of these techniques can be ineffective. According to Nourie and Davidson (1992) computers have an engagement power to draw students actively into the word learning mode.

Background of the Study

Computer Assisted Language Learning (CALL) is the term most commonly used by teachers and students to describe the use of computers as part of a language course (Maley, 1989). Although CALL gives the impression of being new in language classes, it has evolved over a period of time. Developments in CALL can be traced back to the 1960s and since that time CALL has been pursued enthusiastically.

With the growing use of computers in language instruction, the selection of what vocabulary should be learned has been placed increasingly in the hands of the learner (Hatch & Brown, 1995). "Programs such as Hypercard or Toolbook allow teachers to prepare 'hypertexts,' which are texts linked to other texts, such as dictionaries, thesauruses, or pictures within the computer" (Hatch & Brown, p. 408). Such hypertexts allow students to decide when and where they need help with vocabulary. When a student clicks on a word or touches the key indicated in the program, a pop-up dictionary gives the meaning, grammar, or cultural information. With computer access to the

dictionary, a thesaurus, or large database, the student can search for the meanings with ease.

From the researcher's point of view, the computer has a potential to positively effect language learning. Teachers can make use of computers with their classes if they are appropriately trained and appropriate materials are available. Experience has shown that working with the computer is rated highly by students, that attention spans are longer, and that the material is usually learnt better and more quickly (Kennedy, 1989). Surveys of learners' attitudes to their experience with CALL reveal positive reaction for motivation, continued enrollment, and improvement in the quality and the pace of learning (Ahmad, Corbett, Rogers & Sussex, 1985). A Florida Department of Education report (1980) and a series of studies undertaken by Kulik and colleagues (Kulik, Bangert & Williams, 1983; Kulik & Bangert-Drowns, 1983-1984) all suggest that students hold positive attitudes toward using computers (cited in Dunkel, 1991). But in earlier studies of the affect of computers on attitudes, it appears that students' attitudes toward the subject matter of the CALL tutorials were not affected so positively as a result of using computers. Therefore, the analysis showed that computers did not seem to have much impact on students' motivation to learn the subject matter even though students may report that they 'like' to use computers (Dunkel, 1991).

Hence, in this study the researcher plans to investigate the effectiveness of Computer Assisted Language Learning (CALL), in support of

vocabulary learning by Turkish EFL learners at the College of METU (Middle East Technical University). The secondary school of METU College has a modern computer lab equipped with 16 computers (Pentium 120, 8 MB terminal) functioning within a network and supervised by a teacher's desk (a server computer, Pentium 133, 16 MB terminal) running under Novell 4.11 communication system. The lab at METU College was set up in 1996 and the computers are connected to the 'Internet'. The lab has been used for courses in Music, History, Geography, and Arts. The home institution of the researcher, Çukurova University, has the same system which was set up in 1995 but for various administrative reasons has not been used since then. Thus, in this research study the researcher aims at finding data concerning the effectiveness of computers in language learning, particularly in vocabulary instruction that will be of great benefit for further studies at the home institution of the researcher.

Figure 1 illustrates the framework of this study and briefly summarizes the areas that are going to be discussed. The capacities of computers in language classes, advantages and limitations, research studies conducted on the effectiveness of CALL and multimedia in CALL will be reviewed. In addition, the goals and techniques of vocabulary learning, and word-teaching strategies will be examined. Computer Assisted Vocabulary Instruction (CAVI) will be presented in an EFL context and research studies conducted on the effectiveness of computers in vocabulary teaching and learning will be introduced.

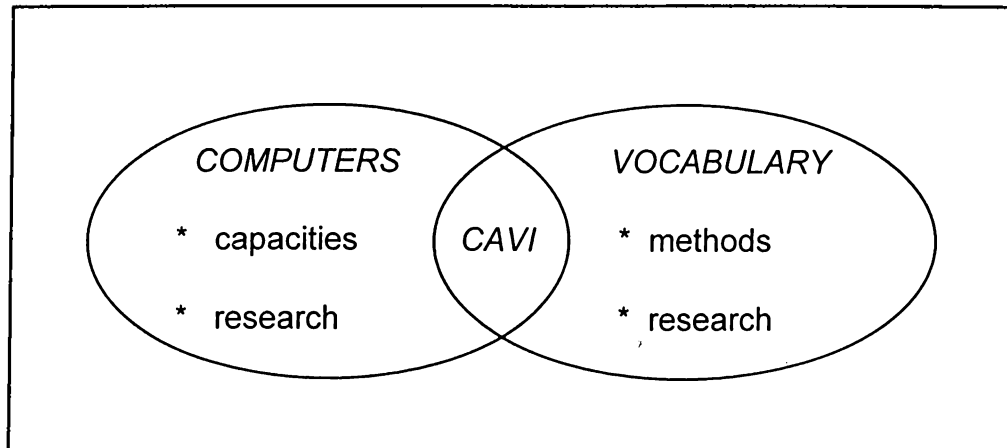


Figure 1

Computer Assisted Vocabulary Instruction (CAVI)

As Figure 1 illustrates, this research study intends to find out what kinds of capacities can *computers* provide by investigating prior research studies. What kinds of methods are used in vocabulary instruction and what have prior research studies proposed? How and where do *computers* and *vocabulary* instruction overlap? Is Computer Assisted Vocabulary Instruction (CAVI) an effective way of teaching and learning vocabulary?

Statement of the Problem

The problem recognized by teachers and students alike is that students cannot learn vocabulary items easily, nor do they keep them in mind for a long time and recall them when they need to. In order to motivate students and to help them succeed in vocabulary learning, teachers may use

various techniques in the classroom such as drawing pictures, maps, bringing graphs, charts, giving synonyms/antonyms, using symbols, miming, and acting. Despite these efforts, students still have difficulties in retrieving vocabulary when necessary.

It has been estimated that an educated native speaker of English knows around 17,000 base words (dictionary entries, excluding proper names, verb forms, derived words, etc.) and has learned them at the rate of 2 or 3 words a day (Goodfellow, 1994). Goodfellow also states that this rate represents a 4- year full-time task for a learner of English, in order to read a quality newspaper and about another 13 years to become completely fluent. Therefore, the teaching and learning of vocabulary is crucial but difficult and time consuming. Both the teacher and the student need time, patience and imagination.

In this experimental study, the place of computers in vocabulary acquisition will be examined. It is the researcher's aim to investigate if CAVI really helps students expand the vocabulary that they need for all the skills of their second language, for example, for reading, writing and speaking. The kind(s) of teaching that computers can provide in vocabulary teaching and learning will be investigated.

Purpose of the Study

Having mentioned the need for vocabulary learning in language learning, it is clear that teachers need to be concerned with the methods of word-teaching. Nagy and Herman (1987, cited in Nation, 1990) suggest:

Vocabulary instruction that does improve comprehension generally has some of the following characteristics: multiple exposures to instructed words, exposure to words in meaningful contexts, rich or varied information about each word, the establishment of ties between instructed words and students' own experience and prior knowledge, and an active role by students in the word-learning process (p. 33).

If teachers know more about the methods of word teaching and what works and what does not work well, they can help learners acquire a great deal of vocabulary by using appropriate word teaching techniques. Examples of such techniques are: contextualized vocabulary practice, guessing meanings of words from context; mnemonic techniques, visual aids, lexical sets, keywords, story making; word analysis, learning the meanings of prefixes and roots; semantic domain approach, words in the same semantic field; games; and drills.

Therefore, one of the aims of this study is to focus the attention of EFL teachers on the importance of vocabulary and the means for vocabulary development and to suggest possibilities that CALL might offer. It has been observed that as students progress they need a wide range of vocabulary and the teacher who is struggling to teach grammatical points, reading

comprehension or academic writing often neglects teaching of vocabulary. This study hopes to highlight some efficient and effective ways that vocabulary acquisition can be part of the instructional program through the use of CALL capacities.

Significance of the Study

Computer use in education is just now coming into realization in Turkey. As yet, many institutions, including the context of the study, have yet to determine the most effective use of this technology in learning and in language learning, particularly. This study should suggest some possible avenues for effective computer use in language education as well as suggest additional topics and research methodologies for local study.

This thesis seeks to investigate the effectiveness of CALL and CAVI and to present the possibilities offered by computers in the classroom. The students reactions and state of interest will be observed. Whether CAVI contributes to the vocabulary size of the students will be examined. Therefore, students, teachers of English, administrators, and curriculum designers can benefit from this research.

Research Questions

This study will address the following research questions:

- 1- In a comparative study involving software and text materials covering the vocabulary of the same subject matter, what differences in the mastery of vocabulary are noted between an experimental group using CALL materials and a control group using the text materials only?
- 2- Is there a significant relationship between the use of CALL and vocabulary development?
- 3- What responses - positive and negative - do students have in respect to using a computer to study the vocabulary of a second language?

Conclusion

After having mentioned the general focus of this research study on the effectiveness of Computer Assisted Language Learning (CALL) in vocabulary instruction to Turkish EFL students, the next chapter will provide a review of the relevant literature.

CHAPTER 2 LITERATURE REVIEW

Introduction

As noted in the previous chapter, this thesis seeks to investigate the effect of Computer Assisted Language Learning (CALL) on vocabulary teaching and learning. In this chapter, the researcher reviews the capacities of computers in language classes; as well as, the goals and techniques of vocabulary learning. This study integrates computers and vocabulary learning and teaching in second language classes. Previous works and research that investigate the interaction between Computer Assisted Language Learning (CALL) use and vocabulary learning will be presented.

The computer is a reasonably new participant in the classroom, and its role in changing classroom environments is an issue of great interest to researchers as well as teachers (Johnson, 1991). Viewed as a new resource to help, promote, enhance, and facilitate learning, the computer has fostered high expectations of more effective, more relevant, more motivating, and more innovative learning experiences (Schreck & Schreck, 1991, cited in Jamieson, 1994).

The decision to create vocabulary programs for use on the computer is usually made because vocabulary study is an extremely important aspect of language learning but is often neglected in class or left to the initiative of the student (Kidd, 1990). In one of his articles McCarthy (1990, cited in Ooi & Kim-Seoh, 1996) made the observation that, in recent years, vocabulary

teaching has come into its own again in ELT, but with a difference, practitioners now have much more to think about and draw from. According to Ooi and Kim-Seoh (1996) computer- aided research is giving us vast amounts of information about how words behave and the relationships they form in real-life communication; psycholinguistic studies are providing further insights into how the mind processes and stores vocabulary, and teachers now know more about effective teaching and learning strategies. As a result, traditional ideas about what is involved in the teaching of vocabulary appear to no longer be defensible.

What are the key issues of teaching and learning vocabulary? What are the traditional and current approaches in vocabulary teaching?

The Role of Vocabulary Acquisition in Language Teaching

“For many years vocabulary has been the poor relation of language teaching; its neglect is in part due to a specialization in linguistic research on syntax and phonology which may have fostered a climate in which vocabulary was felt to be a less important element in learning a second language” (Carter, 1987, p. 145). Since the late 1970s, there has been a revival of interest in vocabulary teaching (Carter, 1987). So, vocabulary has rapidly changed in status from ‘a neglected aspect of language learning’ to an area of growing research and publication (Channel, 1988). Since possession of a wide range of vocabulary items provides learners an opportunity to have satisfying communication and increases self-esteem (Krashen, 1982),

linguists, pedagogues, researchers and teachers have been trying to better understand vocabulary learning and improve vocabulary teaching methods.

Although some English language courses contain specific, analytical study of vocabulary, there is still a widespread feeling among teachers that vocabulary is somehow best left to be picked up naturally (Fox, 1984).

Although it is possible to acquire vocabulary incidentally, through exposure to the language, it takes a long time to achieve a good command of vocabulary in this way, especially when opportunities for input are limited, as in the case of foreign, as distinct from second, language learning (Kenning & Kenning, 1990). As noted previously, research on readability (Chall, 1958; Klare, 1974-75) stresses the importance of vocabulary knowledge in reading, as does research on academic achievement (Saville-Troike, 1984; cited in Nation, 1990). In addition, reading comprehension and the ability to write well are both related to word knowledge (Nourie & Davidson, 1992).

Vocabulary learning should be viewed as the learning of ways in which a given word can be combined with other words to express particular concepts, ideas, thoughts, and emotions and not as the mere acquisition of a new label or name for a given concept (Rivers, 1981; cited in Kang & Dennis, 1995). There are numerous types of approaches, techniques, exercises, and practice that can be used to teach vocabulary (Hatch & Brown, 1995).

According to Hatch and Brown the dilemma teachers often face is deciding which among these numerous types would be best for their students and their circumstances. There are many techniques that can be taken into

consideration. These include; contextualized vocabulary practice, mnemonic techniques, word analysis, semantic field analysis, dictionary use exercises, grouping, the use of flash cards, crosswords and word puzzles, and games.

Jenkins, Matlock, and Slocum (1989, cited in Hatch & Brown, 1995) look at two approaches to vocabulary instruction, teaching individual word meanings and teaching how to derive word meaning from context. These researchers found that the first method resulted in students' having knowledge of specific words and that the second method taught students how to use contextual clues. According to Carter (1987) a mixture of approaches should be adopted - such as learning words both in and out of context (e.g., through using mnemonics).

One of the ways of improving ones performance in learning new words is by using mnemonic links. Mnemonic means "aiding the memory" (Higbee, 1979, cited in Cohen, 1990, p. 25) and mnemonic techniques "involve physically transferring to-be-learned materials into a form that makes them easier to learn and remember" (Bellezza, 1981, cited in Cohen, 1990, p. 26). One can create associations between a target language word to be learned and something else such as; by linking the word to the sound of a word in the native language, to the sound of a word in the language being learned, or to the sound of a word in another language. To help students remember words, or help them store words in memory mnemonic techniques such as loci, paired associates and keyword techniques are suggested by Nattinger (1988). 'Loci' are the world's oldest and best-known memory

device. To memorize an item, one forms a visual image of it and places it at one of the loci in one's imagined scene. 'Paired associates' is a memory device, which links two words of similar sounds and meanings. 'Keyword technique' is an extension of paired associates; it is the association of the word to a keyword. According to Nattinger (1988) concrete words which one can easily form an image of seem to work best and bizarre images make the most effective associations.

"Semantic field analysis uses features to show the relationship of lexical items within a field or domain" (Hatch & Brown, 1995, p. 33).

According to Hatch and Brown's example, if one studied the word *iron*, one would also look at *toaster*, *vacuum cleaner*, and other items in the household tools domain. Or, one would study it along with *copper*, *zinc*, and other items in the metal domain.

Dictionary use is a valid activity for foreign learners of English, both as an aid to comprehension and production (Summers, 1988). The dictionary is good for checking those words that keep coming up and that are not readily understood from context (Cohen, 1990). It is also good for finding the meaning of unknown words that seem to be crucial to the meaning of the utterance. According to Cohen, it can also serve to provide intermediate or advance learners with a more finely tuned meaning or set of meanings for a word with which they have some familiarity. But teachers usually try to convince students that instead of looking up every word in a dictionary, they should use different techniques for discovering meaning. Guessing

vocabulary from context is the most frequent way to discover the meaning of new words. The prevailing view is that newly encountered words should only be decoded by means of contextual clues. Morphology also offers clues for determining word meaning, such as introducing lists of stems and affixes with their meanings for students to memorize (Nattinger, 1988). Nation and Coady (1988) include looking in a dictionary as the last means of checking a guess, and the guess is only made if the use of the wider context does not provide the meaning (cited in Cohen, 1990).

Another distinction made in respect to vocabulary learning is that it can be direct and indirect. According to Nation (1990), in direct vocabulary learning the learners do exercises and activities that focus their attention on vocabulary such as word-building exercises, guessing words from context, learning words in lists, and vocabulary games. "In indirect vocabulary learning the learners attention is focused on some other features, usually the message that is conveyed by a speaker or writer" (p. 2). Whether direct or indirect learning, unless students are actively engaged in the learning process, drills in any of these techniques can be ineffective; but according to Nourie and Davidson (1992) computers have the engagement power to draw students into the word learning mode. Currently, there are many computer programs which have been designed for the purpose of developing vocabulary. These programs aim at teaching and practicing vocabulary both in context and in isolation. Contextualized and de-contextualized vocabulary

teaching computer software programs will be discussed in later sections of this chapter.

The next section takes a brief look at the history of Computer Assisted Language Learning (CALL) in education and the place of Computer Assisted Vocabulary Instruction in the history of CALL.

History of CALL

The impact of technology on society and on individual lives has increased dramatically in recent decades, and the computer, geared to the achievement of efficiency, is “ already part of everyday reality and will become increasingly so with the accelerating pace of current technological developments” (Brown, 1988, p. 78, cited in Kennedy, 1989). With the expansion of the use of the computer in all walks of life, it was inevitable that computers should rapidly become part of the everyday life of the classroom (Drage & Evans, 1988). At the present time it seems to be widely accepted that the computer has the potential to be a useful tool in the learning process (Kidd, 1990). Kidd also states that what remains to be done is to create courseware that effectively exploits this potential. There are many computer programs already available on the market, aimed at vocabulary teaching, and more are being produced weekly.

The TESOL (Teachers of English to Speakers of Other Languages) CALL Interest Section Software List 1997 reports the most recently produced

software for vocabulary instruction. There are 70 software programs devoted to vocabulary instruction in this software list. The list reviews 32 programs which require an IBM compatible PC and 27 programs run only on Macintoshes. 47 programs work on DOS, whereas a small number (6) works on all versions such as Mac, Win and DOS. The list covers a selection of materials for all levels of learners, under categories such as TOEFL (6), spelling (20), concordance programs (4), games (7), encyclopedia (5), dictionary (6), puzzles (5), contextual exercises (17). Over the last years the number of language learning software programs has expanded considerably, and this tends to indicate that growth will continue in the coming years. Until recently, however the amount of material written specifically for English language learning has been limited even though studies with Computer Assisted Instruction (CAI) have been traced back to the 1950s.

Computer Assisted Instruction (CAI) is a general term that has been used to define the use of computers in giving instruction in all kinds of courses such as mathematics, physics, art and many other disciplines; whereas Computer Assisted Language Learning (CALL) is a term commonly used to describe the use of computers as a part of a language course.

As noted above, the first experiments with Computer Assisted Instruction (CAI) took place in the fifties. Further exploration, though largely restricted to universities and other large institutions, flourished throughout the sixties and the seventies (Higgins, 1988). Large scale development projects in CALL took place in the 1960s: the PLATO project, a large system

developed at the University of Illinois, and the computer-based foreign-language-teaching project at Stanford University, led the way in the evolution of CALL (Ahmad et al. 1985).

The late 1960s and early 1970s are of particular historical importance for CALL (Ahmad et al. 1985). After the PLATO project, another significant development in educational computing occurred in 1964 when the CAI Laboratory was created at Pennsylvania State University (Bitter, 1989).

It was not until the late 1970s, when the first popular microcomputers appeared, that any significant attempts were made to introduce CALL to a wider audience (Davies & Higgins, 1985). TICCIT (Time-shared, Interactive, Computer-Controlled Information Television) was developed in 1972 and this minicomputer-based system was intended originally for teaching mathematics and English courses to college freshmen (Bitter, 1989). Like PLATO which used a special authoring language called TUTOR, TICCIT also used an authoring system so that users could create their own software. TICCIT also included a color television and sophisticated graphics. TICCIT attempted to present concepts and to teach the use of rules rather than presenting drill-and practice activities, as well as giving the learner control over the lesson (Bitter, 1989). Bitter says that many groups have formed to develop theory and materials for teaching with computers. In 1972, a group calling themselves the Minnesota Educational Computing Consortium (MECC) joined forces to try to improve the use of computers in education, and MECC began to develop software with a reputation for excellence and

reasonable cost. Another group dedicated to improving the use of computers in education is WICAT (the World Institute for Computer-Assisted Teaching); formed in 1977, WICAT was created to develop high quality software for teaching basic skills such as reading and mathematics (Bitter, 1989). In 1977, the Micro-PLATO system was introduced, reflecting the trend of educators toward smaller computer systems (Bitter, 1989).

During this period, a major preoccupation of research into CAI was to test its cost effectiveness, as well as its educational effectiveness; but the research results were not overwhelmingly convincing regarding the value of the computer (Hainline, 1987). A survey carried out in the winter of 1978-79 of 1810 foreign language departments in American higher educational establishments revealed that, of the 602 who responded, only 62 made use of CALL systems (Olsen, 1980, cited in Hainline, 1987). Cost and the attitudes of many in the language teaching profession who were suspicious of computers and modern technology were major reasons for non-use.

The 1980s saw continued growth in CALL. Some EFL journals in which articles on CALL have appeared are: Computer Assisted Language Learning, SYSTEMS in Britain; CAELL (Computer Assisted English Language Learning) Journal, CALICO (Computer-Assisted Language Instruction Consortium) Journal, several newsletters in the USA; ON-CALL in Australia; MUESLI (Micro Users in ESL Institutions) News, and the newsletter of the CALL special interest group, which is distributed to interested members of

IATEFL (International Association of Teachers of English as a Foreign Language) (Higgins, 1996).

Advances in computer technology have resulted in various forms of interactive multimedia (Kanning, 1994). The introduction of multimedia is the most apparent change during the 1990s in CALL. The term multimedia means that more than one medium of communication is employed to deliver a message. Multimedia presentations may combine video, sound, graphics, still photography, animation and text (Kanning, 1994). Multimedia computers that deliver video, audio, graphics, pictures and sound using CD-ROM technology are becoming more common at home and in education (Brett, 1996). The ability of the computer to provide video and audio in combination with text is an important advance that has implications for the development of computer-based language-learning programs (Brett, 1996). Multimedia language learning programs are therefore beginning to appear in a variety of languages, for a variety of purposes and aimed at various types of learner (Brett, 1996).

Concordancing, i.e. retrieving and displaying in context all occurrences of a word, phrase, punctuation sign, or other types of text from a corpus of text, is one of the most important ideas to have emerged in language teaching in the last five years (Higgins, 1996). Teaching programs incorporating concordancing indexes are beginning to appear.

Computer Assisted Vocabulary Instruction (CAVI)

For many years, foreign language teachers have used the computer to provide supplemental exercises (Higgins, 1993). These exercises have been mainly for vocabulary instruction. Basic drill-and-practice software programs have dominated the market in Computer Assisted Language Learning (CALL). These programs focus on vocabulary or discrete grammar points. According to Higgins a vast array of drill-and-practice programs are still available; however, an increasing number of innovative and interactive programs are being developed. When computer programs on vocabulary are considered, the following statement by Hatch and Brown (1995) should be taken into consideration. "It is important for educators to know what kind of vocabulary adjustments are made by materials developers- to know how vocabulary is selected and in what context it is introduced and reinforced in language teaching materials" (p. 405).

Hatch and Brown (1995) also note that with the growing use of computers in language instruction, the selection of vocabulary to be learned has been placed increasingly in the hands of the learner. The students using these programs decide where and when they have a need for vocabulary; when a student clicks on a word, a pop-up dictionary gives the meaning, grammar, cultural information, or simple translation information related to the word. Collocational information can also be provided, as in the COBUILD language course and the BBI Combinatory Dictionary computer programs.

Ellis (1995) says that there is a more direct route to meaning than that of guessing from context. "Learners can use a well-established technology for explicit instruction in word meanings, namely electronic dictionaries and thesaurus" (p. 113). By explicit vocabulary instruction Ellis (1995) proposes that learners' acquisition of new vocabulary can be strongly facilitated by the use of a range of metacognitive strategies: (1) noticing that the word is unfamiliar, (2) making attempts to infer the word from context (or acquiring the definition from consulting others or dictionaries), (3) making attempts to consolidate this new understanding by repetition and associational learning strategies. "Contra Krashen (1989), it does not follow that vocabulary has been subconsciously acquired from the fact that we have not been taught the vast majority of the words that we know. That we have not been taught vocabulary does not entail that we have not taught ourselves" (Ellis, 1995, p. 107). If this holds then CALL has a considerable role to play, as do the electronic dictionaries. Electronic dictionaries, which provide clear information with colorful illustrations, as well as videos, are becoming increasingly available in the market.

Kidd (1990) states that the computer seems ideally suited to the task of vocabulary teaching and learning because it can present a lexical item using graphics, color and text and it can produce exercises and games that test the student's knowledge and further the embedding process. According to Kidd, since words are the basis of any language, when learning a second language a large amount of new vocabulary has to be acquired in a relatively short

period of time. This usually involves memorization and repeated use. The individualized, self-paced instruction offered by the computer may help the students to learn more lexical items, better and faster and this frees up more classroom time for spontaneous interaction and provides more opportunities for the use of newly-acquired vocabulary (Kidd, 1990). The LEXI-CAL authoring system for vocabulary acquisition was developed by a group of researchers at the University of Ontario in 1985 and completed in 1989. Many of the considerations mentioned above led the researchers to undertake the LEXI-CAL project. The project has been field-tested in three Ontario schools, and Kidd (1990) reports that it has been successful.

According to Kenning and Kenning (1990), vocabulary practice nowadays often appears in the guise of a game. The computerized forms of major games like Hangman and Word Squares are widely available. But they generally focus on spelling, and words out of context, rather than vocabulary teaching and learning. Most of the vocabulary spelling programs generally take one of these three approaches: tutorials, practice programs, and games (Wresch, 1987). For example, the program *Vocabulary Adventure* by Intellectual Software demonstrates a range from tutorial to game style. It is an adventure game set in a 50-room castle. Player must answer multiple choice vocabulary questions to enter rooms and collect treasures and points. There are quite a lot of multiple meanings and idiomatic uses that make the program challenging.

Kenning and Kenning (1990) mention that in addition to promoting the development of word games, concern over the need to support the acquisition of vocabulary has led to a revival of interest in mnemonic techniques. The Keyword method developed by Atkinson (1975) has attracted the most attention in this area. Kenning and Kenning (1990) describe the Keyword method as a form of paired-associate learning which involves building a mental image around the meaning of the word being learnt and that of a known word with a similar sound, the Keyword. *Linkword* is one system implementing this keyword principle. Another computer program mentioned by the Kennings (1990) is *Wordstore* which allows the learners to enter items as database-style records and build their own dictionaries, consisting of three fields: the word, a definition, and a context sentence.

Many CALL programs have claimed to teach vocabulary. Goodfellow (1995) states that in Jung's (1988, cited in Goodfellow, 1995) survey of the international bibliography of CALL, vocabulary is the fifth most common keyword, following more general descriptors such as English as a Foreign Language. Jung also says that vocabulary as a topic came top amongst the software packages he reviewed. According to Goodfellow (1995), the claims of these packages regarding their ability to teach vocabulary rest mainly on the fact that the computer is considered to be motivating for learners.

Advantages and Limitations of CALL in ELT Classrooms

In this section, language teachers' and learners' attitudes towards CALL will be reviewed and the advantages and the limitations that computers offer in language classes will be discussed.

Language Teachers' and Learners' Attitudes

Education has traditionally been known as a conservative institution, one that responds slowly to change (Merrill et al. 1986). Therefore, the idea of using computers for teaching purposes in subjects like modern languages arouses mixed feelings and meets with a variety of reactions (Kenning and Kenning, 1983). As an example of technological controversy, consider the following exchange:

' This new technology will ruin education.'

' No, it won't. It will make education much more efficient than it is now.'

' I see the problem as one of depersonalization! If this new technology is done well, it won't even be necessary to have teachers at all. Students will interact with technology rather than with human beings.'

' Not true! Teachers can permit students to learn basic information more efficiently from the new technology. Then the teachers will be able to use their own time to focus on individual needs. The result will be an increased quality of interaction between students and teacher.'

' But almost no students or teachers know how to use the new technology. They'll be dependent on unseen technologists and mysterious forces to control their learning.'

' Then maybe students and teachers will have to acquire a certain degree of literacy. The benefits will be worth the effort.'

This conversation between two educators took place five centuries ago.

The 'new technology' was the increasing availability of the book .

(Vockell and Schwartz, 1988, p. 11)

According to Vockell and Schwartz (1988), computer education parallels book education. Education with the book is considerably different from education without the book. Education with the computer is likely to be considerably different from education without the computer. They also state that used effectively, the computer has the potential to have an impact on education as beneficial as that of the book.

It has been said that the computer has enormous potential as an educational aid, providing new learning opportunities (Kenning & Kenning, 1983); however, some educators claim that computers have no place in second language programs, expressing concern that computer use will isolate students and deprive them of the kind of communicative interaction they need for second language learning (Johnson, 1991). Others claim that the computer has created a new 'classroom context that appears to invite task-related interaction among children' (Hawkins, Sheingold, Gearhart, & Berger, 1982, p. 372, cited in Johnson, 1991). But there are few sources of research that review the social aspects of computer use in language classes.

Advantages

In recent years, advances in computer technology have motivated teachers to reassess the computer and consider it a valuable part of daily foreign language learning (Higgins, 1993). Higgins states that innovative

software programs, authoring capabilities (authoring software is software designed to help teachers to be the authors of their own Computer Aided Instruction (CAI) lessons), compact disk (CD) technology, and elaborate computer networks are providing teachers with new methods of incorporating culture, grammar, vocabulary and real language use in the classroom while students access audio, visual, and textual information about the language and the culture of its speakers.

According to Kennedy (1989) one of the advantages of the computer for both the teacher and for the student is that it can present statements and illustrate them with examples, and can offer tremendous scope for dynamic explanations using color, graphics, and animation in a way that far outclasses talk and chalk. For example, one computer program called *Multimedia Flashcards* is aimed at vocabulary development. The learner is presented with color pictures, and can listen to the words and optionally look at how they are written. Another program called *English Vocabulary* is a set of courses designed to build knowledge of high-frequency words such as those used at home, at school and when shopping. Each CD includes graphic/sound supported vocabulary from accompanying texts. Even a dictionary can turn into an exciting and creative reference tool for students of English, such as *The Longman Interactive English Dictionary (LIED)*. It is a feature-rich package combining a grammar, a pronunciation dictionary, a dictionary of common errors and other reference works on a single CD, together with an extensive picture library and some short video clips. These programs claim to

motivate students to maintain a high level of attention and enthusiasm for learning English, but thus far there is little specific research which supports this.

Unlike conventional technologies (e.g., paper, pencil, book, language lab, video), computers can now be used to address multiple dimensions (e.g., combining text, sound, animation, realistic activities, and feedback) in implementing language learning activities (Foelsche, 1990, cited in Kang & Dennis, 1995). The computer's capability for controlling and orchestrating various forms of input such as still pictures, sound, animation, and video sequences can now be exploited for language instruction (Kang & Dennis, 1995). Lessons with computers do allow for voice recording and self comparison just as language labs have done for many years. An additional enhancement is the display of acoustic waveforms and amplitude and pitch contours of the speaker (Jamieson, 1994).

The computer gives the learner the opportunity to benefit from material carefully designed or selected by the teacher. By using a computer, learning sessions can be made more concentrated than normal classes, therefore the computer seems to be a powerful force for productive study (Kennedy, 1989).

To teachers the computer offers the opportunity to make better use of their time and expertise (Kenning & Kenning, 1983). If computers can help teach grammatical points, sentence construction and transformations, and assist in the learning of vocabulary needed for even the simplest

conversation, the teacher can concentrate on the communicative use of language (Maddison, 1987).

This section presented some of the advantages and positive potentialities of CALL. The next section looks at some limitations of CALL.

Limitations

Today, with the expansion of the use of computers in all walks of life, computers have rapidly become part of the everyday life of the classroom (Drage & Evans, 1988). But, there are potential problems presented by the computer such as the cost of acquiring and maintaining computers, selecting software, integrating software into the curriculum and training teachers to use computers. When educators are first introduced to computer-assisted language learning, they invariably ask how a machine, even one with the extraordinary capabilities of a computer, can assist a student in learning so complete and human a skill as language (Denver & Pennington, 1989).

According to Kenning and Kenning (1983) the drawbacks of the computer are: One cannot usually roll back or move on through a computerized lesson as easily as one turns the pages of a book; it is more tiring to read from a screen than from a printed text; and, for teachers who develop their own material, the time spent on programming and typing in the lessons can be quite lengthy.

To some degree the computer can replicate human activity, but only if that activity can be comprehensively and unambiguously described (Kennedy,

1989). Davies (1985) points out that the computer may be an excellent aid to presenting one aspect of a subject but inferior to more traditional methods in presenting other aspects. It has been suggested that the concern expressed by teachers opposed to CALL is based on their prior experience with 'revolutionary' instructional media such as language labs (Kennedy, 1989). Many expect that the computer will be just another in a series of highly touted technological tools that have neither revolutionized learning nor lived up to initial promises (Dunkel, 1991). A particular reason why language teaching has tended to be bypassed by the microcomputer revolution is that computer specialists and computer hobbyists have never found it easy to demonstrate value for the computer in language learning (Higgins & Johns, 1984).

Is the computer just another fad- a practice or interest followed for a time with exaggerated zeal? If we wait a while, will the enthusiasm pass? Will computers go away? According to Vockell and Schwartz (1988) the computer is not just another fad in education. They claim that the computer differs from educational fads in one important respect: it is rapidly becoming a major part of our everyday life.

Research on CALL and on the Effectiveness of CALL

The aim of comparative method studies is to establish which of two or more methods or general approaches to language teaching is most effective in terms of the actual learning that is achieved after a period of time (Ellis,

1994). The early studies comparing methods took place in 1960s. Scherer and Wertheimer (1964, cited in Ellis, 1994) compared the grammar-translation method and the audiolingual approach by following the progress of different groups of college-level students in 1964. A large-scale study known as the Pennsylvania Project (Smith, 1970, cited in Ellis, 1994) compared the effects of three methods on French and German classes at the high-school level. But these comparative method studies have been criticized and have been abandoned as a research inquiry. Research that has reported the effective uses of the computer in education, and more specifically in reading and vocabulary, has generally compared computer instruction with traditional instruction. It is also the intent of this research study to investigate the effectiveness of CALL in vocabulary instruction as compared with traditional (textbook) instruction.

When computers were introduced into education in the early 1960s, researchers naturally wanted to evaluate this new, expensive, but potentially useful medium and many studies were carried out to attempt to discover whether computer-using students learned better and faster than students taught by traditional methods (Chapelle & Jamieson, 1989). Research on the effectiveness of computer- assisted instruction (CAI) and computer-assisted language learning (CALL) increased markedly during the 1980s (Dunkel, 1991). According to Dunkel, the issue of effectiveness is an important one, for unless student performance and skills improve, some might perceive that

the millions of dollars invested in microcomputer hardware and software for CAI/ CALL have been wasted.

As Chapelle and Jamieson (1989) point out, these studies have yielded primarily positive, and some neutral, results over the past twenty-five years. Studies in which CALL-using students did better than a control group receiving conventional instruction include two studies of students learning basic language skills (Buckley & Rauch, 1979; Sarracho, 1982, cited in Chapelle & Jamieson, 1989). Another study, in which CALL was used to teach grammar in a journalism class, found that the CALL-using group made greater gains in their post-test scores over their pre-test scores (Oates, 1981, cited in Chapelle & Jamieson, 1989). Also, one group of ESL students improved their punctuation use with a CALL program (Freed, 1971, cited in Chapelle & Jamieson, 1989), and another group made progress in writing using a text analysis program (Reid, 1986, cited in Chapelle & Jamieson, 1989).

Experience has shown that working with the computer is rated highly by the students, that attention spans are longer, and that the material is usually learnt better and more quickly (Kennedy, 1989). Surveys of learners' attitudes to their experience with CALL reveal positive reactions for motivation, continued enrollment, and the quality and pace of learning (Ahmad et al. 1985).

In contrast to these positive results, Chapelle and Jamieson (1989) report that CALL drill-and-practice lessons did not effect any greater

achievement than ordinary instruction in a written French course (Brebner, Johnson, & Mydlarski, 1984, cited in Chapelle & Jamieson, 1989). An experimental group of students in grades 3 and 7 using a reading program ten minutes daily made no greater reading gains than the students in the non-CALL sections (Lysiak, Wallace, & Evans, 1976, cited in Chapelle & Jamieson, 1989).

Research on CAVI

In one of the studies conducted by Wheatly, Muller and Miller (1993), vocabulary lessons were presented on the computer in a context clue type manner as definition, contrast, linked synonyms, examples, inference, and general context. It was hoped that the students would find the learning task more enjoyable and effective. The program was designed to help at-risk college freshmen develop vocabulary and contextual analysis skills at East Carolina University, and posttesting showed significant vocabulary growth. Other studies indicate that computer-assisted instruction contributes to student achievement, student involvement and increased motivation (Tolman & Allred, 1984; Wepner, Feely, & Minery, 1990, cited in Wheatly, et al. 1993).

Since the 1980s, research on the effectiveness of computer -assisted instruction (CAI) and computer-assisted language learning (CALL) have increased considerably. But there are still few research studies focused on the effectiveness of computer-assisted vocabulary instruction. Most of the

research studies on vocabulary development have focused on students who were low performers, who were culturally disadvantaged, or who were mildly handicapped. This is quite different from the researcher's context.

Conclusion

As many writers on computers in education have observed, the computer is one more teaching tool (like blackboards, books and tape recorders) that teachers can use according to their varied instructional purposes. Teachers are discovering that they have considerable power to use the machines' unique capabilities for their own purposes. The purpose of the researcher is to conduct a comparative method study to examine the effectiveness of CALL versus traditional textbook instruction, focusing on the vocabulary teaching and learning aspect of foreign language learning.

CHAPTER 3 METHODOLOGY

Introduction

A large, rich, working vocabulary is an extremely important facet of today's foreign language education. As mentioned in the first chapter, vocabulary is basic to communication and as Krashen (1987) notes, 'When students travel, they do not carry grammar books, they carry dictionaries' (cited in Lewis, 1993, p. 27).

This was an experimental research study examining the effectiveness of Computer Assisted Language Learning (CALL) on vocabulary teaching and learning. The research focused on integrating computers into the second language vocabulary teaching and learning processes. This study examined whether computers have a positive effect in EFL vocabulary instruction or not. The support computers could provide was investigated, and CALL was presented as an alternative way of teaching vocabulary to EFL students. In other words, this research study on the effectiveness of CALL was an investigation of an additional means of vocabulary teaching and learning, based on the principle that computers could be used to address multiple dimensions such as combining text, sound, animation, realistic activities, and feedback.

It was reasoned that all learners do not learn in the same way; some are visual learners and some are auditory learners. As a multimedia

technology, CALL has the capacity to appeal to both senses simultaneously, thus serving a broad range of learners as well as providing multi-sensory input for each individual learner.

The long-term goal of this research is to investigate ways to effectively employ the CALL lab recently installed at YADİM, Çukurova University. The equipment for the lab was donated by the Foundation of Sabancı (VAKSA), but at the moment that lab lacks software, staffing and students so it was not possible to conduct the research inquiry in the target setting. Thus, the experimental study was conducted at METU Charity College with students of secondary education (ages 13-14 years). The reason the study was conducted at METU College with 13-14 year olds was that the secondary school of the College had a modern computer lab equipped with 16 computers, it was close-by and was willing to participate. CALL software was the 'Longman Interactive English Dictionary' (LIED) CD and the 7th unit of the textbook 'Project English 3' by Hutchinson from Oxford University Press. Twenty vocabulary items were chosen from this unit. This was a comparative method study where the researcher examined which of two methods of vocabulary instruction to EFL students was more effective; instruction by LIED in the computer lab, or instruction through the textbook alone used in the classroom in a traditional way.

This study addressed the following research questions:

- 1- In a comparative study involving software and text materials covering the vocabulary of the same subject matter, what differences in the

mastery of vocabulary are noted between an experimental group using CALL materials and a control group using the text materials only?

2- Is there a significant relationship between the use of CALL and vocabulary development?

3- What responses - positive and negative - do students have in respect to using a computer to study the vocabulary of a second language?

Subjects

Fifty-two students, twenty-six in each group, of secondary education (13-14 years old) at METU Charity College were the subjects of the research study. The students were taking a four-hour English course once a week and they were of intermediate level. They have been learning English for four years, starting at the primary school of the same College. They have been using computers as a part of their various courses such as history, geography and mathematics since that time. The subjects were randomly chosen among the classes of the 7th grade. The females and the males were almost equally distributed (14 males and 12 females in the experimental group, 13 males and 13 females in the control group).

Instruments

The focus of this study was on a textbook versus software comparison of vocabulary learning. In other words, in order to carry out this research

study, an experimental comparison of textbook instruction in the classroom with a group of students and software instruction in the computer lab with another group of students with special attention to vocabulary learning was conducted.

The commercial software material which was used by the experimental group in the computer lab was the 'Longman Interactive English Dictionary' (LIED) CD. LIED was produced by Longman Group UK Limited in 1993. It contains 80,000 vocabulary definitions as well as 52,000 spoken pronunciations. There are video mini-dramas, fully labeled color pictures, and assistance with common student errors. LIED was used by the experimental group in the computer lab with the instruction of the researcher (For more information see Appendix A) .

The control group worked in the classroom with the text book called 'Project English 3'. 'Project English 3' is an English course book for young teenagers of intermediate level. It was published in 1987 by Oxford University Press and it was written by Tom Hutchinson. The students' book contains eight units with a number of sections such as an input text, exercises, a project task, a grammar review, and a vocabulary list. The teacher of the class instructed the control group.

Both groups of students were given a pretest in order to estimate their range of vocabulary on the subject matter which would be taught in the class to the control group and in the lab to the experimental group. The experimental group was taught vocabulary chosen from the 7th unit of their

textbook called 'Project English 3' with the software material which was the 'Longman Interactive English Dictionary' CD and the control group was taught the same vocabulary with the textbook alone. After instruction a posttest (which was the same as the pretest) was given to measure the growth of vocabulary in both groups (see Appendix B).

The pre and posttest contained 20 vocabulary items, each scored as 1 point, in a test which contained four parts. In the first part, students were given a very short reading passage with 6 words underlined. Beneath the passage there were two columns; on the right there were the underlined words, and on the left there were the meanings of the words in jumbled order. In the second part of the test the students were asked to read 4 sentences and write down the meanings of the underlined word in each sentence in English. In the third part, the students were asked to write down the Turkish equivalents of 5 words, and in the last part, the subjects were provided with 5 pictures and 5 words and were asked to match the words to the pictures. Figure 2 briefly overviews the design of the pretest and posttest.

PARTS	SCORES	SAMPLE QUESTIONS
I	6 points	<u>b</u> bleeding a- a cut <u>a</u> wound b- blood flowing from a cut
II	4 points	1- If someone has hurt a <u>limb</u> , they might not be able to move it. <u>leg, arm or wing</u>
III	5 points	First aid: İlk Yardim
IV	5 points	1- plane 2- finger 3- face <u>3</u> ☺ <u>1</u> → <u>2</u> ∅
Total:	20 points	20 words

Figure 2

The structure of pretest and posttest design

Procedure

This study was conducted with the permission of the Coordinator of the English Courses at METU Charity College, as well as the Principal of the school. Timing and requirements were supplied to the Coordinator by the researcher, but unfortunately only four hours of instructional time could be arranged for the experimental group.

The experimental procedure had four stages for each of the two groups: (1) information about the experiment, (2) pretest, (3) treatment, (4) posttest. The last stage (5) which was the questionnaire administration was only for the experimental group.

1-Information on Experiment

Before giving the pretest, all students were informed that an experiment would be conducted and they would be given a test before and after the treatment. They were not told that the pretest and the posttest would be the same. They were also informed that the tests would affect their final grades. This was the suggestion of their teachers in order to increase their motivation.

2-Pretest

A pretest of 20 L2 vocabulary items was given to both the control and the experimental groups at the first sessions before the treatment. The experimental group was given the pretest by the researcher in the computer lab and the control group was given the same pretest by their teacher in the classroom. As mentioned in the instruments section, the pretests included four parts, testing the meanings of 20 vocabulary items both in context and in isolation. The time limit was 10 minutes for the pretest and the total possible score that the students could get was 20.

3-Treatment

The treatment sessions focused on 20 vocabulary items for the experimental group. These 20 words, chosen from the text book under the subheading of *First Aid*, were studied in the lab using the software material for two hours once a week for two weeks (four total hours) by the experimental group. Thus, the experimental group was instructed with the 'Longman

Interactive English Dictionary' (LIED) CD, in the computer lab for four hours over a two week period under the instruction of the researcher. Since there were 16 computers available in the lab, the experimental group was split into two groups, each group comprising 13 students. In the first week, both halves of the experimental group were taken to the lab on two different days and each half used the LIED CD for two hours. In the second week, the same procedure was applied to both halves of the experimental group. Therefore, at the end of the two weeks, the experimental group was exposed to four hours of total instruction.

The experimental group was given a text from the text book 'Project English 3'; 20 words were underlined, but the meanings of the words were not introduced. The students independently searched the meanings of the words, listened to their pronunciations, looked at the pictures of the words if available, were reminded of the common errors regarding the usage of these words, and watched the video-movies related to the topics from the software material, the Longman Interactive English Dictionary (LIED) CD.

The control group was instructed in the classroom by their teacher using the text book "Project English 3" alone. The control group studied the 7th unit of the textbook over a two week time period, for eight hours. The subjects were obliged to take English for four hours a week, but the experimental group did not have the chance to be exposed to eight hours of instruction in the computer lab due to administrative regulations. During those two weeks, the control group studied the texts in the unit, one of which

was *First Aid*. The meanings of the vocabulary in the text (20 words) were introduced to the control group by their teacher using both Turkish and English explanations. The subjects were aware of the fact that they would be tested on the vocabulary items of the text *First Aid*.

4-Posttest

At the end of two weeks, both groups were given the posttest (which was the same as the pretest) in order to measure the growth of vocabulary. The posttest was given to both groups at the same time after the treatment finished. Both groups took the posttest in the classroom under the instruction of their English teachers. The subjects were again given ten minutes to answer the questions.

5- Questionnaire

The experimental group also received a questionnaire at the end of the treatment in which they were asked to respond to eleven questions (see Appendix C). The responses to four open-ended statements were analyzed in a descriptive way, whereas the other seven Likert-type rating statements were analyzed as response percentages. The questionnaire was designed to find the students' attitudes towards using CALL software materials in their various courses as well as in their English classes.

Data Analysis

The pretest and the posttest were analyzed separately. Each test was scored using a 20 point scale. A t-test was used to compare the scores of the experimental and control groups. The results of pretest and posttest were put into tables and analyzed in the next chapter.

In order to analyze data for the Likert-type rating statements in the questionnaire, percentages, frequencies and means of each item on each questionnaire were calculated. Responses to the open-ended items on the questionnaires were categorized and similar responses identified. The attitudinal data which was derived from the questionnaire was also placed in tables.

Conclusion

The focus of this chapter was on the methodology of this research study and the subjects, instruments and the procedure were introduced. The next chapter will provide the data analysis.

CHAPTER 4 DATA ANALYSIS

Overview of the Study

The primary purpose of this study was to investigate the effectiveness of Computer Assisted Language Learning (CALL) in vocabulary instruction to Turkish EFL students. In order to find out whether there is a significant effect of computers in vocabulary instruction, the researcher compared the performances of two groups. The scores were from a group of students instructed in the computer lab with a commercial CD (Experimental Group) versus a group of students instructed in the classroom on the same material using only a textbook (Control Group). The subjects were Middle East Technical University (METU) College secondary school students at the intermediate level. Both the experimental and the control group consisted of 26 students. The groups were randomly chosen.

A pretest and posttest design was set up in order to gather the comparative data. Both groups of students, experimental and control, were given the pretest at the beginning of the treatment in order to estimate their vocabulary range on the topic which was presented in the treatment. After two weeks, the same test was given to subjects as a posttest in order to estimate the changed performance of both groups. The means and the standard deviations of the pretests and posttests were computed. To compare the means from two sets of scores, a t-test was employed.

Overview of the Analytical Procedures

The statistical analysis for this study was carried out in four stages. The first stage consisted of scoring the pretest and the posttest. For each correct answer, one point was given for a range of 0-20 for each test. In the first part of the test, students were asked to read a short passage and then match words in a column with meanings in the second column (6 words, 1 point each). In the second part, they were asked to read four sentences and write down the meaning of the underlined word in each sentence in English (4 sentences, each contained 1 word underlined, 1 point each). In the third part, there were 5 words and students were asked to write down their meanings in Turkish (each 1 point), and in the last section, students looked at 5 pictures and matched 5 words with the right picture (1 point each) (see Figure 2 in chapter 3).

In the second stage of data analysis, means and standard deviations were computed for each group for each test. In the third stage, after means and standard deviations of pretest and posttest of experimental and control groups were determined, a t-test was used to compare the means.

In the fourth stage, the questionnaire results were analyzed. Means and frequencies were determined for seven questionnaire items. For the remaining four questions, responses were analyzed in a descriptive way.

Results of the Study

The results of the pretest and posttest for each group were analyzed separately. The pretest and posttest results of both groups were compared by t-test analysis.

Pretest Results of the Experimental and Control Group

Table 1 presents the mean scores and standard deviations for the pretest for the experimental and control group.

Table 1

Means and Standard Deviations for the Pretest for the Experimental and Control Group

Group	Pretest	
	<u>M*</u>	<u>SD</u>
Experimental	9.307	3.069
Control	9.653	4.260

Note: *Highest possible score is 20

Pretest mean scores (Experimental: $M = 9.307$; $SD = 3.069$, Control: $M = 9.653$; $SD = 4.260$) showed some differences. The control group scored slightly higher at the start of the study even though the classes were randomly chosen.

Posttest Results of the Experimental and Control Group

Table 2 presents the mean scores and standard deviations for the posttest for the experimental and control group.

Table 2

Means and Standard Deviations for the Posttest for the Experimental and Control Group

Group	Posttest	
	<u>M*</u>	<u>SD</u>
Experimental G.	15.769	3.037
Control G.	13.423	3.678

Note: *Highest possible score is 20

Comparisons of posttest mean scores (Experimental : M = 15.769; SD = 3.037, Control: M = 13.423; SD = 3.678) indicate that the treatment made a difference in vocabulary growth between the experimental and control group. To test the differences between the scores of the two groups a two-tailed t-test was administered.

T-test Results for Pretest and Posttest of the Experimental and Control Group

Table 3 presents the T-test comparison between means for pretest and posttest scores of both groups.

Table 3

T-test Results for Pretest and Posttest of the Experimental and Control Group

Group	Pretest		Posttest	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Experimental G. (n:26)	9.307	3.069	15.769	3.037
Control G. (n:26)	9.653	4.260	13.423	3.678
Between Groups	<u>df</u>	<u>t</u>	<u>df</u>	<u>t</u>
	50	0.327* *p<.10	50	2.511** **p<.02

According to the results of a two-tailed t-test, there was no significant difference between the two groups' vocabulary scores in the pretest. In other words, the application of t-test analysis revealed no significant difference between the experimental group and the control group in the pretest ($p < .10$). Both groups were said to be equivalent at the beginning of the treatment. Treatment did cause a difference in vocabulary scores in a positive way for both groups. Both the experimental and control group improved between the pretest and posttest. But the experimental group showed a higher mean

score in the posttest than the control group. According to the results of a two-tailed t-test, there is a significant difference between the two groups' vocabulary scores ($p < .02$). The difference between the two groups is attributed to the use of the computer by the experimental group.

Questionnaire Analysis

A questionnaire was given to the experimental group to measure the students' attitudes towards using the computer in their courses, especially in English. Responses for the first two questions (Questions A & B) showed that students were using computers in their various courses such as; Science, Geography, History, Art and English. Therefore, this study was not their first experience with computers.

Table 4 presents the results of the Likert -type rating statements in the questionnaire, in terms of means and percentages.

Table 4

Means and Percentages of Likert Scale

#	Likert-type Rating Statements	<u>M</u>	<u>f*</u>	<u>%</u>
1-	found it fun	4.576	19 5 1 1	73.07% AS* 19.23% A* 3.84% NO* 3.84% DS*
2-	helped me to learn more	3.961	9 10 4 3	34.61% AS 38.46% A 15.38% NO 11.53% D*
3-	cannot replace classroom teacher	3	9 1 4 5 7	34.61% AS 3.84% A 15.38% NO 19.23% D 26.92% DS
4-	enabled me to get extra practice	3.961	11 9 3 3	42.30% AS 34.61% A 11.53% NO 11.53% DS
5-	let me work at my own speed	4.076	12 6 7 1	46.15% AS 23.07% A 26.92% NO 3.84% DS
6-	liked immediate feedback	3.961	11 5 9 1	42.30% AS 19.23% A 34.61% NO 3.84% DS
7-	was bored by software	1.846	1 5 6 14	3.84% AS 19.23% NO 23.07% D 53.84% DS

Note: AS* Agree Strongly (5) A* Agree (4) NO* No Opinion (3) D* Disagree (2) DS* Disagree Strongly (1)

n*: Total number is 26

In Table 4 the responses to seven Likert-type rating statements are presented and the means and the percentages for each item are shown. The first statement of the scale had a mean of 4.576 out of 5, and 92.03% of the subjects found it fun working with a computer (19 agree strongly, 5 agree), 3.84% of the subjects had no opinion (1) and 3.84% of the subjects did not find it fun working with a computer (1 disagree strongly).

The second statement had a mean of 3.961 out of 5, and 73.07% of the students believed that the computer helped them learn/remember more (9 agree strongly, 10 agree), whereas 15.38% of the subjects had no opinion (4) and 11.53% did not believe the computer had helped them (3 disagree).

Three out of 5 was the mean for the third statement, and 38.45% of the subjects agreed that a computer was useful for extra practice, but it could not replace a classroom teacher (9 agree strongly, 1 agree), whereas 46.15% of the subjects believed that a computer could replace a classroom teacher (5 disagree, 7 disagree strongly). 15.38% of the subjects had no opinion as to the third question (4).

The mean of the fourth statement was 3.961 out of 5, 76.91% of the subjects liked the computer because they believed that a computer enabled them to get the extra practice they needed (11 agree strongly, 9 agree). 11.53% of the subjects had no opinion (3) and again 11.53% of the subjects disagreed with the fourth statement (3 disagree strongly).

For the fifth statement, the mean was 4.076 out of 5, and 69.22% of the subjects said that they liked the computer because it let them work at their

own speed without being held back by weaker students (12 agree strongly, 6 agree). 26.92% of the subjects said that they had no opinion (7) and only 3.84% of the subjects disagreed with the fifth statement (1 disagree strongly).

The sixth statement in the Likert Scale had a mean of 3.961 out of 5, and 61.53% of the subjects agreed (11 agree strongly, 5 agree), 34.61% of the subjects had no opinion (9) and 3.84% of the subjects disagreed with the fact that they liked the immediate feedback that was available with the computer (1 disagree strongly).

For the last statement, statement seven, the mean was 1.846 out of 5, 3.84% of the subjects said that they were bored by the time they spent in the lab using LIED software program (1 agree strongly). 19.23% had no opinion (4), and 76.91% disagreed with the statement that they were bored by the time they spent at the lab using LIED program (14 disagree strongly, 6 disagree).

The responses to the questions "What did you like most about using the computer in your English class?" and "What did you like least about using the computer in your English class?" were analyzed in Table 5.

Table 5

The responses of two open-ended questions in the questionnaire

Questions	QD*						QE*	
Categories of responses	Internet	Games	Video Library	Fun	Pictures	Sound	Exercises	Test
Number of subjects responded	11	7	12	17	9	15	13	10

QD* (Question D): What did you like most about using the computer in your English class?

QE* (Question E): What did you like least about using the computer in your English class?

As Table 5 presents, the responses of the subjects to questions D & E fall into 8 categories. The subjects stated that they liked to surf through the Internet (11 subjects out of 26), and they like to play games (7 out of 26 subjects). The "Video Library" section of LIED was the part most preferred by the subjects with 12 subjects who selected this choice. For 17 subjects, using the computer in their English class meant having "fun". Nine subjects stated that they liked to see the picture of the word in the dictionary, and 15 subjects indicated that they liked to hear the words pronounced by a native speaker.

Exercises and tests were the elements that subjects liked least about using the computer in their English class. Most subjects did not comment on the last question, question E, which might mean that they had no idea or they had nothing to state against using the computer in their English class. The general impression of the students towards using computers in their English

class was positive. However, one female student stated that she hates computers wherever and whenever used.

Conclusion

In order to investigate the effectiveness of Computer Assisted Vocabulary Instruction (CAVI), an experimental research study was conducted at the secondary school of METU College. In this comparative study involving software and text materials covering the vocabulary of the same subject matter, the researcher found that the experimental group using CALL materials did better in the posttest (subjects got higher scores) as opposed to the control group using the text materials only. Thus, it appears there is a significant relationship between the use of CALL and vocabulary development. The results of the questionnaire indicated that students have positive responses in respect to using a computer to study vocabulary of a second language.

CHAPTER 5 DISCUSSION OF FINDINGS AND CONCLUSION

Summary of the Study

This study set out to investigate whether Computer Assisted Language Learning (CALL) had any effect in vocabulary instruction for Turkish EFL students. The focus of the study was on the effectiveness of Computer Assisted Vocabulary Instruction (CAVI). This was a comparative study involving software and text materials. The study was conducted with experimental and control groups of intermediate level students at METU (Middle East Technical University) College in Ankara.

In this study, 52 secondary education students (ages between 13-14 years) from METU Charity College were the subjects. The students were of intermediate level, and they were taking a four-hour English course once a week. Both groups of students, the control and the experimental group, were randomly chosen, and each group comprised 26 students. In the experimental group, there were 12 females and 14 males, whereas in the control group there were 13 females and 13 males. The site was chosen because it had a modern computer lab equipped with 16 computers functioning within a network (the same as the researcher's home institution), it was nearby and willing to participate.

A commercial software package the "Longman Interactive English Dictionary" (LIED) CD was used by the experimental group in the computer

lab. "Project English 3" by the Oxford University Press was the textbook that was used by the control group in the classroom.

The research questions were:

1- In a comparative study involving software and text materials covering the same subject matter, what differences in the mastery of vocabulary are noted between an experimental group using CALL materials and a control group using the text materials only?

2- Is there a significant relationship between the use of CALL and vocabulary development ?

3- What responses - positive and negative - do students have in respect to using the computer to study the vocabulary of a second language?

At the beginning of the study, a pretest of 20 vocabulary words was administered to each group. After the pretest, each group received different types of instruction. The experimental group worked in the computer lab under the instruction of the researcher, and the control group worked in the classroom under the instruction of their English teacher. The experimental group had a four-hour treatment with LIED (due to time constraints), whereas the control group had an eight-hour treatment. The same test with the same target vocabulary was given as a posttest after two weeks. Both groups were administered the posttest at the same time. As a final step, the experimental group was given a questionnaire in order to measure their attitudes towards CALL.

Discussion of the Results and Conclusion

In this experimental study, two groups of students were used, experimental and control. Therefore, two sets of scores were obtained from two different groups. Means and the standard deviations for pretest and posttest scores were computed for each group (see Table 1 and 2). Then a t-test was used to compare the means from the two sets of scores (see Table 3). Tables 4 and 5 provide the data obtained from the questionnaire. The results will be presented in terms of research questions.

The first research question was that what differences in the mastery of vocabulary noted between an experimental group using CALL materials and a control group using the text materials were noted. According to the pretest mean scores (Experimental Group: $M = 9.307$, $SD = 3.069$; Control Group: $M = 9.653$, $SD = 4.260$), the control group had a higher mean score in the pretest than the experimental group but the difference was not very large. After the application of a two-tailed t-test for pretest scores of both groups, the results revealed that there was no significant difference between the experimental and the control group at the beginning of the treatment (Pretest $t = 0.327$, $df = 50$). Consequently, both groups were said to be equivalent before the treatment.

After the treatment, the posttest mean scores showed that the experimental group did better in the posttest than the control group (Experimental Group: $M = 15.769$, $SD = 3.037$; Control Group: $M = 13.423$,

SD = 3.678). According to the result of a two-tailed t-test, there was a significant difference between the two groups' vocabulary scores in the posttest (Posttest $t = 2.511$, $df = 50$). The t-test results indicated that there is a significant relationship between the use of CALL and vocabulary development (second research question). Therefore, it was noted that in this comparative study involving software and text materials covering vocabulary of the same subject matter, the experimental group using CALL materials made a more significant improvement in vocabulary than the control group using the text materials only.

At the end of the treatment, the experimental group received a short questionnaire. After the analysis of the questionnaire it was noted that students had positive responses in respect to using a computer to study the vocabulary of a second language (see Table 4 and 5). As an example, in the Likert-type rating statements (5 = Agree strongly, 4 = Agree, 3 = No Opinion, 2 = Disagree, 1 = Disagree strongly) students stated that they found it fun working with a computer ($M = 4.576$ out of 5), they liked the computer because it let them work at their own speed without being held back by weaker students ($M = 4.076$). According to the students, the computer helped them to learn/remember more ($M = 3.961$), it enabled them to get the extra practice they needed ($M = 3.961$), and they particularly liked the immediate feedback that was available with the computer ($M = 3.961$). Consequently, the hypothesis that the researcher had at the beginning of the study was confirmed that Computer Assisted Language Learning has a

potential to positively effect foreign language learning, particularly in terms of vocabulary instruction. The t-test scores and the questionnaire analysis supported this fact (third research question).

Limitations of the Study

In this study, 52 secondary school students (13-14 years old ages) of intermediate level from METU Charity College were used. The intention of the study was to provide information for the researcher's home institution (YADIM) where the students are 17-18 years old. This was the only limitation when the research situation was considered. Otherwise, the computer lab was set up and equipped similarly in both institutions and the materials which were used in this research study would be appropriate to the students' level and interest at YADIM.

The study period was totally four hours for two weeks, two hours a week. This period was too short to be definitive in predicting the effect of CALL in vocabulary instruction. The time span should have been longer for more reliable results. Unfortunately, timing was limited and the requirements which were supplied by the Coordinator were not fulfilled by the teachers of the experimental and the control groups. The researcher intended to give a retention test after the posttest to both groups in order to find out whether vocabulary items were retained and retrieved more effectively by the experimental CALL group or the control group. But the arrangements could

not be fulfilled by the teachers of both groups due to the strict program they are required to follow.

The teacher of the experimental group was the researcher herself. It is possible that unconscious researcher bias may have influenced the results. It is also necessary to know whether regular classroom teachers can use the CALL material with equal success as reported here.

Finally, there is no evidence if students could use the vocabulary they had studied in more communicative conditions.

Implications for Further Research

Vocabulary development is only useful to the extent that the vocabulary can be used and understood in communicative situations. A subsequent research study might look at the extent to which vocabulary learning in alternative treatments was actively and passively available for learner use.

Commercial software materials are increasingly becoming available in the market and every day new and more improved software programs are coming into use. For further studies, different software packages can be used for vocabulary instruction as well as for different skills of foreign language learning such as reading, writing, speaking and listening.

Learners with all levels of language proficiency can be the subjects of further studies, however modern computer labs are not widespread through

Turkey because it is expensive to implement a lab with an adequate number of computers.

The sample size of the subjects should be larger in further studies so that results can be more generalizable. Length of instruction should also be longer in order to find out how CALL might work in long-term situations.

Pedagogical Implications

This study aimed at showing both teachers and administrators the effectiveness of Computer Assisted Language Learning (CALL) in vocabulary instruction to Turkish EFL students. The results show that there is a significant relationship between the use of CALL and vocabulary development, and students enjoyed using CALL materials in their foreign language class.

The researcher believes that Computer Assisted Language Learning has a potential to positively effect foreign language learning. This study indicates that, even when conducted on a small scale, particularly in vocabulary instruction, computer instruction has an important place that should not be underestimated. As mentioned in chapter 2, according to Kennedy (1989) working with the computer is rated highly by students, attention spans are longer, and the material is usually learnt better and more quickly. The researcher feels that the computer can be one more teaching tool that teachers can use according to their varied instructional purposes,

and that students can learn better from such instruction. However, computers are expensive tools and once they are implemented they should be used effectively and efficiently to avoid wasting scarce resources. More research should be conducted to enlighten administrators of schools and universities concerning how both teachers and students can benefit from this new and constantly changing technology. Moreover, the private sector, as well as the government should invest and help institutions to implement computer labs and provide them with software materials. Teachers should be trained on how to use computers efficiently in their language classes as well as other subject areas.

Conclusion

Vocabulary teaching is an area which has been somewhat neglected in the foreign language teaching field (Kidd, 1990). Most research has been conducted on writing and reading, whereas the vocabulary teaching and learning process has been inadequately investigated. Most teachers have thought that vocabulary learning should be left to learners' initiative; however, this is not always sufficient since many of the students who graduate from an English medium school or a university cannot communicate because of their lack of vocabulary. Vocabulary is the essence of language learning, so new teaching methods should be encouraged and used to improve learners' range of vocabulary. Computer Assisted Vocabulary Instruction (CAVI) is one of the ways that can be applied to Turkish EFL learners where there is a computer

lab available. Technological advances, one of which is the computer, continue to offer many capabilities that both teachers and students can benefit from. As Schreck & Schreck (1991, cited in Jamieson, 1994) noted the computer has fostered high expectations of more effective, more relevant, more motivating and more innovative new learning experiences. This research study should be a part of a continuum of research studies conducted on CALL and it can help to enlighten the way for further studies on CAVI.

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APPENDICES

Appendix A

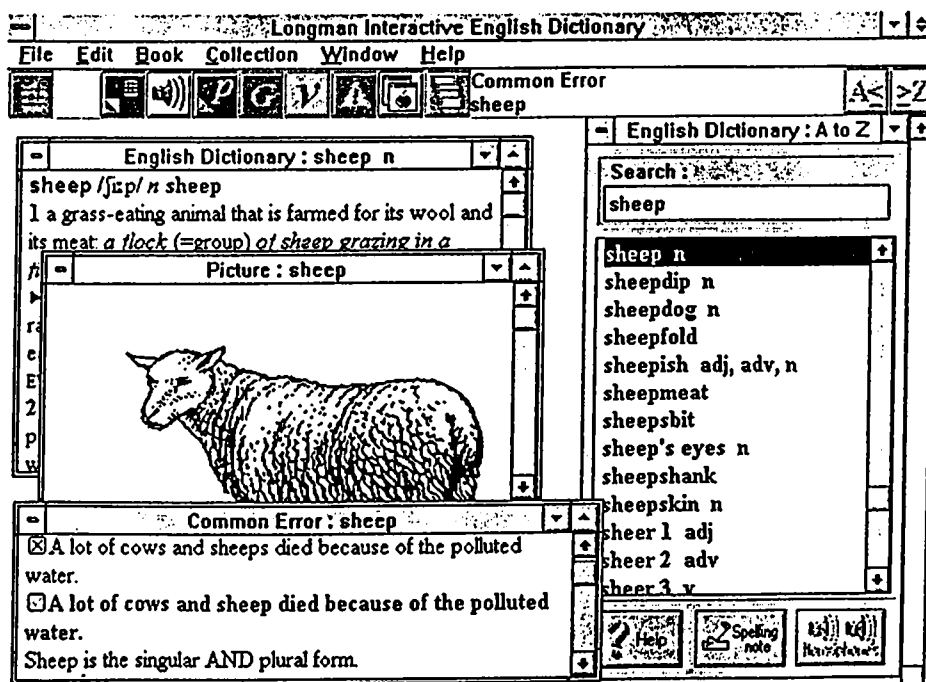
Longman Interactive English Dictionary

The Longman Interactive English Dictionary (LIED) is an exciting and creative new reference tool for students of English. It brings English and American language and culture to life before your eyes.

In it you will find:

- * 80,000 word English Dictionary
- * over 52,000 spoken pronunciations
- * video mini-dramas
- * over 5,600 fully conjugated verbs
- * comprehensive grammar reference
- * help with common student errors
- * fully labelled colour pictures

LIED is an exciting new learning tool which combines a computer database with sound, video and pictures. It not only gives you access to many different kinds of information contained on the database (about grammar, the meanings of words, pronunciation, famous people and places, etc.) but also allows you to see and hear as well as read, through the use of the compact disk and video. It contains many drawings and photographs to help you understand the meanings of words, and there are short films which show how English is used in real-life situations.



Appendix B
Pretest and Posttest

VOCABULARY TEST

I- Read the passage. Then match the words in the first column with the meanings in the second column. (6 points)

If someone has cut himself or herself, you should try to stop the bleeding. Hold the edges of the cut together. (Make sure your hands are clean!) If possible put a bandage or a plaster on the wound. (Make sure it isn't too tight.) If the wound is dirty, the patient might need an anti-tetanus injection. Take the patient to a doctor or hospital.

_____ bleeding	a- a cut
_____ edge	b- someone who has hurt himself/herself or needs a medical attention
_____ wound	c- the place where something, especially a surface, ends
_____ tight	d- fitting very closely
_____ injection	e- blood flowing from a cut
_____ patient	f- a needle used to put a drug into something or somebody

II- Read the sentences and write down the meanings of the underlined words. (4 points)

1- If someone has hurt a limb, they might not be able to move it.

2- If you have to move the patient, carry him or her on a stretcher.

3- It is difficult to tell a fracture from a leg, so the patient ought to have an X-ray.

4- I think I've broken my leg. It is already swollen.

III- Write the meanings of the words below in Turkish. (5 points)

first aid:

discoloured:

bandage:

blanket:

painful:

IV- Look at the pictures and match the words below with the right picture. (5 points)

1-shoulder

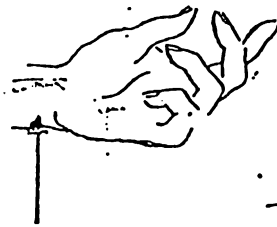
2- plaster

3- sling

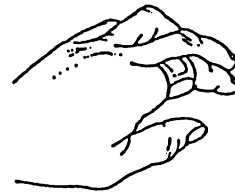
4- injection

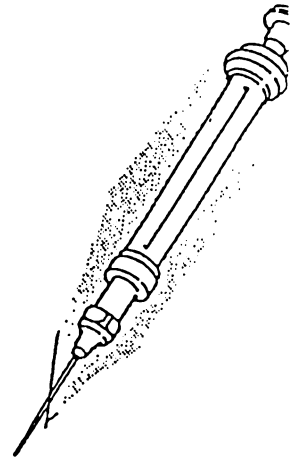
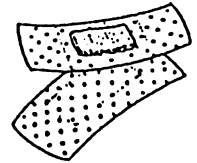
5- wrist











Appendix C
Sample Questionnaire

QUESTIONNAIRE FOR THE STUDENTS OF METU COLLEGE

A- Was this your first experience with computers?

Circle one: Yes No

B- If you are using computers at school, in which of these courses do you use computers as a part of the lesson? (Circle all that apply)

a- Science b- Maths c- Physics d- Music e- Art f-Geography
g- History h- English i- Others _____

C- For the following questions, please circle the appropriate number.

5=agree strongly 4=agree 3=no opinion 2=disagree 1=disagree strongly

- | | | | | | |
|--|---|---|---|---|---|
| 1- I found it fun working with a computer. | 5 | 4 | 3 | 2 | 1 |
| 2- The computer helped me to learn/remember more. | 5 | 4 | 3 | 2 | 1 |
| 3- A computer is useful for extra practice, but it cannot replace a classroom teacher. | 5 | 4 | 3 | 2 | 1 |
| 4- I liked the computer because it enabled me to get the extra practice I needed. | 5 | 4 | 3 | 2 | 1 |
| 5- I liked the computer because it let me work at my own speed without being held back by weaker students. | 5 | 4 | 3 | 2 | 1 |
| 6- I particularly liked the immediate feedback that was available with the computer. | 5 | 4 | 3 | 2 | 1 |
| 7- I was bored by the time I spent at the lab using that software program. | 5 | 4 | 3 | 2 | 1 |

D- What did you like most about using the computer in your English class?

E- What did you like least about using the computer in your English class?