The Effects Of Computer-Assisted Cloze Procedure On The Acquisition Of English As A Second Language

Bette Lynn Eichel

University of Nevada, Las Vegas

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The effects of computer-assisted cloze procedure on the acquisition of English as a second language

Eichel, Bette Lynn, Ed.D.

University of Nevada, Las Vegas, 1987

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THE EFFECTS OF COMPUTER-ASSISTED CLOZE PROCEDURE ON THE ACQUISITION OF ENGLISH AS A SECOND LANGUAGE

by

Bette Lynn Eichel

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctorate of Education in Secondary Education

Department of Secondary, Postsecondary and Vocational Education
University of Nevada, Las Vegas
August, 1987
The dissertation of Bette Lynn Eichel for the degree of Ed.D. is approved.

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University of Nevada
Las Vegas, Nevada
August, 1987
Abstract

The purposes of this study were (1) to determine the effect of computer-assisted cloze exercises on the acquisition of English as a second language of selected community college students, and (2) to determine if computer-assisted cloze exercises were more effective for Spanish as opposed to Chinese native language students. It was hypothesized that (1) students using the CAI exercises would receive higher posttest scores than students not using the exercises, and that (2) within the experimental group, Spanish native language students would receive higher scores on a posttest of grammar proficiency than Chinese native language students. The sample for the study was composed of thirty-eight community college students of various ethnic backgrounds. Measures of achievement were obtained through the administration of the ALFA test of grammar proficiency. The Mann-Whitney U test and the t test were used to determine the retention or rejection of the hypotheses. Statistical analyses indicated that (1) computer-assisted cloze exercises were not, overall, more effective than traditional instruction, and (2) Spanish and Chinese students did not differ significantly in posttest scores of English language proficiency. Recommendations are made for future research.
concerning teaching methods and materials, language proficiency measurement instruments, and computer-assisted exercises.
ACKNOWLEDGEMENTS

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Finally, I am grateful to my parents, Willis and Carmen, and to my sister, Terri, for all the encouragement they have given me toward completion of this project.
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CHAPTER I

IDENTIFICATION OF THE PROBLEM

Introduction

Students taking the laboratory-based English as a Second Language classes at Clark County Community College, Las Vegas, Nevada, have traditionally composed their assignments without the aid of an instructor, have had them graded by a teacher, and have read the responses regarding error and style some time after the writing process had taken place. In addition, these students have undergone two processes while attending class: they have both acquired and learned the second language. (Krashen, 1982)

Acquisition of the second language concerns developing an internal linguistic pattern which makes speaking the language natural and spontaneous. Learning is a self-correcting function which causes us to pause and improve our thoughts, sometimes before the thought has even been completed. (Dulay, Burt & Krashen, 1982)

With the recent introduction of computer-assisted language programs that are easy to operate and which can be set to a particular level and style of learning, these ESL students can now receive immediate, non-judgmental (and non-embarrassing) feedback while learning English. They
are able to access cross-referenced grammar explanations for the material which they themselves have written, thereby combining acquisition and learning in the process.

As instruction becomes more individualized, specific lessons can be developed for each student that take into account particular learning styles. (Chapelle and Jamieson, 1986) The lessons can be tailored to unique cognitive styles in order to provide the maximum learning experience for students acquiring English as their second language. Some students may benefit more from examples provided by the computer-assisted instructional program, others may receive maximum educational benefit from explicitly stated rules; the preference relates directly to learning style. (Abraham, 1985)

The cloze exercise, a well-established method for assessing readability of texts (Taylor, 1953) measures the student's ability to infer meaning using contextual clues from a passage in which words and/or letters have been systematically deleted and replaced by numbers. Several computer-assisted language programs make use of the cloze design to exercise a variety of language learning skills at various levels of difficulty.

Statement of the Problem

The Null Hypotheses

1. In a statistical analysis of pretest and posttest
scores on the criterion-referenced ALFA (a test of English language proficiency for beginning students), there will be no significant difference at the .05 level of the scores of those selected CCCC students who regularly use the computer-assisted cloze exercise program while learning English and the scores of those selected students who learn without assistance from a computer-assisted exercise program.

2. There will be no significant difference at the .05 level between the scores on the ALFA of those same students classified as Spanish speakers and those classified as Chinese speakers as a result of using the computer-generated cloze exercise program.

The Research or Alternate Hypotheses

1. CCCC ESL students who regularly use the computer-assisted cloze exercise program while learning English will obtain significantly higher scores at the .05 level on the ALFA test of English language proficiency than those students who learn without assistance from a computer-assisted exercise program.

2. Selected CCCC students classified as Spanish speakers will obtain significantly higher scores at the .05 level on the ALFA test after having used the computer-assisted exercise program than those same students classified as speakers of Chinese who have used the
computer-assisted exercise program.

Need for the Study

The literature pertaining to English as a Second Language instruction and the teaching of grammar suggests that there is a need to investigate computer-assisted instruction regarding learning styles in order to individualize instruction. Chapelle and Jamieson (1986) believe that we have not yet developed the potential power of individualized instruction regarding particular learning styles: "Researchers and educators must continue to describe and to assess cognitive/affective characteristics that are important in L2 (second language) acquisition" (p. 42). They suggest computer-assisted instruction as an educational innovation in which: "Our understanding of L2 acquisition can be reflected in the intelligent use of computerized lessons and ultimately in the development of more 'intelligent' lessons" (pp.42-43). An integrative approach to language instruction, one that would combine the major theories of learning into a coherent teaching program aimed at developing communicative competence, is made more viable with computer-assisted instruction. (Underwood, 1984).

Educators at all levels emphasize the need for more systematic evaluation of computer use. (Snider, 1987) Many curriculum designers stress the importance of
developing a set of criteria that can be used to assess software and CAI programs for a variety of learning and language needs, and of establishing demonstration sites to test new technologies. (Snider) Chomsky (1969) alludes to the value of constructing individual educational settings that make better use of technology: "The ability to construct for oneself an abstract grammar of underlying principles is a unique human endowment, a fundamental characteristic of human intelligence" (p. 13). He further states that educators are responsible for creating the environment most conducive to learning: "It is the task of the teacher to construct the conditions under which this natural human ability will be put to use" (p. 13).

Hendrickson (1977) further points out that traditional classroom grading practices have not been effective in the teaching of a foreign language, as underlying linguistic structures remain unchanged by surface correction: "Neither error correction treatment, regardless of level of communicative proficiency, made any statistically significant difference in students' written proficiency" (p. 12). Terrell (1982) believes that overt correction of every individual mistake discourages student learning. Error correction should include the student in active criticism of his own work; explanations then are made more understandable.

Krashen (1982) distinguishes between correction for
acquisition and for learning: "Error correction has little or no effect on subconscious acquisition, but is thought to be useful for conscious learning" (p. 11). Conscious attention to grammatical form leads only to "learning," not to acquisition. The CAI exercises, by providing implicit rather than explicit grammar, allow the student to acquire grammar rules after considerable experience with real communication. (Underwood, 1984) (Implicit and explicit grammar are explained in depth in Chapter II of this study). Richards (1980), in his detailed description of error analysis, recommends that researchers study the effects of various error correction techniques in the classroom.

The limitations for learning of the traditional classroom are discussed by Krashen (1982): "There are several ways in which the outside world clearly excels...The classroom will probably never be able to completely overcome its limitations...Its goal is to substitute for the outside world" (p. 59).

Krashen also points out that adult second language learners need not be limited to learning functions as described by previous research: "Some second language theorists have assumed that children acquire, while adults can only learn. The acquisition-learning hypothesis claims, however, that adults also acquire, that the ability to "pick-up" languages does not disappear at puberty" (p.
He claims that adults, though not as skilled as children at second language learning, can nevertheless obtain a high level of second language proficiency: "This does not mean that adults will always be able to achieve native-like levels in a second language...it does mean that adults can access the same natural 'language acquisition device' that children use" (p. 10).

Regarding native language and cognitive learning style, Chapelle and Jamieson (1986), Ballard (1985), Roberts (1983), and Stansfield (1980) have implied that there may be a difference between speakers of an oriental language and Spanish speakers in effectiveness of certain cloze procedure grammar exercises and computer-assisted instruction. Politzer and McGroarty (1985), in analyzing specific learning strategies, indicated that Asians and Hispanics differed in their approach to language learning. Some of the observed behaviors were associated with conscious learning, while others concerned acquisition and gains in general communicative proficiency. They have suggested that Spanish speakers approach language learning in a global way; they prefer the process of acquiring the language informal through communication and are not overly concerned with correcting grammatical errors. Asian students are more apt to concentrate on "monitoring" their utterances, sometimes to the point of interrupting communication. Krashen's language learning theory of the
Monitor (conscious correction) versus the Natural Acquisition Process (subconscious language acquisition) presents a dichotomous approach to language learning. Although most English as a second language students exhibit both behaviors while learning, the extent to which they rely on one approach or another categorizes them as either Monitor-users or Monitor-underusers. (Krashen, 1982)

In studies conducted on cloze exercises and instruction, results have been contradictory. Oller (1975) recommends using the cloze test to measure underlying competence rather than achievement on a specific test. Alderson (1979) states that the cloze test as a measure of overall language proficiency has rarely been investigated. In order to use the cloze procedure to measure achievement, the test should be administered to speakers of languages other than English. Implications are that cloze test scores are influenced by pertinent specific knowledge of the language in addition to an overall language ability (Taylor, 1953), a point that has not been investigated. Schneyer (1965) states that additional experimentation with cloze procedure and instruction will yield information on learning variables, so far undefined by researchers.

The few studies of the effectiveness of the cloze procedure regarding adult remedial reading learners have not yielded definitive results. Research on individualized instruction and underachieving adult students needs to be
conducted concerning the cloze procedure and transfer of learning. (Kennedy and Weener, 1973)

Rye (1982), Guice (1969), Eskey (1973), and Louthen (1965) found a positive correlation between cloze exercise usage in instruction and student achievement on a posttest of grammar. Myers (1976), while focusing his study on cloze exercises in the teaching of reading, recommended further studies in which the variables would be more firmly controlled. Pessah (1975) found that the cloze procedure was effective in enhancing instruction when used within the traditional classroom framework. However, conflicting results (Beck 1985; Blumenfield and Miller 1966; Friedman 1964; and Schneyer 1965) indicate that cloze exercises in certain studies had not been effective in increasing student learning of English.

Inferencing has been found to be an important factor in learning strategies (Carton and Magaud, 1966; Bialystok, 1981a; Bialystok, 1983), although researchers have not been able to identify the specific skill involved in intuitive "guessing" of correct grammar concepts. Bialystok (1983) suggests that researchers attempt to specify the nature of those processes of inferencing responsible for learning. McLaughlin, Rossman and McLeod (1983) posit a model of information processing that parallels Krashen's (1982) schema of Learning and Acquiring a second language. As researchers discover more facets of the learning process,
studies to investigate the importance of specific skills in learning need to be conducted (Cheng, 1985; Dornic, 1979).

Psycholinguistic theories concerning second language reading suggest that there is some transfer of skill from the native to the second language. (Selinker, 1972; Genesee, 1979). Bialystok (1983) used cloze-type sentence-completion texts to demonstrate how informational redundancy in the context could be exploited. Students were encouraged to guess and attempt to infer meanings from context. Their transfer behaviors were recorded and correlated with native and second language reading processes. A more definitive study of beginning and intermediate ESL readers has not been done.

Eskey (1973), in researching the importance of teaching holistic language skills, points out the importance of observing practical applications of the skills students have learned in the English classroom. Blumenfield and Miller (1966), Ryan and Semmel (1969) and Briere, Clausing, Senko & Purcell (1978) advocate more research on the design of cloze exercises used in instruction and the effectiveness of improving reading by teaching grammatical constraints.

Finally, Dulay, Burt and Krashen (1982) propose the need for research on methodology in second language education regarding innovations and learning theory: "Most second language teaching methodology has developed without
the benefit of research on second language learning" (p. 8). They advocate investigating innovative approaches to instruction: "Much of what we now know about the way people learn languages has been discovered only in the last twenty years, and many teaching methods are much older than that" (p. 8). Research, because it is time-consuming, has not been conducted as frequently as it should be: "Research is a slow and tedious process, and educators often lack the luxury of time to wait for its results" (p. 8). It is hoped that such research will help educators identify specific learner variables and indicate effective instructional methods, program design, and materials that can intensify the language learning success of a diversified second language student population. (Ballard, 1985)

To date, research on second language learning has focused on the student of high-intermediate and/or advanced proficiency in English. Studies of the beginning and lower-intermediate learners' interaction with computer-assisted instruction will give educators more insight into the variables associated with language acquisition, knowledge needed to enhance instruction by integrating technology into the second language classroom.

Assumptions

The following assumptions were made regarding the
subjects and the research project:

1. The students who had registered for the English language class, as a result of being placed into certain Levels of the course by means of a preliminary placement test, obtained scores within a small range of variance on a pretest of English language proficiency.

2. Nonparametric tests are able to detect significant differences in small samples.

3. Learning strategies vary within a population of English language learners.

Design of the Research

Three levels of English as a Second Language students at CCCC were randomly assigned to either the experimental or the control group. Randomization was accomplished by assigning students, by Level, a number. By systematically following a table of random numbers, half the subjects were chosen to form one group; the remaining subjects formed the second group. Choice of which was to be the experimental group was made by flipping a coin. One class of twenty students (experimental) received the treatment, one hour per week completing assignments (cloze exercises) with the aid of a computer-assisted program. The other class of eighteen students acted as the comparison group. The experimental and control group subjects represented thirteen different countries (Mexico, Peru, Chile, El
Salvador, The Dominican Republic, Colombia, Iran, Vietnam, Laos, Ethiopia, Taiwan, Korea, and Pakistan).

Both classes were taught by the same master teacher and instructors, using the same textbook (English ALFA for Foreign Students, Books 2, 3, and 4). The experimental class students completed their assignments and did CAI exercises on the computers available at the community college for student use. The STORYBOARD, CLOZEMASTER and M-SS-NG L-NKS cloze exercise programs presented material in various levels of difficulty for the students to complete. The control group completed cloze exercises in the ALFA textbook without the aid of a CAI program.

Final grades were determined by the scores on the ALFA tests, which are part of the instructional materials distributed by the textbook manufacturer. However, the degree of English language proficiency was determined by administering the posttest of competency supplied by the English ALFA textbook designers. The scores on this instrument did not affect the final grades of the students.

A criterion-referenced test, the ALFA test of English language proficiency, was administered to all thirty-eight students, Form A as the pretest, and, after fifteen weeks of instruction, Form A as the posttest. The test is a discrete item measurement system based on a standard demonstrated morphological proficiency (DMP) performance scale. (Van Karssen, personal communication, June, 1987)
Since the scale serves as the basis for the behavioral objectives that constitute the English ALFA program's sequence of structural skills, a detailed list of test items based on the Level yields a fairly accurate description of competency relative to the instructional material. Test specifications require that each item adhere to its respective Level's competency requirements (in lexical, syntactical, morphological, and phonological domains) and corresponding readability level. Using the Dale-Chall readability formula, the test follows the instructional material's progression of incremental complexity as indicated:

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<td>4.65</td>
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<td>4th Grade and Below</td>
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<td>5.05</td>
<td>5.1</td>
<td>5-6th Grade</td>
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<td>4</td>
<td>5.75</td>
<td>6.5</td>
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Since the ALFA is a relatively new test, extensive studies of the reliability and validity have not been disseminated. However, in a pilot study of adult ESL community college students, the test-retest evidence shows that for Level 2 twenty-three of twenty-five students are classified in the same Level, for Level 3 twenty-four of twenty-seven place in the same Level, and for Level 4 thirty-one of thirty-three students attain the same Level. The overall results of the study indicate that the test seems to be a stable set of subscales with which accurate
measurement of student proficiency in the English ALFA program can be substantiated. Currently, the Houghton-Mifflin Publishing Company is conducting studies of the content validity, the internal consistency, and the reliability of the ALFA test in various educational settings. (Van Karssen)

The students' final grades and proficiency scores were tested for significant difference at the .05 level by rank-ordering the data and performing the Mann-Whitney U test for small samples. The sub-groups of native language Spanish (6-control; 11-experimental) and Chinese (4-control; 7-experimental) student scores were also rank-ordered and tested for significant difference by means of the Mann-Whitney U test.

A nonparametric t test (Siegel, 1956) was performed on the data to determine if there was a significant difference in pretest scores of the control and experimental group students' mean scores before the treatment began. The Mann Whitney U test was applied to posttest scores of both groups to determine if the experimental group received significantly (at the .05 level) higher scores on the grammar test than did the control group.

**Delimitations**

1. Measure of significant achievement gains was confined to the population of English as a Second Language
students at the post-secondary education level—those students registered for the class at Clark County Community College, N. Las Vegas, Nevada. The sample of thirty-eight students was composed of various nationalities including a subgroup of Chinese and Spanish English language learners.

2. The sample size was small; therefore, the results were not generalizable to all English as a Second Language classrooms in the U. S. at the community college level of education.

3. Two randomized groups of students, the experimental and the control group, received a pretest and a posttest.

4. Nonparametric statistical tests were used to determine statistical significance.

5. One master teacher and three tutors taught both the control and the experimental groups.

6. The materials for instruction were confined to the cloze procedure computer programs and the English ALFA (Houghton Mifflin) textbook and workbook.

7. Computer-assisted instruction and cloze procedure exercises were not treated as separate variables for the purposes of this study; computer-assisted cloze procedure was contrasted with traditional cloze exercises in classroom instruction to determine instructional effectiveness.
Definition of Terms

The following terms have restricted meaning and are thus defined for this study.

1. **Acquisition.** Acquisition refers to the spontaneous, uncorrected language that flows from the subconscious. (Krashen, 1982)

2. **Ambiguity tolerance.** Ambiguity tolerance is the amount of stimuli a person can receive and still be able to function rationally and calmly. (Chapelle and Jamieson, 1986)

3. **Cloze procedure.** The cloze procedure is an exercise in which every nth word is deleted from a text.

4. **English as a Second Language Student.** A student whose first and native language is not English is classified as ESL. (Dejnozka and Kapel, 1982)

5. **Feedback.** In language acquisition research, feedback generally refers to the listener's or the computer's response to the learner's speech or writing. One type of feedback is correction, another is approval or "positive feedback." (Dulay, Burt, & Krashen, 1982)

6. **Field dependent.** A field dependent student perceives concepts as a whole; s/he may be lost in the totality of too many stimuli. (Chapelle and Jamieson)

7. **Field independent.** A field independent student is able to discriminate discrete parts of the information to be learned. S/he approaches problem-solving analytically.
8. **Inferencing.** The process of inferring meaning from contextual indicators is termed inferencing. (Weible, 1980)

9. **L2.** The second language, or target language, is abbreviated as L2.

10. **Learning.** Learning is the conscious, consistent monitoring process by which we correct our mistakes, sometimes in mid-sentence. (Krashen)

**Outline of the Study**

Chapter I contains the introduction, the background surrounding the problem to be investigated, and a statement of the research hypotheses. In addition, the research design, the methods of analysis, the assumptions and limitations, and the organization of the study are defined.

Chapter II is a review of the literature concerning the problem to be investigated. The literature includes research that has been done in the area from thirty-four years ago to the present.

Chapter III is a detailed description of the research design, the data collection procedures, and the data analysis.

Chapter IV presents the findings of the study, provides details of significant differences within the data analysis, and summarizes the testing of the hypotheses.
Chapter V includes a summary of the findings, conclusions, and recommendations for further study.
CHAPTEB BIBLIOGRAPHY


foundation of the City University of New York, New York.


CHAPTER II

REVIEW OF RELATED LITERATURE

Research in the value of computer-assisted instruction in teaching English as a Second Language encompasses the following topics: language acquisition theory; ESL learning research; error correction; learning strategies; student variables; field-dependence/independence; theories of reading; teaching ESL students to read; computer-assisted instruction in general; CAI in language learning; CAI as an aid in reading; and the cloze procedure and learning.

Language Acquisition Theory

Language acquisition theory has traditionally encompassed two distinct schools of thought, that of Noam Chomsky (Creative Construction) and that of B. F. Skinner (Behaviorism), although many modern theorists favor a dual approach to the process of language learning.

B. F. Skinner's theory of verbal behavior advocated the Stimulus-Response (drill and practice) method of language teaching. By making direct connections between concepts, rules, and examples in the language, learners assimilate the underlying concepts associated with the target
language. Instruction is based on the mastery of a hierarchy of increasingly difficult grammatical items. Through exercise, conditioning, and reinforcement of correct answers, the learner begins to comprehend the grammatical rules unique to the language being studied; with practice, the student gains proficiency.

Noam Chomsky and his followers described a discovery learning approach to language acquisition. Creative construction is a specific pattern developed by the learner as a result of exposure to the target language; the learner internalizes the rules and concepts and is able to generate unique sentence patterns to communicate ideas. "Once the student has the proper degree of cognitive control over the structures of a language, the facility will develop automatically with the use of language in meaningful situations" (Carroll, 1966, p. 102). In other words, learning becomes acquisition. (Krashen, 1983) By viewing the language initially as a "whole" and subsequently breaking the language down into discrete parts and concepts, the learner becomes proficient. (Littlewood, 1984)

The Language Acquisition Device, LAD, (Chomsky, 1965) is the ability of each learner to formulate a set of rules about the language which then forms the basis for a theory about how grammar functions in the language. Theories of language acquisition center on either the "kernal"
hypothesis (Miller, 1962) or the deep structure hypothesis. (Chomsky, 1965; Rohrman, 1968)

Kernel theory implies that simple sentences are "tagged" with an increasingly more complex system of markers to convey meaning. For example, Chomsky's SAAD (simple, active, affirmative, declarative) tags are optional additions to base sentences that enhance meaning; the greater the number of tags, the more difficult the sentence is to comprehend. Deep structure concerns the transformations the learner must make to translate the surface structure (words, grammar) into meaning. The specific physical construction of the sentence and the context within which the sentence is embedded are utilized to determine exact meaning. Theories related to tag complexity imply that the difficulty experienced in comprehending a sentence is determined by the number of grammatical rules the learner must use in order to extract meaning from the words.

The Extended Standard Theory takes both Behaviorism and Creative Construction into account in order to explain the function of conditioning and transformations in language acquisition. (Underwood, 1984) Language is regarded as a rule-governed creativity; the learner must develop the skills associated with the target language as well as exhibit global understanding of the rules by creating unique structures. Stevick (1980) demonstrated the
blending of acquisition and controlled processing strategies in language learning. Sajavaara (1978) suggested that acquisition is developmental; stages of learning can be identified.

Research supporting the theories have investigated only techniques, the subparts of methods. No single methodology has been proven to provide more educational benefit than any other. Mueller (1971) investigated the use of purely behavioral (fundamental skill) instruction versus cognitive-code instruction which utilizes material more relevant to the learner. Although the cognitive-code technique proved more effective, he advocated a dual approach to language learning to account for individual student preferences. There is a need to investigate the effectiveness of total acquisition programs such as the "natural approach" developed by Terrell (1977) at the University of California at Irvine, in which practical language patterns are presented for the student to use to communicate in everyday situations. When older methods such as grammar-translation, cognitive-code, and audio-lingual are compared, there are no significant differences in efficiency. Cognitive-code proves to be slightly superior for adults in contrast to audio-lingual, but there is no difference when adolescents are compared. (Krashen, 1983)

McNeill (1966), a proponent of developmental
psycholinguistics, described the onset of language learning capability by means of first grammar analysis. He posited the existence of universals in language acquisition; learning strategies are similar for speakers of all languages. Structural linguistics, an already established field of research with a wide knowledge base, was integrated with an understanding of human growth and development and cognitive theory to form the subject area of developmental psycholinguistics.

Terrell (1982), however, believes that viewing language instruction as applied psycholinguistics is misunderstanding the relationships between an intellectual activity and a practical one. "Teaching languages as an intellectual activity is, to a great extent, responsible for the failure of the educational establishment to impart even the most fundamental communication skills to normal students in foreign language classrooms" (p. 122).

Lennenberg (1966) studied the characteristics of early speech and subsequent learning phases, finding that they closely parallel stages of growth in the child. Certain "fertile" times in brain development allow rapid language acquisition. Although the ability to learn language is not directly connected to motor coordination, the onset and development of language complexity follows a regular pattern. Even children raised by deaf parents have innate language learning abilities; children who enter school
quickly learn traditional speech patterns from their peers. In fact, such children are in many cases bilingual, speaking standard English at school and an idiosyncratic "dialect" to their parents. (Lennenberg)

Environment and the desire to model certain speech patterns (the affective filter described by Krashen, Dulay & Burt, 1982) are additional variables which influence speech development, once the basic language patterns are internalized. Researchers have found that speech growth includes several "windows" or periods of optimal language acquisition; from the teen years on, language learning becomes, on the average, increasingly more difficult. (Lennenberg) Although standard acquisition patterns are also influenced by biological constraints as depicted by Cairns (1986), generalizations can be made about the various stages of language learning.

In describing language acquisition, Chomsky (1965) made the distinction between competence and performance. The learner who possesses both abilities understands the phonetic representations of the language, comprehends messages, can construct sentences using his knowledge of the language structure, and is able to "retrieve" information stored in long-term memory. (Reibel, 1971) Osherson, Stob & Weinstein (1986) mention the processes of gradualism (information is absorbed at various rates and stored for future use in the language processing centers of
the brain) and computability, a process also connected to the process of information storage and the degree of relevancy of the material being learned. Ervin-Tripp (1971) favors a processing model of language acquisition, in which material is not contrived; learners are exposed to "real life" language. The model integrates rote learning, or competence, with individual creative utilization of the language, or performance.

ESL Learning Theory

Researchers agree that students of English as a second language have universal learning problems, similar to first language acquisition difficulties. (Bailey, Madden & Krashen, 1974; Dulay and Burt, 1975; Richards, 1971) However, the success of the second language learner depends on his use of language learning strategies, interaction with the target language (Bialystok, 1978), and the effectiveness of the instructional methods.

Since language learning involves a certain amount of creative construction (defined here as the discovery and testing out of hypotheses formulated through contact with the second language), certain similar language strategies can be identified. (Bailey, Madden & Krashen) Although adults may prefer the structure of the traditional classroom, interaction with the target language can cause the learner to become sensitive to the "natural syllabus"
of the language. Terrell (1982) believes that a conscious understanding of grammar rules is not a prerequisite to their acquisition. "Most adults are not very good at learning grammar, but they acquire rules readily, although usually imperfectly, given the chance to interact in communicative situations ..." (p. 123). Educators should discover what aspects of the language follow a universal sequence and understand what factors determine such a sequence in order to structure lessons that follow a "natural" order for learning.

Pimsleur (1968) found a positive correlation between final grades and scores on the Language Aptitude Battery, a criterion-reference test used to measure English proficiency. Genesee (1976) concurred that IQ and language aptitude correlated the highest with skills deemed "academic." However, there are numerous other variables that determine a student's performance when learning another language.

Native language is such a variable in acquisition of structures. Although an "order of acquisition" common to all language learners has been determined, individual differences in ease of acquisition can sometimes be predicted by the nature of the first language. (Lado, 1957) Transfer, recognition of cognates or false cognates, inability to comprehend a "foreign" language structure, etc., depend on the grammar and vocabulary of the native
language. For example, Chinese students find the placement of modifiers in English sentences especially difficult to grasp, whereas Spanish speakers commonly make mistakes in verb inflections and plural markers. In addition to determining developmental stage in language learning, error identification can serve as a predictor device for the teacher. Instructors who realize that certain errors are commonly associated with particular native languages can more efficiently individualize instruction.

The specific skills identified as language learning variables are generalization, transfer, redundancy reduction and imitation. By analyzing errors, educators can determine at which stage of development a learner is operating. Some variables are related to the first language (transfer) while others concern the student's developing but incomplete knowledge of the target language and its grammar rules (imitation, generalization).

Language stage research of first and second language acquisition has concerned phoneme acquisition and pattern identification. Brown (1973) detailed the development of first language speech patterns through longitudinal studies of children. Cross-sectional comparisons (de Villiers, 1973) yielded data on L2 acquisition and the complexity of grammatical concepts. Dulay and Burt (1973), in working with second language learners, described morpheme acquisition; Krashen (1975) and Fathman (1979) studied the
order of acquisition of phonemes. Larsen-Freeman (1975) established a Bilingual Syntax Measure to determine language development stage; the validity of her instrument was disputed by Rosnashy (1976) who had found a different order of acquisition.

Acquisition abnormalities caused partly by interference from the native language were the focus of a longitudinal study of Italian children learning German. (Pienemann, 1980) Huang and Hatch (1978) determined that learners can memorize and use "prefabricated" patterns of grammar, or patterns from a first language. The resulting errors are attributed to transfer from the first language. Although the L1 does influence acquisition of the L2, learners tend to make more generalization errors as proficiency in the second language increases; they rely less on native language pattern as their knowledge of the second language increases.

Second language learners progress through some of the same stages as children learning a first language. Speech of beginners is "telegraphic;" it lacks inflection and function words such as articles and prepositions. (Littlewood) Depth of expression is gradually developed as the learner internalizes and uses the underlying concepts of the L2. Learners create an idiosyncratic dialect, or "interlanguage" (Selinker, 1972) that approximates their knowledge of the target language. By analyzing the
"interlanguage" educators can determine at which developmental level the student is. (Clahsen, 1985)

O'Malley, Michael, Chamot, & Stewner-Manzanares (1985) identified steps in learning through text processing. Learning is most effective when it involves processes that create meaning by building relations between the text and what we know. Meaning is generated by relating parts of a narrative to each other or to information already stored in the learner's memory; meaning is produced by the interaction between the person and the information received. Motivational intensity, attention span and other factors mentioned later in this study affect rate and effectiveness of learning.

Metacognitive strategies, or knowledge about the learning process itself, as well as individual cognitive strategies of the second language students, influence retention and later utilization of information stored in long-term memory. Good learners combine metacognitive information with a cognitive approach to learning strategies by guessing and inferencing from context: the learner uses hunches derived from clues to guess the general rules of the target language. Results of studies conducted by O'Malley, Michael, Chamot & Stewner-Manzanares indicate that beginning and intermediate level students use more cognitive than metacognitive strategies, that better students have more fully developed metacognitive
strategies, and that metalinguistic knowledge, the ability to reflect on forms and structures of the language and to analyze the language structures, is a prerequisite for mastery of a second language. Providing learners with a variety of language in meaningful and motivating contexts challenges the student to become more active in his own language acquisition. (Lightbrown, 1985)

Taylor (1975), in studies related to adult learning strategies and their pedagogical implications, found that language learners immediately begin to rely on their ability to analogize, systematize, and regularize the target language. In forming a schema, learners are not passive; they must be active participants in learning. As students begin to internalize more grammar rules, their mistakes tend to be characterized by overgeneralization—the learner uses language rules inappropriately. Reliance on overgeneralization is directly proportional to proficiency. Taylor's recommendation to second language teachers is to design a language program to re-teach problem structures at intervals throughout the language course to enhance retention of grammar rules.

Bialystok (1981a) identified stages of language proficiency and stated that inferencing is not as important for achievement in a second language as functional practice with language structures. Practicing, monitoring, inferencing, formal practicing, and functional practicing
are necessary processes in target language development. The relative learnability of a particular concept relates directly to the stage of the student's incomplete but developing second language proficiency. (Hammarberg, 1985) Intuition, the use of available information to derive explicit linguistic hypotheses about the target language, is enhanced by exposure, formal practice, and use of the target language in various contexts. The intuitive mechanism is responsible for most cases of language production and comprehension and results in communicative meaning in the use of the second language. Bialystok maintains that inferencing and monitoring, when combined with formal practice, are the most powerful tools in language learning, in that students are compelled to generate and test hypotheses about the target language.

Prediction techniques can be developed and utilized in language learning to trigger a learner's awareness of a core rule in grammar, a rule learned easily on the basis of minimal exposure to the language. In studies related to acquisition of dative complements, passives, and dative questions, Mazurkewich (1985) found the principle of adjacency to be a paramount component of language acquisition theory.

The importance of exposure to reading material in the target language was investigated by Falk (1979) in relation to subconscious acquisition of language structures.
Students may utilize their natural language acquisition capacities to internalize the basic principles, structures, and organization of the style prior to any overt teaching on the part of the instructor. Teachers should therefore encourage students to do extensive reading to enhance a holistic learning of the language rather than a mastery of a series of discrete parts. The formal study of grammar, vocabulary building exercises, and drill and practice are not sufficient for language learning; language must also be acquired by tacit interaction with the language and internalization of the patterns and principles. Drill and practice, isolated from contextual meaning, do not offer students the opportunity to form hypotheses about the second language.

Fillmore (1983) described stages of language learning by listing characteristics of students in each stage. Novice speakers depend on situational clues and L1 strategies; they have rules for the new language, but the rules are not arranged in a schema. Advanced beginners understand most face-to-face conversations and can use rules to generate language, whereas competent speakers know the L2 rules, make few errors, and can think in the second language. Proficient speakers can choose language effectively, having mastered the nuances of the L2; they have intuitions about what "sounds right." Language exposure intensifies sensitivity to rules and intuitive
guessing competence.

Intuitive capabilities are investigated by Leontev (1975) in his study of levels of consciousness: current (focal), awareness, conscious control, unconscious control, and the subconscious. Elements and units of verbal thought can fluctuate between all four levels as the student internalizes a second language. Additional studies (Takala, 1984) indicate that students learn by reading, and that the text characteristics influence memory and comprehension as information is transferred from one level of consciousness to another. Memory for verbal material (constructive and reconstructive) is affected by text characteristics. Grammatical information is determined mostly by context and, only in cases of ambiguity, do students actually make use of grammatical markers for the purposes of comprehension. (Terrell, 1977) Acquisition takes place in the class whereas learning occurs through specific kinds of exercises done by the students individually outside the classroom. A natural approach to language exposure allows students to comprehend ideas without understanding every component of the sentence.

Pica (1983), in studies related to natural versus instruction only approaches to language learning, found that all subjects made errors of morpheme overgeneralization and overuse, but such errors were more prevalent among students receiving instruction only.
Learners exposed to some degree of natural input, with or without a classroom component, develop similar hypotheses about the nature of the target language. Felix (1981), however, in his study of German students, found that there was little difference between formal and naturalistic teaching practices. He concluded that there must be universal and common principles flexible enough to allow students to adapt to different conditions.

Sprague (1981) favors the decline of behaviorism and the rise of cognitivism in learning. Cognitive processes, including attention, motivation, verbal and imaginal encoding, storage, and retrieval, need to be studied to provide educators with an understanding of the interaction between student learning style and achievement in learning a second language. The ability to gather relevant information and organize that information into schema that aid in retrieval of information is a self-conscious management technique for controlling one's own thinking behavior. The schema can diagram both structure and process. Instruction based on the schema theory should help learners effectively and efficiently process new knowledge and retrieve old knowledge. Cognitive approaches emphasize that one can learn without practice or reinforcement of overt behavior, and that one may learn by actively changing perceptions of experience and by constructing new meanings and interpretations of events.
Naiman, Frohlich & Todesco (1975), also proponents of cognitivism, suggest that researchers focus on investigating the effects of stimuli relevant to language and ignore isolated and repetitious drill and practice.

Cognitive pruning (Brown, 1972), the elimination of unnecessary information in preparation for storage of new material, indicates the importance of emphasizing meaning over structure, semantics over syntax, and situational context over mechanistic pattern. The most basic learning mode, rote learning, stresses the mechanical mental storage of items having little meaning or coherent organization. As meaningful learning is characteristic of most human learning and necessitates conceptualizing and organization, retention of material learned rotely is inefficient; forgetting is easily induced by interference. The retention and storage in long-term memory of meaningfully learned materials involves selective cognitive pruning to enhance retrieval. The subsumption theory (Ausubel, 1967) provides the basis for rejecting conditioning models of practice and repetition in language teaching and for initiating automaticity of learning. Educators should develop methods such as situational sequencing for augmenting cognitive pruning and subsumption.

Dulay and Burt (1972) advocate emphasizing automaticity in responses. The extinction of an old response must be initiated before acquisition of a new concept can begin.
The learner possesses a specific type of innate mental organization which causes him to use a limited repertoire of processing strategies; since language learning proceeds by the learner's exercises of those processing strategies in the form of linguistic rules which he gradually adjusts to the situation, he organizes more and more of the particular language that he hears. Both the child and adult generalize and make analogies; it is the educator's responsibility to control the environment so that these cognitive processes can be enhanced and meaningful learning can occur (i.e. information is stored and is retrievable in long-term memory). (Taylor, 1974b)

Bialystok (1978) has posited a model of second language learning to account for discrepancies in individual achievement and universal learning strategies. The input > storage > output arrangement of information diagrams how individuals can differ in their efficiency in language learning.

Input refers to the knowledge that is filtered into the mind, storage describes the processing of that information, and output relates to the form and skill level of the language produced by the learner. The processing lines are obligatory, as well as the lines of transfer, although individuals differ in their skill at processing and producing grammatical constructions. The learner acquires language by comprehending linguistic input somewhat beyond
his level of competence. This occurs with the help of contextual and extra-linguistic information, often provided by linguistic "caretakers." (Taylor, 1984) Input can be garnered through exposure to English in the class and outside the classroom, from books, immersion methods, and interaction with the native culture.

Other Knowledge, Explicit Knowledge and Implicit Knowledge relate to the processing system the learner uses. (Bialystok, 1978, 1983) For example, Explicit Knowledge encompasses conscious facts, grammar rules, some vocabulary items, pronunciation rules, etc. Implicit Knowledge is the intuitive "feel" of the correctness of the target language: what is automatic, spontaneous and "sounds right." These designations roughly correspond to Krashen's (1982) theory of the Monitor versus language learning. Explicit Knowledge, according to Bialystok, acts as a buffer for new information and as an area in the conscious where Implicit Knowledge can be articulated. Implicit Knowledge contains the working system of the language complete with all rules necessary for grammatical construction. Other Knowledge encompasses the learner's information about various second languages and the experience he has had with the target language.

Bialystok further distinguishes between Type I and Type II Responses. Type I are immediate, emanating from Implicit Knowledge; Type II occur after a brief delay.
Type II Responses can be corrected by the learner enroute to the hearer. Output contains a combination of both Type I and Type II Responses.

Bialystok posits that several conditions must be satisfied for second language learning. The subject should have formal and functional practice with the language, there should be adequate transfer of information between the Explicit and Implicit Knowledge areas, and the learner should, through inferences, arrive at the grammar rules himself and be able to correct his responses. The efficiency of Bialystok's model depends on attitude, motivation, aptitude, personality and other variables. Cloze tests activate all three areas of knowledge of the model, and are therefore sufficient for measuring those realms of knowledge.

Paralleling Bialystok's model of language learning and Krashen's concepts of Learning and Acquiring is the theory of information processing. (McLaughlin, Rossman & McLeod, 1983; LaBerge and Samuels, 1974; Pike, 1981; Schneider and Shiffrin, 1977; Shiffrin and Schneider, 1977; Bočk, 1982; Dornic, 1979) Information processing is composed of two processes: controlled processing and automatic processing. Cognitive psychologists use the multilevel system to define the process by which we store new information in our memories. Controlled processing, corresponding to the learning mode posited by Krashen, involves concentration
and short-term memory. The process is influenced by attention span and is a function of the task demands. (McLaughlin, Rossman & McLeod) Rehearsal allows the new information to be handled more routinely without much attention or monitoring. The process involves activation of memory nodes in a sequence which regulates the flow of information from working to long-term memory.

Automatic processing is the system by which information is retrieved from long-term storage areas in the brain and used to process new information the learner encounters. These responses, quick and difficult to suppress, are "mapped" to similar input and pattern of activation after many trials. Once automatic processes have developed, the brain is freed to initiate controlled processing. Both systems provide the learner with comprehensive memory and storage as new information is learned. As the learner becomes adept at automatic information processing, more difficult information can be processed by the controlled response, for which intensive concentration is required.

Reading is a series of stages in the information processing system which allow more proficient readers to comprehend more of what they read. (McLaughlin Rossman & McLeod) As the learner progresses, automaticity is achieved with respect to word decoding, and other language learning tasks can be conducted.

LaBerge and Samuels offer an information processing
model in which visual information is transformed through a series of processing stages, involving phonological and episodic memory, until it is finally comprehended. Although attention is necessary for controlled processing, once the automatic level has been obtained, the meaning of the words can be elicited by means of direct associative connections between the phonological unit and the semantic meaning unit.

Perceptual learning involves repetitions which provide more than the consolidation of perceptions; material can be reorganized into higher-order units and stored in long-term memory (the development of a schema for new information). Teaching higher-order units should progress from deeper levels to the sensory, or more immediate, levels.

The associative link directly recorded in memory (rote learning) serves to activate automatic retrieval processes by which new information can be stored in memory. Improvement of performance in reading is due to a restructuring of the components of the task so that they are coordinated, integrated, or reorganized into new units. (Cheng, 1985) Massed practice improves the automatic processing response. (LaBerge and Samuels) As the reader interacts with the material, he uses knowledge of the language to predict and create meaning based on the text. The good reader has automatized and mechanical decoding skills which enable him to comprehend the overall meaning
As analogies are made between new information and what the learner has previously stored in long-term memory, structures of the language suddenly become apparent. Language nucleation, or crystalization, (Pike, 1960) is accompanied by a feeling of "naturalness" in language production. Through practice with the L2, students learn to control enough structures in the sentence to understand some of the intricacies of the interrelations of grammatical concepts, concepts too numerous to be handled by the students on the basis of consciously applied rules. The learner attempts to control automaticity by relying on previous experience.

Oller (1981), in his studies of correlation between language ability and intelligence, distinguishes between semantic (paradigmatic, categorical, analytical) and episodic (stream of experience) learning. Good instruction should include exercises that require the utilization of both in an immersion framework. (Oller) Although performance is affected by natural abilities such as IQ, instruction can help students correct for deficiencies in learning strategies.

Krashen, Sferlazza, Feldman, and Fathman (1976) posit a relative difficulty order for linguistic items that is not influenced by the linguistic environment. The results of a study (adult ESL student performance on the SLOPE test)
examining linguistic background, exposure to English, and native language variables appear to confirm their hypotheses. Influence of the native language, length of time studying English, and type of exposure to the target language (classroom versus informal communication) affect the acquisition of English as a second language.

Dulay and Burt (1977) stress creative and divergent thinking in language learning. They believe that speakers can express an indefinite number of thoughts using sentences they never heard before if they have internalized the system that governs usage. Linguistic creativity can be displayed by all speakers to some degree. Creativity stems from the mental mechanisms responsible for learning the rules of the new language. Creative construction in language acquisition refers to the process by which learners gradually reconstruct rules for speech they hear: "Guided by innate mechanisms which cause them to formulate certain types of hypotheses about the language system being acquired, the mismatch between what they are exposed to and what they produce is resolved" (p. 97).

Dulay and Burt also mention the role of affective delimiters, conscious or unconscious motives or needs of the learner which are exhibited as individual preferences of the speakers, or role models, speech patterns or need to identify with a group. These delimiters are partially responsible for individual differences in learning.
Cognitive organizers refer to internal data processing mechanisms used for constructing sentences. Dulay and Burt list them as perceptual salience, frequency, corrective feedback and reinforcement. There should be some contiguity of the elements as well; deviations from structures that the learner hears, overgeneralizations, and use of novel constructions point to the role of cognitive organizers and creativity in language learning. Although second language readers transfer certain skills from one language to another, the exact nature of these skills has not been determined. Learners who exercise integrative rather than discrete point language skills are able to understand grammatical concepts within the second language framework.

Language acquisition, as studied in children by Dulay and Burt (1975), is influenced by two facets of language learning. Linguistic complexity and learning strategy interact to provide an effectiveness quotient for second language learners. The creative construction process, involving children who work out many of the grammar rules through intuition, suggests that children gradually reconstruct the rules from the speech they hear, and are guided by universal and innate mechanisms during this process. The process is affected by the complexity of the material being learner.

Complexity refers to the difficulty of the items to be
learned and the determined order of acquisition. (Dulay and Burt, 1975; Krashen, 1982; Bailey, Madden & Krashen, 1974) There is a tendency to view learning as a series of assimilation of concepts in rank order and as an additive process. Genesee (1979) points out the importance of providing the learner with sequenced reading material, in which grammatical concepts are presented in ascending levels of difficulty, to enhance cognitive organization of input. Strategies refer to the hierarchies of developing syntactic structures: an innate cognitive strategy that helps the child make rules. Acquisition relates to the ability to develop logical relationships among linguistic elements and to form hypotheses regarding language.

Dulay and Burt found that certain groups of functors are acquired before others, pointing to the existence of a hierarchy of knowledge. They suggest researching the variables that have to do with cognitive organization regarding learning strategies, the relationship of the hierarchies of different languages, and the effectiveness of various types of instruction on the acquisition of these functors.

Clark (1986), in working with ESL students in the freshman composition class, observed several facets of second language learning. The tacit internalization of the language through extensive exposure and practical experience, coupled with use of the language in actual and
natural contexts and situations, proved to be efficient in second language learning. The student, through use of the language, can generalize a set of experiences into a principle and apply the principle (test the hypothesis). Students who subconsciously apply these rules are receiving informal language instruction. The variables Clark identified are limited motivation (knowledge transfer is hampered), performance inhibition (shyness, perfectionism), and inaccurate teacher assessment of a student's ability—a preoccupation with surface errors. Clark admits that the internalization process of language rules is slow, but suggests that it can be speeded up by a variety of teaching practices and the concentrated efforts of specialists.

Adams and Adams (1985) in teaching ESL students to read and write, noticed the difference between natural and spontaneous language and those utterances that were corrected several times while enroute to the hearer. Correction, or Monitoring, slows down the natural production of language by forcing the speaker to consciously focus on grammar rules. Spontaneous utterances emanate from the acquired knowledge the speaker has and more accurately depict the student's internalized knowledge of the target language.

The Acquisition-Learning dichotomy, posed by Krashen (1982), is a working model for understanding second language learning. Acquisition refers to the subconscious
impetus for speech; it corresponds to Implicit Knowledge, natural learning, and spontaneous utterances. Learning, in contrast, relates to the conscious attention to rules and the self-correction process, so common among second language learners. Krashen's natural order hypothesis states that grammatical morphemes are learned universally in a special order. There are similarities among different language groups and first and second language learners, children and adults. The Transitional Form describes the developmental errors, which are virtually universal, that learners make. These mistakes could lead to the formation of an "interlanguage." (Selinker, 1972) The student creates a language based on the data to which he has been exposed and his own processing rules. The interlanguage shares properties with both the native language and the second language.

Corresponding to Selinker's "interlanguage" is the basilean produced by students in the early stages of language learning. Speakers who want to say something in the target language use all the lexical, syntactic, and semantic information they have, as incomplete or as erroneous as that may be, to construct an utterance in which rules from the first language or previously learned languages combine to create a pidginized version of the target language. (Schumann, 1987)

The third facet of gaining second language knowledge
relates to the use of the Monitor, the conscious editor of utterances initiated by the "acquired" system. Monitor use varies from over-use (self-correction makes the speech hesitant and unconnected) to under-use (no conscious correction of errors) to optimal-use, those who combine spontaneous and self-corrected speech. Krashen (1978) attributes the development of the Monitor to a combination of cognitive and affective factors, both of which are possibly connected to the onset of formal operations in adolescents around the age of twelve. However, simply knowing the language rules is not always optimal for achievement in the L2.

The knowledge to be stored and processed is determined by the Input Hypothesis, which relates to acquired, not learned, structures. It encompasses all facets of exposure and interaction with the second language. The Input Knowledge is influenced by the Affective Filter, those aspects of individual personality which regulate what will be acquired. These variables include motivation, self-confidence, and anxiety. The weaker the filter, the greater the language acquisition.

Output is important as well in language acquisition. Error correction should supply the rules from which the second language learner generates hypotheses. However, conscious correction of errors and Learning do not necessarily improve Acquisition; many students learn a rule
but never apply it, making the same mistakes over again. There are multiple levels of knowledge which can be identified by analyzing speech of the learner. (Brown, 1973) Even the best learners can learn only a small percentage of the language rules. The place of grammar in language learning, according to Krashen, serves to activate the Monitor, the self-correction device. Progressively, rules will be internalized and made part of the Acquired knowledge of the learner.

Error Correction

Although researchers may agree on the dichotomy of Learned-Acquired, the role of error correction has remained open to debate.

Cohen and Robbins (1976) view error correction as fruitless unless the feedback is selective and tailored to the learner's level of linguistic development. Robb, Ross, & Shortreed (1986), in their study of Japanese students, maintain that there is now no consensus on how teachers should react to student error. While Krashen (1984) believes that error correction should be saved for the final stage of editing during writing practice, Ghadessy (1985) suggests studying and rating errors according to their type: developmental, or lack of knowledge. In this way, the student can be pinpointed in his language development. The errors are measured and quantified to
better measure the student's total competence in the language. Robb, Ross, & Shortreed maintain that teachers often provide indiscriminate feedback, do not keep track of individual student errors, and are unable to provide comprehensive remedial work. However, they suggest that overt correction does not cause learners to learn; they simply become preoccupied with errors. Students would learn better by a discovery approach, treating correction as a problem-solving activity.

Hendrickson (1981) implies that both direct and selective error correction result in insignificant reduction of errors. In fact, he believes that overt correction may negate the positive effect of selective feedback. Students are able to assimilate only a small proportion of corrective feedback anyway, and teachers are hard-pressed to provide detailed explanations for each error. What is needed is a process to supply highly-detailed feedback on sentence-level mechanics, but such a process would take up too much of the teacher's time. (Robb, Ross & Shortreed)

Cohen and Robbins (1976), in their studies involving correction and students' subsequent learning, investigated the short-term effects of teacher correction and the interaction of the learner's background and learning style with error correction. They found that teacher correction, because of its inconsistency, led to confusion and
unsystematic information about each student. It was determined from this study that students made errors either because they forgot the rules or made wrong guesses; correction techniques should be more specific, records should be kept on each student, and remedial work should be assigned individually.

Some researchers advocate describing difficulties the learner may encounter by researching the native language. By analyzing the first language, educators can predict the structures that will be difficult for a particular language learner as determined by first language. (Lado, 1957) Schacter, Tyson and Diffley (1976), in categorizing the distinctive errors of Arabic, Chinese, Japanese and Spanish students learning English, also found that production errors are characteristic of a certain first language.

Hendrickson (1971) states that few language rules are used in isolation; one rule affects another and leads to the formation of a subgrammar which may be ad hoc and misunderstood. The student who is in a period of linguistic transition makes errors of various classifications. By documenting the appearance of certain structures, it can be determined at what developmental level the learner is. Errors are made in three categories: overgeneralization of rules, assimilation with the native language, and communication in different situations. Hendrickson (1978) favors the discovery method in language
correction. He believes that students would like to be corrected more than they are, but that the type of correction technique is important for learning. The teacher should chart the errors made, determine the type of error, and provide useful feedback to the learner. Hendrickson also classifies error according to origin. Interference errors arise from knowledge of the native language; certain structures are transferred to the L2. The teacher should focus more on communication and less on errors, making the classroom a more humanistic and relaxed place to learn. Surface errors are small grammatical errors that do not interfere with the main meaning of the message; global errors hamper understanding of the message and should be corrected. Fossilized errors refer to the habitual mistakes learners make, and can be cultural-specific. Errors that stigmatize should also be corrected first in the learner's communication pattern. Hendrickson's correction techniques include the discovery method, precise and systematic feedback, and selective feedback designed for individual learners according to language level and ability.

Selinker (1972) divides errors into categories, each describing a certain phase of language development. Initially, learners rely heavily on their native language; the errors they make tend to be inter-lingual, the vocabulary and grammar patterns are drawn from the mother
tongue. As knowledge of the target language increases, students begin to make more intra-lingual errors, mistaking forms in the target language. A higher degree of proficiency is demonstrated by extra-lingual errors, mistakes made in the stage of transitional competence (Corder, 1967), a phase related to the understanding of "nuances" in the target language during actual communication.

Richards (1980) also studied errors as evidence of a student's developmental level. Since second language competence is characterized by a dynamic and changing set of variables, a student's knowledge can be determined approximately. However, as the category of error is not clearly distinguishable in many cases, and these categories tend to overlap, a student's progress can only be approximated. Richards divides errors into two categories: intralingual errors (overgeneralizations, simplifications, developmental errors, communication-based errors, induced errors, errors of avoidance and errors caused by overproduction) and interlingual errors (transfer from the first language). By analyzing the type of error made, educators can determine the student's stage of learning in the second language.

Dulay and Burt (1972), in describing and categorizing children's errors in second language learning, regard error correction as the extinction of an old response—the bad
habit-in response to new information which allows the 
student to acquire a new response to a particular stimulus. 
Theoretical assumptions in the Dulay and Burt study are 
that the learner possesses a specific type of innate mental 
organization which causes him to use a limited selection of 
processing strategies. As language learning proceeds, the 
student's exercise of those processing strategies in the 
form of linguistic rules (which he gradually adjusts as he 
organizes more and more of the particular language he 
hears) allows him to begin to approximate native language 
linguistic patterns.

Krashen (1982) views error correction from several 
points of view. His Acquisition Theory posits that error 
correction will only help the student if errors are limited 
to the learnable and portable rules, if errors are 
corrected under conditions that allow Monitor use, if 
learners are free to use their own conscious knowledge, and 
if the learners are indeed Monitor-users. Teaching grammar 
can result in acquisition only if the target language is 
the medium of instruction. Error analysis and error 
correction yield information of the nature of the student's 
learning strategies and the variables involved in language 
acquisition and learning.

Reading

Reading, described by Goodman (1967) as a
"psychological guessing game," is not a precise process. It involves a complicated system of sampling the language, recognizing contextual clues, forming hypotheses about meaning, and testing those hypotheses for "fit." The guessing process requires that the reader pick up graphic cues and relate them to syntactic, semantic, and phonological cues; these choices are decoded and stored in short-term memory to be tested and associated with future decoded choices. As partial information is processed according to the reader's knowledge, tentative decisions are made. The testing of those decisions involves an interaction between the knowledge and background of the reader and the printed material. The ability to guess and test hypotheses is related to inherent language skills and inferencing, using intuition successfully, and accurately recognizing the proper context of the words.

In Goodman's model, a series of steps not necessarily sequential, the reader scans the page for letters and words, makes a selection of possible meaning by utilizing contextual constraints, learning strategies, and graphic cues, and forms a perceptual image of the text. Short-term and long-term memory come into play; as the reader concentrates, information in short-term memory may be lost. If the hypotheses formed by the reader prove to concur with other contextual clues, the reader continues. Faulty hypotheses cause the reader to concentrate once again in
order to posit another possible meaning. Variables associated with ability to predict are the reader's knowledge of the grammar, the ability to remember previous cues, and the ability to make the necessary associations within the text.

Some of the difficulties second language learners experience in reading are due to their imperfect knowledge of the language, wrong cues and associations, and interference from the native or another language. (Yorio, 1971) Teachers of reading to second language learners should help the student to get information from print as efficiently and as rapidly as possible with full comprehension. Certain skill areas need to be developed to aid in speed of recognition of sentence structure, lexical differences, paragraph structure, and meanings of vocabulary in context. (Norris, 1970) Since the processes of decoding in listening and reading differ from those of encoding in speaking and writing, teachers should be able to distinguish between reading and thinking, recognize the psychological processes involved in both, and teach toward greater gain in those competencies. (Wilson, 1973) As readers approximate the language, guesses are made on a few lexical, structural, and graphic clues; redundancy and the sequential nature of the native language, when recognized by the student, aid in comprehension. (Goodman, 1967) Reading comprehension ability is related to the process of
discovering underlying, inherent structures of meaning within a context that encompasses more than one word or sentence.

Reading involves the process of encoding the deep structure from the surface structure; creating sentences is the reverse process. Both processes require a knowledge of transformational rules. In order to assess the reading proficiency of an ESL student, integrative skills needed to efficiently apply these rules should be measured. (Medley, 1977)

Frank Smith (1971, 1985) details the reading process through various physical and psychological aspects. Readers are able to identify only four or five "bits" of information per glance. These "bits" may be in the form of individual letters, words, or meanings. For example, the reader can absorb several letters, four or five words, or the meaning of a phrase each time the eye focuses for a fraction of a second on the reading material. Reading involves the effective strategies the reader employs to transfer the information from short-term memory into long-term memory. Retrieval of stored concepts is also an important part of reading competency.

Analyzing surface structure (orthographic symbols, phonetics, grammar) is a necessary prerequisite for comprehension, the extraction of meaning from the underlying deep structure. Readers operate at both levels
as they utilize syntax to mediate surface and deep structure. (Smith, 1971) As proficiency increases, the reader who initially relied on surface structure analysis to comprehend can use his knowledge of the language to "predict" the occurrence of letters, words and meanings. For example, knowledge of English phonetics can reduce the possibility of the occurrence of certain letters ("q" is followed by "u"; "th" is followed either by "r" and a vowel or simply a vowel). The reduction of redundancy and subsequent development of prediction techniques signal proficiency in the target language. In addition, through exposure to the target language, the reader is able to supply more information from long-term memory, thereby relying less on surface structure.

Context serves as the medium for reading proficiency development. As predictions are made, hypotheses tested, and feedback generated during the reading process, the learner internalizes the concepts of the target language. (Smith, 1985) Various studies on the effect of linguistic environment on the comprehension of ambiguous words support the importance of learning grammatical concepts in context. Conrad (1974) maintains that prior linguistic context influences comprehension by suppressing inappropriate meanings for words. In studies of ambiguous text processing, researchers found that subjects guessed alternative possibilities of meaning for the same word;
context allowed the subjects to choose the correct meaning. Schuberth and Eimas (1977), in similar experiments involving classification techniques of words and nonwords, found semantic context to be the most important variable in guessing correct meaning. The skilled reader interacts with the text, contributing information strategically in order to extract meaning from the passage as a whole. (Wisher, 1976) Through interplay between the visual information and implicit knowledge, the reader gradually makes informed guesses as to correct meaning.

The reader can be taught to improve his "guessing" ability. Perkins and Angelis (1985) stress the importance of schema theory in teaching students to read. ESL students in the study were given a schematic concept formation task which involved graphic stimuli representing four categories. The results of the study imply that the ability to classify information requires active participation of the subject in forming hypotheses about the schema, finding common structures, and evaluating categories. MacNamara (1970) studied the reading (and problem-solving) skills of sixth grade native and non-native speakers to categorize phases of processes and to determine how certain students were able to excel at one phase but not another. He found that subjects differed in their: 1) perception of individual words; 2) perception of strings in grammatical sequence; 3) interpretation of
individual words; 4) interpretation of syntactic structures; and 5) effective anticipation of what follows in a sentence, all discrete abilities relating to reading proficiency. Kellerman (1980) stresses the importance of regarding the sentence as the unit of meaning, rather than the individual word. Students should approach the material through a "broader" view in order to comprehend the "gist" of the passage. The "broader" view requires integrated reading skills which can be developed by practicing certain reading exercises and by prolonged periods of reading.

MacGinitie (1961), in studies of contextual constraint using restoration of words periodically omitted from two English prose paragraphs, found that the paragraph form for teaching reading reduces confusion; the text supplies meaning in context rather than words and sentences in isolation. Although constraints between words generally decrease rapidly with distance, they do operate over that distance. Mandler and Johnson (1977) found the story format also an enhancer of recall, as words are presented within context. Foss and Jenkins (1973) found that differential amounts of information are transferred to long-term memory according to how ambiguous the context of the reading material is. Context provides the reader with an intuitive "gist" of meaning which helps to organize the text into a coherent whole. (Kintsch and van Dijk, 1978)

The macro and micro structures of the text are comprehended
according to the reader's skills in processing, his memory, inferencing ability, and his degree of intuition. Van Dijk (1977) breaks the idea of context down into the use of various grammatical structures, such as connectives, conjunctions to promote coherency in the text, verb tense, and ordering and sequence of facts.

Intuition, defined by Carrol, Bever, & Pollack (1981) as the inner perception necessary for gaining insight into the language structures, was the focus of a study done by Gass (1983) in which the grammaticality judgments of L2 students were recorded. Increased proficiency in English enabled students to move from the overall ability to make general assessments of grammaticality to an ability to identify and/or correct particular details. Through exercise, students acquired a subconscious "feel" for the grammar, and could identify the grammar rules. Carroll, Bever & Pollack found that linguistic intuitions can be manipulated by altering the conditions under which sentence pairs are presented to the student; intuitive processes, linked to linguistic intuitions, have a dual systematic nature; they can be basic and primitive manifestations of the grammatical knowledge of the student, or complex performance indicators that can be understood and interpreted only by a comprehensive analysis of learning style.

Gass identified advanced degrees of intuition of the
subject's ability to correct his own mistakes by being able to think about the language and his learning process (metalinguistic awareness). The student develops a "feel" for the grammaticality of the sentence as a whole, even if he can not identify the specific grammar rules. The first judgment may be of a gestalt-type before detailed analysis can be made. The "feel" becomes more refined until there is a gradual change from implicit to explicit knowledge. (Gass) Language learning develops from the whole to the detailed, first by providing the student with a general notion of the language structures, and then by allowing for dissection of the language into discrete syntactic points.

Reber and Allen (1976) used trials of synthetic grammar reconstruction to investigate the effect of instructional set on implicit learning. Implicit learning, a process in which the student becomes sensitive to the structure inherent in the language without being given concrete grammar rules, allows for the discovery and formalization of the rule system of the language. The twenty undergraduate students who participated in the study indicated that intuitive "feel" for language structures was enhanced by implicit instruction. Conscious attempts to learn underlying rules were detrimental to natural acquisition of language. Learning takes place in a tacit way largely outside of the consciousness of the students; as depth of knowledge increases, the ability to use that
knowledge is augmented. Implicit learning, a nonconscious, nonrational and automatic process, allows the student to learn by abstraction or analogy. (Reber and Allen, 1978) Brooks (1974, 1978) and Baron (1977) concur that analogic thinking accounts for much of the concept identification, especially in natural learning environments. Learners absorb more information when using a combination of explicit and implicit learning.

Syntactic and semantic anticipation, similar to "top-down" processing (narrowing a set of alternatives for upcoming words by using information from prior text) are skills the reader develops as he becomes more proficient in the target language. (Wildman and Kling, 1979) Semantic anticipation refers to the reading strategy a reader uses to predict some or all of the semantic components of the text by using his knowledge of the topic and the context. Syntactic anticipation denotes the prediction of the grammatical class of words by using prior knowledge and the context of the material. The more a student has exposure to the language, the more efficient his anticipation of grammatically acceptable sequences in the target language becomes. (Wildman and Kling) "Good" readers expect particular patterns to follow others, and they base their expectations on their knowledge of 1) the rules of grammar, 2) the situation (context), and perhaps 3) the relative frequency of syntactic sequences. Anticipation of
unknown words and meanings requires active involvement of the reader. Active reading requires the processing of visual clues (although it is not necessary to read each word) combined with the retrieval of information from several levels of knowledge.

Inferencing, the ability to gain tentative knowledge based upon partial information, is a process influenced by the student's unique experience with the language, his conceptualization of prior experience with the language, and the form of response elicited by the new stimuli encountered in the text. (Carton and Magaud, 1966) More informal than inferring, "inferencing" tends to be a rapid and haphazard process in which the learner moves from learning mere skills to the acquisition of complex intellectual processes (demonstrated by the learner's ability to creatively utilize the target language). In studies of City University of New York students, inference learning versus transfer learning was studied. Although, in the use of cloze indicators the speed of completion was related to a subject's IQ, the researchers found that the ability to infer also indicated the level of mastery of a language.

Students can be taught "inferencing" skills; a curriculum which focuses on developing the use of cues from context (intra-lingual, inter-lingual, extra-lingual) enhances language acquisition. (Carton, 1971) Graesser
and Clark (1985) found that question asking during reading can activate long-term memory and retrieval of information, thereby increasing "inferencing" performance.

For second language learners, clues within the text can be utilized to increase comprehension. Krashen (1985) advocates an indirect approach to teaching grammar in which rules are implicit and "discovered" by the learner. Intralingual clues, supplied by the target language, provide the student with a tentative knowledge of the grammar rules. Inter-lingual clues, loans between languages caused by similarities of the grammar, enhance analogic reasoning. Extra-lingual clues, those garnered from context in the reading material, provide a framework for comprehension. Immersion language programs, informal exposure, and communicative contact help the student to develop implicit and explicit learning skills and linguistic awareness of the L2. Bialystok (1981b) found that information processed automatically as implicit knowledge and stored in long-term memory can be utilized in explicit rule formation. The type of input will influence the learning mode of the student and the degree of transferability from one mode to another.

Ryan and Semmel (1969) found a clear distinction between beginning and mature readers. Young readers are more concerned about letters and words, whereas the more experienced reader can comprehend material without knowing
every detail. The more experience a reader has, the greater the ability to "expect" certain meanings from the words. The development of reading skills is not a phenomenon that occurs over a short period of time. Requisite reading skills are gradually fine-tuned and move from the simple to the complex, reflecting the learner's increasing linguistic competence. (Medley, 1977) Kennedy and Weener (1973), in studying third grade readers, found that subjects were able to transfer skills they had developed through the administration of cloze-type exercises. The items caused the readers to pay attention to units larger than words, and so to make more guesses based on contextual clues.

Writing

Writing theory centers around cognitive operations involved in constructing sentences and paragraphs. Emig (1977) maintains that writing uniquely corresponds to certain powerful learning strategies. For example, first-order processes (talking and listening) and second-order processes (reading and writing) progress across a continuum of increasingly more complex skills.

Writing involves the active participation of both hemispheres of the brain. The right hemisphere, connected with intuition, gestalts, and flashes of images, provides the imagery for creative construction. Clear writing
signals, without ambiguity, the nature of conceptual relationships, and so requires an interaction of thought processes and skills. In addition, writing is a unique form of feedback because the information is immediately available as the product. One writes as one learns: at one's own pace. Writing can sponsor learning because it proceeds at the learner's pace (Emig). Flower and Hayes (1981) suggest that the hierarchical structures of ideas and grammar, not fixed in rigid order, may be embedded subprocesses which enable the writer to be flexible. The translating of ideas into written work involves conscious attention to grammar and rules while attempting to retain the creative "impulse" of the ideas to be expressed. Writing is a generative process, calling on a variety of skills and knowledge.

ESL students, although experiencing similar problems in writing as native English speakers, have a unique lack of certain communication skills and knowledge, which makes writing a difficult chore. While ESL composition research has pointed out the similarities between the processes of experienced L1 and L2 writers, there has been less attention directed to unskilled L2 writers and how their composing processes differ from those of unskilled L1 writers.

Raimes (1985), in her study of L2 student writing, asked students to keep journals, to brainstorm, and to
write freely, responding to each other's writing in a collaborative workshop set-up. Her students composed after thinking aloud on tape; they had the opportunity to determine if a sentence "sounded right." She found that the language and the ideas expressed in the L2 emerged out of the student writer's own creativity, and not out of textbook instruction or teacher supplied material. Raimes mentioned that language learners realize they are deficient in certain language skills, and may rely on the teacher to correct errors; therefore, they have no fear of making mistakes while composing. They were able to interact more with the text, and let ideas flow. Raimes noted that writing was a type of discovery learning that paralleled the learning process itself.

Zamel (1985) investigated university-level ESL students in writing classes taught by fifteen teachers, and found that teachers respond with ambiguous, contradictory and surface comments, many times do not understand what their students mean to say, and give responses that provide students with a limited notion of their writing. Students may be confused when small errors and large are addressed in the same corrections; teachers may apply conflicting standards in correcting one sentence. Since error identification is ingrained in the ESL teacher, he may not judge written work in a global way. Students may not be encouraged to make revisions, and, if they do rewrite, may
not know which errors must be corrected to convey meaning, and which errors are surface grammar mistakes. Zamel's study identified several weaknesses in the grading procedures of ESL teachers. Instructors frequently misread sentences, make arbitrary corrections that do not remain consistent through the essay, provide vague prescriptions for change, respond to texts as fixed and final products (not as drafts that can be revised), and rarely make content-specific comments or offer strategies for revision (p. 86). The comments teachers do make are idiosyncratic and unbending. Teachers should act as consultants, assistants and facilitators during the writing process. Zamel (1983), further noted that written products tell us very little about the process and the learning strategies that students utilize; we must understand how the product came about to correct errors, etc.

Writing is not a linear process. Ideas are explored, clarified, reformulated and assimilated into developing patterns of thought. Monitor-users correct constantly; under-users never make more than surface revisions. However, the writing process is seen as a recursive activity in which ideas and modes of thought are revised. By studying learning strategies, we can devise teaching methods and approaches to individualize writing practice for each student.

In a study of composition students (Chinese,
Portuguese, Hebrew, and Persian), Zamel (1983) found that less skilled writers were concerned mainly with errors, while the more skilled devised strategies that let them pursue their ideas. She suggested that teachers can aid the writing student by providing true feedback, taking into account the specific type of error the student makes, and by becoming less concerned with surface errors and more attentive to content. Adams and Adams (1985) attained similar results in correcting errors of ESL writers, many of whom agonize over each word, correcting and revising rather than letting the natural sequence flow. They suggest that teachers spend less time on drill and more on composing, using grammar only as part of revising. Pianko (1979) documents students' excessive attention to rules and "slavery" to the Monitor, instead of allowing their creativity to help them construct sentences.

Writing is considered a thinking process in itself—an organized, intelligent activity, and not just an exercise in covering a paper with correct signs, choosing the right word, or applying the proper grammar rules. (Oster, 1985) Students must free themselves from the preoccupation with surface errors and let their styles develop; teachers should not enforce one style by insisting on a narrow-range of corrections. (Davies, 1985)

Krashen (1984) maintains that, if second language acquisition and the development of writing ability occur in
the same way, then writing ability is not learned but acquired. Therefore, when the student reads in the second language, grammatical structures will automatically become part of the subconscious rules the student has acquired. Krashen divides second language acquisition and learning into various aspects, all of which play a great role in learning. The Natural order, the Monitor, Affective Filters, and Input all interact in writing. The writing process requires the transfer of knowledge between the Learned and the Acquired, while the Monitor acts primarily as an editor. Effective communication requires time, knowledge, and a focus on form: "Grammar has a role to play in what should be in the final stage of the composing process, editing. Writers can use their conscious knowledge of grammar to fill in gaps left by acquisition" (pp. 34-35).

The Affective Filter manifests itself as the willingness to learn and the preference for a model to imitate regarding emotional states, social group identification, and motivation. (Dulay, Burt, & Krashen, 1982) Classroom anxiety is a factor in learning as well.

Studies on the Cloze Procedure

The cloze procedure, first identified by Taylor (1953) as a measurement tool for readability, is defined as the systematic deletion of every nth word from a passage. The
reader must supply the missing words by using contextual clues and knowledge of the language. The ability to identify, learn, recognize, and remember language symbols depends on associations the student makes within the text. Cloze responses are made by grasping the language structures and by understanding the substance and tone of the passage. Completing cloze exercises requires the reader to supply the missing segment in a continuum by using lexical and grammatical cues around the missing item. (Louthen, 1965) By a process similar to the closure of Gestalt psychology, the reader guesses the proper word, both syntactically and semantically.

Alderson (1979), in investigating the ability levels of native and non-native speakers in completing cloze exercises, found that the tests are measures of overall language proficiency of the lower-order language skills. White (1953) discovered that certain abilities were associated with the cloze procedure. Bachman (1985), could not definitely determine which language skills the cloze exercises measured, but stated that the deletion of certain word types produced differing ability measures. Virtually all items deleted from the text depend on contextual clues for meaning. In deletions of three types of words, syntactic, cohesive (dependent on interclausal and intersentential constraints), and strategic (dependent on long-range patterns of coherence), varying tests resulted
in a recommendation to produce tests that did not rely on random deletion.

Stansfield (1980) used the cloze procedure as a progress test and determined that the cloze can measure prior familiarity with a specific body of knowledge. However, the cloze procedure, influenced by too many variables (examinee's level of general knowledge, intelligence quotient, ability to assimilate new information, familiarity with the subject) reduces its value as an instrument for assessing language proficiency. Stansfield concluded that the cloze may be a better tool for teaching rather than for testing. James (1975) used the cloze as a teaching device with English-limited proficiency children. By choosing texts that required use of syntactic and semantic cues across and within sentences, young students were able to develop language learning skills.

Oller (1973) maintains that the cloze test can measure language proficiency, comprehension, and quality of translation. By comparing performance on written cloze tests with performance on the oral cloze, the results may measure an underlying competence. One language skill definitely identified as sensitive to cloze measurement is the grammar of expectancy, the skill of guessing proper words through contextual clues and intuition. Further indications that the cloze is a valid test of ESL
proficiency are suggested by the results of a study of English, Thai, and Vietnamese subjects. (Oiler, Bowen, Dien & Mason, 1972) Reciprocal translations of passages from English, Thai, and Vietnamese, prepared as cloze exercises, implied that the context of items was much more important than any other single variable in contributing to item difficulty, and that the cloze task is equivalent across languages.

Cloze correlations with other language abilities were documented by Oller and Conrad (1971) in their study of the cloze technique and ESL proficiency measurement. A positive correlation between the aural cloze and listening comprehension of the TOEFL (Test of English as a Foreign Language) indicated that cloze, in measuring integrative skills like dictation, may be effective in teaching and diagnosing ESL students. The responsiveness of the cloze readability measures to linguistic variables operating over segments of text in studies by Ramanauskas (1972) and Shanahan, Kamil & Tobin (1982) indicated that sentences must be related or integrated in order for students to interpret the passage. Kintsch and van Dijk (1978) detail the many variables influencing text processing ability and specific language skills. Alderson (1979), in varying deletion frequencies and using different scoring methods (exact word versus approximate word) found that, by modifying the deletion frequency, researchers can construct
entirely different tests which measure various language abilities.

Diagnosing and placement of students into language levels can be facilitated by using the cloze procedure. (Porter, 1978) Carrol, Carton & Wilds (1959) investigated novel ways of testing by defining skills measured by the cloze. They found that word-cloze exercises correlated more highly with standardized language proficiency tests, letter-cloze tests measured more integrated language skills, and that content-bearing words were divined by usage of contextual clues and previous experience with the target language. In using the cloze to detect the grammatical from the ungrammatical, the test could measure a learner's subconscious "feel" for the grammaticality of the L2. Darnell (1970), after having conducted studies to investigate the effects of clozentropy (a combination of a data collection instrument and a method of analysis for correlating effects of word deletion), regarded the cloze as the ideal test of language proficiency, which could be adaptable to the needs of specialized groups of students and particular uses of the target language. Studies on word-type deletion (Stubbs, Bartow & Tucker, 1974) also indicate that the cloze procedure is an effective diagnostic tool and an economical measure of proficiency.

Exact skill measurement tapped by the cloze procedure is the focus of several studies. (Chihara, Testuro, Oller,
Weaver & Chavez-Oller, 1977; Bormuth, 1968) In order to determine if cloze items are sensitive to constraints across sentences, two passages of prose were made into cloze tests, one in scrambled form, one in normal order. Trials of native and non-native speakers indicated that, as language learners become more proficient, they also become more competent in the use of discourse constraints. The cloze scores correlated highly with a word recognition and readability index. In addition to its function as a readability indicator, the cloze procedure discriminates between the reading ability of subjects, although it can not measure affective variables such as motivation and interest in learning the L2. Irvine, Atai & Oller (1974) found that the cloze and dictation subtest of the TOEFL correlated better with the listening comprehension portion of the TOEFL and that dictation scores and listening comprehension cloze had a high degree of correlation. They concluded that the cloze, like dictation and listening comprehension exercises, tapped the learner's underlying language competence or internalized expectancy of grammar.

Specific skill identification is continued in studies by Aitken (1977), Porter (1976), and Oller (1972). Aitken found the cloze to be a measure of the learner's facility in using redundancy, the ability allowing one to predict missing symbols from the context. Porter maintains that the cloze test can measure comprehension at all levels; it
requires only that the student understand the text and predict the meaning of omitted words, a process requiring effective use of contextual clues. Oller states that the cloze can provide teachers with valid and convenient ways to determine how well instructional materials have been understood by the students and what grammar points have been successfully taught. He found that the cloze tended to correlate best with tests that required high-level integrative language skills. Kang (1985), in using the cloze to test Korean students' knowledge of French, found the procedure to be effective in determining instructional level by identification of the exact skill to be mastered.

Weaver and Kingston (1963) maintain that the cloze is related to individual aptitudes, and so can be used as a valuable placement tool. In studying word-type deletions such as structural (every nth word omitted) and lexical deletions (every nth noun or main verb is deleted), the results indicated that the cloze tests vary little from standardized tests in measuring proficiency. The cloze tests were more related to each other than to other factors such as verbal comprehension and rote memory. Carroll, Carton and Wilds found that the cloze correlated highly with IQ, measured individual differences in language ability, and was associated with word and ideational fluency. Taylor (1957) indicated that individual scores correlated significantly with other tests of recall and
standardized aptitude tests of IQ.

The cloze procedure as an instructional tool is debated by various researchers. Jongsma (1971), in investigating the effectiveness of using cloze exercises to help students gain insight into the language patterns of the L2, found that students using the exercises did not make significantly higher gains in insight than students learning by the traditional method. Blumenfield and Miller (1966), in a study using cloze exercises in teaching college students, also found no difference between the two groups after the treatment when using five parallel cloze exercises in which every fifth word had been eliminated. However, Guice (1969), indicated that the cloze procedure was an effective tool in teaching reading comprehension to college students. Pessah (1975) reported that the cloze was effective in improving reading comprehension scores when used as part of the regular ESL classes at a community college. Friedman's subjects, three groups of university students, performed cloze exercises in which every fifth word was omitted. Friedman (1964) found that the cloze exercises did help to increase vocabulary and made students more aware of language patterns, even though the subjects of his study did not significantly outperform students who had not used cloze exercises. Jonz (1976) recommended the cloze procedure as a learner-centered teaching and testing device that challenges the efficiency of the developing L2
Differential omission of words form the basis for studies on cloze procedure effectiveness. Cloze exercise format was the focus of a study by Fitzgerald and Fitzgerald (1978) to determine the instructional value of multiple choice, maze and cloze exercises. The cloze was found to be sensitive to measurement of the student's ability to use and process visual language by highlighting semantic encoding and language clues. Martin (1968), in studying three groups of students performing cloze with selected omission, found significant differences in learning according to the word class of the deletion. Henry and Hincq (1975) integrated four different cloze exercises into classroom instruction. They found that the cloze, if constructed to focus on certain word classes, was effective for remedial instruction.

The cloze procedure as a tool for improving reading comprehension was the focus of studies by Schneyer (1965) and Rye (1982). Because sixth grade readers who performed cloze exercises did not achieve significantly higher reading comprehension scores, Schneyer concluded that merely filling in blanks and checking the answers did not increase the reader's awareness of the reasons for the appropriateness of the correct choices. Rye distinguishes between reading (sampling graphic information mainly from the context of the immediate sentence) and cloze (using a
wider context to elicit a personal response to linguistic variables). Rye maintains that studies disproving the affectiveness of cloze in teaching reading comprehension have been too short and have not focused on the proper deletion patterns for maximum learning. For example, the deletion of structure words (conjunctions, articles, prepositions, auxiliary verbs) or content words (nouns, main verbs, adjectives, adverbs) require different skills for completion.

Field-dependence/independence and cloze ability have been correlated in studies by Davey (1976) and Readance (1980). Although the designation as either field-dependent or field-independent is obtained by the use of several reliable and valid instruments (i.e., the Group Embedded Figures Test), specific skills associated with cloze performance correlate with both learning styles. (Elliot, 1960) Readance, though, found that field-independent subjects performed better on all reading tasks than their field-dependent counterparts, the differences in the correlations did not imply that a field-independent learning style facilitated achievement on cloze exercises. Differentiation, the ability related to field-independent style, refers to a broad dimension of psychological functioning. (Karp, 1963) Davey found no significant difference between field independence and cloze procedure
scores or comprehension scores for college juniors and seniors.

Studies Related to Learning Strategies

Some researchers focus on the specific strategies good second language learners use during the educational process. Oxford-Carpenter (1985) lists the universal attributes of successful language learners: direct involvement with and manipulation of learning materials to enhance retention; contact with native speakers; a stimulating learning environment; a positive attitude toward the target language; inherent interest in languages; and specific, conscious use of individual learning techniques. In order to increase the effectiveness of the time spent in the second language classroom, teachers should provide a setting that aids the student in extending and revising his understanding of the basic underlying rules associated with the target language. The "good" second language learner gradually develops the L2 into a reference system separate from the L1; he learns to think in that language. Suggested strategies for enhancing learning are: determining one's own preferred method for learning, discovering one's errors and correcting these mistakes, and focusing on formal and informal practice with the L2.

Certain variables have been identified in second
language learning. Some studies have investigated the influence of these variables, other facets of language learning remain to be studied.

Nelson, Howard, Lomax, & Perlman (1984) compared two teaching methods regarding a small sample of young learners and student teachers. They studied the effects of socio-economic background, innate cognitive ability, language proficiency, attitudes toward the target language, motivation, and instructional approach. The contrasting methods of instruction were the mechanical style (behavioristic, drill & practice, error correction) and the communicative style (integrative, a fusion of cognitive and nativist, reciprocal dialogue, encouragement of creativity). The results favored the integrative, communicative teaching model that relies on student creativity and participation. This model enhances motivation as well as instructional language proficiency.

The latent variable of socio-cultural background (specified as the combination of socio-economic level and cultural designation) had no significant effect on the learning results.

Age as a variable in second language learning was studied by Pathman (1975) in a project involving two hundred children from diverse backgrounds. She found no major differences in the order in which children of different ages learned to produce certain linguistic
structures. The rate of learning, but not the order of acquisition of functors, was affected by various age categories. Fathman suggested that studies be conducted to determine what other aspects of acquisition change with age, what kinds of errors are made by age group, what strategies are utilized by different learners, and what individual differences are displayed in language learning.

A study of Hmong refugees living in Thailand (Weinstien, 1984) revealed individual cognitive differences displayed in writing. Cognitive ability was defined as the performance measure in writing, reading, and grammar. Functional language ability referred to skills in speaking and oral comprehension. Although there were no significant differences between literate and non-literate learners regarding innate language ability, writing was a direct expression of increasing cognitive development in the native language. Weinstein recommends that teachers facilitate the process by which students interact with the target language both inside and outside the classroom.

Sex of the student, language background, field of study, length of stay in the United States, and educational experience were studied to determine possible influence on the language learning of 257 community college ESL students in San Fransisco. (Spurling and Ilyin, 1985) It was found that sex and length of stay were not significant, whereas language background and previous educational attainment
were significant variables in language proficiency. However, the differences noted were not directly attributed to the variables, as there could have been interaction of unspecified affective factors (motivation level, attitude toward the second language, parental support, etc.). The latent variable of socio-cultural background (specified as the combination of socio-economic level and cultural designation) had no significant effect on the learning results. Roberts (1983) found that a large number of predictive variables could be collapsed into general factors and so generate misleading results. She recommended identifying specific personality variables related to successful language learning, and developing a personality profile of the successful learner to provide teachers with useful information about individualizing instruction.

Lucas (1984) isolated a significant affective variable that teachers often overlook: some students experience classroom anxiety, are hesitant to speak and to ask questions, and thereby do not get full advantage of their time spent in the language class. In particular, Lucas found that Japanese students are disinclined to speak because: they fear failure; they fear making mistakes; their culture does not stress speaking or questioning the teacher; they do not want to be the center of attention; they do not want to be critically evaluated, especially in
front on their peers; and they do not want to be perceived as demanding and dominant. Therefore, it is the teacher's responsibility to identify students who are reticent to speak, and to provide opportunities for these students to interact with the target language in a more comfortable setting.

Field-Dependence/Independence

One of the significant variables in language learning is the classification as either field-dependent or field-independent learning style.

Field independence is defined as an analytical method for perceiving objects that are embedded within the surrounding environment of the subject. An FI personality can distinguish discrete parts from a whole, possesses internal frames of reference that are distinct from outside referents, and favors formulating hypotheses from the available information and testing those hypotheses. (Witkin, Moore, Goodenough, & Cox, 1977)

In opposition, a field-dependent person does not impose structures by himself; he relies on the judgments of others to supply relevant information. An FD student has more difficulty if the material to which he is exposed is unorganized, and he prefers learning facts and rules rather than nebulous packets of knowledge for which he must devise a classification and hypotheses. (Witkin, et al., 1977)
FD learners recognize concepts that are salient more readily than FI persons, and have difficulty learning sets; they favor the spectator approach to learning. Both FD and FI students learn differently according to the form of motivation offered within the educational environment. It can be predicted which students will be affected by what kinds of reinforcement, and lessons can be designed to individualize instruction. (Witkin, et al.)

The classification into FI or FD defines a broad dimension of self-consistency in forms of cognitive function: how we perceive, think, solve problems, learn, relate to others, etc. The quality is merely a tendency in the way we approach information processing. The category describes a personality type as well.

Roberts (1983), in her study of language learning influenced by cognitive style, viewed the FD/FI designation as a bipolar measure of an individual's preferred approach to problem solving and information processing. The style is not correlated with intelligence. Roberts defines the FD students as having the ability to see the "whole picture" rather than the discrete parts of the totality; they are people who are much more attuned to others, and who learn through social contexts by being sensitive to social clues. Material to be learned is assimilated more readily if it contains social content. Field-dependent students learn better from the teacher as they need an
organized pattern for memorizing facts and concepts. Field-independent students, on the other hand, may be perceived as impersonal, aloof, and cold, as they exhibit an analytical approach to problem-solving, relying on internal frames of reference to supply concepts and structure to the material. They construct hypotheses from the available information, test the hypotheses, and formulate their own rules. These students learn better than FD students under intrinsic motivation, and have a more developed sense of separate identity. (Roberts, 1983) Roberts suggests that the FD/FI distinction may be culturally related: those people from more industrialized societies that stress educational attainment appear to exhibit more FI tendencies. To conduct the study, Roberts asked the research questions: "What is the relationship of FI/FD to successful second language learning? Can knowledge of a learner's FI/FD test score predict his success in learning a second language? She hypothesized that successful language learners would be FI, as demonstrated by a greater ability to concentrate on relevant language stimuli. Roberts's results showed a significant correlation between FI and improvement on the TOEFL grammar and listening test of English language proficiency. Although FI was a positive factor, she recommended that other personality variables be studied in relation to language learning. Roberts also recommended
that, if hypothesis testing is a characteristic of the successful second language learner, this skill should be taught. Educators should not assume that one teaching method is best for all students; the class structure and instructional materials should be varied to accommodate the wide variety of learning styles.

Field-dependence/independence is central to the study of second language learning conducted by Ballard (1985), in which four cultures (Laotian, Spanish, Tongan, and Vietnamese) were tested for FI/FD designation and language proficiency. The results implied that there is a significant correlation between FI and the scores on the language test (CAT), but that reading involves the combined skills of FI and FD learning styles. Reading competence requires not only linguistic analysis and restructuring, but also the ability to extract meanings from social communications.

Abraham (1985) studied FI/FD learning styles of forty-five males and sixteen females of Spanish, Arabic, Indonesian, and Chinese descent at Iowa State University regarding learning success. She defined the field-independent personality as possessing a consistent tendency to approach the environment in analytical, as opposed to global, terms. FI is the characteristic of articulating figures as discrete from their backgrounds and the facility in differentiating objects from embedded contexts, as
opposed to the countertendency to experience events globally in an undifferentiated fashion.

Field-independence, the ability to differentiate parts from their surroundings, has been related to success in second language classrooms in which deductive teaching dominates. (Carroll, 1975; Frohlich, Stern, & Todesco, 1978; Bialystok and Frohlich, 1978; Bialystok, 1978) The FI learning style has been found to be modestly significant and positively related to language success in several standardized paper-and-pencil tests, in the use of the Monitor (Krashen, 1982), and in measures of imitation and cloze tests in the deductively taught class.

Abraham reported that the FI students performed better with a deductive lesson, while FD learners preferred the example lesson in which rules are stated. The results suggest that teachers should prepare alternative lessons for FI and FD students. While better retention of rules results from the deductive lesson, more transfer of the rules to new situations is obtained from the discovery method. (Hermann, 1969)

In a study conducted by Hansen and Stansfield (1981), FD/FI learning style is defined as contrasting tendencies to rely either on external or on internal cognitive frames of reference, respectively, in processing information. There is some indication that the restructuring behavior of FI learners extends into verbal information processing as
well. Psycholinguistic studies on first language sentence construction and deeper-level grammatical transformations imply that certain verbal processing procedures are similar to those used in performing the visual-spatial tasks associated with FI and FD. Discrepancies in results may be a result of different instruments used to measure FD/FI, and different second language tasks required of the tests, etc.

Hansen and Stansfield studied three hundred students at Boulder, Colorado, in regard to FI/FD designation and proficiency in Spanish as measured by the cloze test (a multiple-choice test requiring restructuring ability associated with FI). The students were given the Group Embedded Figures Test, in which subjects must perceive and outline a simple geometric figure within a larger, more complex design which serves to obscure the simpler shape. The subjects must overcome the organizational context, by "disembedding" discrete, relevant information from the "field." Restructuring skills also apply when performing similar cognitive operations with verbal or symbolic material. The results indicated that FI is correlated with greater success in second language learning. However, the authors caution that the relationship does not imply cause-and-effect. FI varies in regard to the particular language tasks being demonstrated. In addition, Oller and Hinofotis (1976) found that overall second language ability involves
a separate "speaking ability" associated with the FD learning style.

Nevertheless, field-independence has been shown to be the significant variable in learning grammar rules, as it refers to the tendency to organize, analyze, and structure both perceptual and symbolic material required for successful learning. The internal, analytical approach associated with FI may lead to greater metalinguistic awareness in second language learning; it may provide the underlying basis for the Monitor, described by Krashen (1982).

Bialystok and Howard (1979) concluded that inferencing ("the ability to exploit available information sources maximally in order to gain new insights into unknown aspects of the target language" p. 27) is an integral part of second language learning and may derive from field-independence. Students may be taught the skills of inferencing; they may be taught to become more FI while learning a second language.

Stansfield and Hansen (1983) maintain that learning follows a sequence through which one first understands the whole or broader issues and then grasps details. They used the cloze test to ascertain the amount of language proficiency demonstrated by second language students of either FI or FD learning style. They concluded that the FD style may not exploit all available information in problem
solving required by the cloze tests.

Studies to date in second language acquisition indicate that field-independence is a significant variable in language performance, but it is not fully understood what isolated skills are responsible for language ability. The research suggests that the traditional classroom may be improved by the addition of new teaching methods and materials that would take into account the field-dependent learner.

Computer-Assisted Instruction

Computers have been increasingly used in language instruction because they: offer error analysis, individualize instruction, provide immediate feedback, produce remedial branching, speed the evaluation of material, are accurate, keep track of errors, and offer the ease of revision associated with the word-processing function. (Marty, 1975) Reading explanations on the computer screen, and interacting with the program enhance motivation and keep interest at a high level. The student can request a detailed explanation for the errors he has made, and feels responsible for his learning, not only because he can control the pace of instruction, but because the material presented is uniquely designed for him.

Raschio (1984) discusses the attributes, role and uses of CAI materials in the foreign language classroom. The
most important advantage of CAI is that it can match the cognitive style of the student, going beyond the drill and practice exercises of the traditional classroom to a more individualized course. Students doing CAI exercises are processing information within context, not simply discrete language elements. By providing students with dialogs, narratives and other story formats, extrapolating the particular meaning of words is made a more immediate activity in the learner's experience, rather than rote memorization of word lists. Students processing a text, whether oral or written, in the language they are learning, sidestep the need to switch into and out of their native language. Simultaneous listening and reading of foreign language texts exercise similar skills.

In reference to matching learning styles, Raschio maintains that the CAI software, if designed with learning styles in mind, can exercise inductive and deductive reasoning skills. The computer-generated practices require alertness, expectancy, retrieval from long-term memory of grammar rules, selective perception, semantic encoding, and intuitive responses from the learner. Language learning in the past has stressed only memorization of vocabulary and grammar rules, and the manipulation of discrete grammar points in translation exercises.

According to Krashen (1982), comprehensible input must satisfy certain conditions. Knowledge about language is
conscious, but knowing the language involves implicit learning; drill and practice exercises are not sophisticated enough to require higher-order language skills. Students must be encouraged to find meaning beyond letters, words, and structures. Text processing forces the learner to focus on elements of meaning within context. Good articulation with a traditional language course, however, yields the greatest benefit in language acquisition. When integration of CAI into the curriculum is successful, students will acquire the discrete linguistic elements governing the L2 and be able to use the implicit grammar rules.

Estrine (1975) studied the effects of CAI on adult learning, and found that adults prefer the self-paced and independent style of computer-generated text processing. Terry (1977) states that CAI, if integrated into the instruction, helps to alleviate some of the boredom and lack of motivation present in many language classrooms. CAI exercises help to bridge the gaps between the teacher's methods and individual learning style. (Venti Duncan, 1985) Although several studies have implied that programmed instruction is more effective in teaching English than CAI (Lundgren, 1985), the results suggest that software designed to match learning styles would significantly increase student achievement.

Researchers of individual language learning CAI
programs have recommended ways in which CAI can be integrated into the curriculum. Daily practice with CAI can help students to, not only identify their own mistakes, but to analyze the errors. (Schmidt, 1983) Schaeffer (1982) studied the effectiveness of structural and semantic computer practice across two levels of verbal aptitude, concluding that CAI can create meaningful interaction between the student and the text. Boyd, Keller, & Kenner (1982) documented successful trials with CAI activities and increased critical thinking skills of students. The modules used by the researchers drew together a number of skills and integrated them into sentence-building exercises.

Foreign language instruction is particularly conducive to individualized instruction. Ruplin and Russel (1968) found that German instruction via CAI, though not a replacement for the language lab, provided thought-provoking exercises within a meaningful context. Olsen (1980), in investigating CAI and German instruction, concluded that the computer, used as a supplement to traditional language class, helps students to acquire the concepts just taught. King (1985) individualized CAI instruction for students, who worked on the exercises twenty minutes a day. The experimental subjects made improvement over the control group in reading comprehension and written expression. Weible (1980) used computer
programs to teach high frequency vocabulary, basic syntax, and reading skills by encouraging students to infer meaning from context. The exercises involved the processing of language clues from several levels of knowledge. Analysis of scores determined that students using the exercises obtained a significantly higher score in vocabulary than those subjects not using the CAI instruction.

In a study of the effectiveness of grammar exercises using the PLATO mainframe system, Chapelle and Jamieson (1986) investigated ambiguity tolerance, attitude toward CAI, language proficiency, time spent on the CAI system, anxiety, and motivation. The ESL students, Spanish and Arabic, were able to work at their own pace, receive individualized instruction and a diagnosis of their needs, records of their errors, and meaningful explanations about various grammar points. There were no embarrassing corrections as in a traditional classroom, and the student's progress was kept confidential. Chapelle and Jamieson determined that CAI was a significant teaching innovation in language learning, although field-independent students did not prefer using the computer to do their lessons. These researchers suggest that studies be done to describe the strategies used by good language learners and to assess cognitive/affective characteristics that are important in L2 acquisition. They hope that, "our understanding of L2 acquisition can be reflected in the
intelligent use of computerized lessons and ultimately in
the development of more "intelligent" lessons" (p. 42-43).

Mydlarski (1985) maintains that computers can lower the
affective barrier; students are generally more relaxed and
can work in privacy in a protected environment. The
computer can free the teacher to attend to more complicated
learning methods. Students retain interest in CAI if their
own language is used for demonstration. Errors pointed out
by the software program can lead the student to "discover"
his own mistakes and remember the correction. Some
theorists believe that understanding is deeper if students
discover the patterns and language rules for themselves.
(Stern, 1984; Stowbridge and Kugel, 1983) In addition, the
program is able to loop and branch to show the student the
consequences of his decisions, while offering alternative
choices.

Russell (1984), in her work with CAI programs in
Australia, favors computers in education because they:
allow teachers to structure the student's interaction;
allow teachers to display the process as a process-the
student can watch the correct word order being used; there
is an efficient use of the material stored by the computer,
especially in regard to individualizing instruction; CAI
frees the teacher from routine correction; computers can
not replace, only supplement the teacher; and good computer
programs are calm, patient and always correct—neither the
teacher nor the student feels threatened and the student
does not feel stupid when making an error.

Underwood (1984) values CAI as a tool requiring active
participation of the learner in an instructional mode that
utilizes implicit instruction to enhance acquisition,
rather than rote memorization. He recommends STORYBOARD
and CLOZEMASTER as programs that offer extensive practice
to encourage discovery learning about the language.

Anderson (1984) cautions that instructors should not make
the same mistakes in instituting CAI as in initiating the
language laboratory: do not try to impose the technology on
staff who are unprepared and who fear being replaced by
computers. In-service workshops and minicourses should be
designed to aid in the assimilation of CAI as a supplement
in regular classroom instruction. Educators should
thoroughly investigate the advantages and disadvantages of
CAI in order to effectively integrate computer-assisted
instruction into the curriculum. "The beauty of the
machine is that it is just that, a machine. It will wait
for as long as we want it to wait and then do whatever we
are clever enough to have it do for us" (Russell, 1983, p.
51).

Computer-assisted instruction was found to be less
successful than programmed textbooks and traditional
classroom lessons in a study of students taking Business
English (Lundgren, 1983). It was predicted that CAI would
be more effective, as it requires active participation from the user. However, the study suggested that programmed instruction was favored over CAI because it allowed for review of previous grammar points. Good CAI software can also be designed with this review feature.

For writing, the computer is limited in its ability to process natural language. The software and hardware are in the developing stages, and knowledge about the inter-relationships of cognition and machine operation is scant. However, the computer can be programmed to respond in a certain way to help students deal with new information and connect it in logical fashion to existing knowledge for retention. (Balajthy, 1985)

The research presents conflicting opinions regarding computer-assisted text analyzers in language instruction. Oliver (1984) cautions that the computer cannot function as an effective audience and tutor for inexperienced writers. CAI is yet so limited, that the deficiencies make the machine into more of a monster than a mentor. The tendency to isolate tiny points from intended meanings make the text appear disjointed and incoherent. He maintains that: "A knowledgeable sixth-grader is more skillful at locating and correcting errors in grammar and punctuation than is the most intelligent of today's electronic grammarians" (p. 95). Inexperienced beginning writers, lacking discriminating judgment and confidence, may defer to the
machine's inaccurate analysis regarding style, diction, and readability. The computer-assisted text analyzer is product-oriented and tends to reinforce rigid, error-oriented perception regarding writing. Oliver states that there is no evidence that computers enhance a writer's ability. Smith, Kiefer, and Gingrich (1984) report numerous advantages of using the Bell Laboratories' UNIX Writer's Workbench text analyzer. Students were able to receive cross-referenced grammar explanations, suggestions for improvement, and dictionary files. A copy of the analyzed text can be taken home and studied for revision, since the program only calls attention to potential problems—the student must make the final decisions on how to change the essay.

Collier (1983) found no significant improvement in the writing and revising of those students using CAI. Computer use may even discourage creativity, the free play of ideas, and experimentation as well. In addition, the computer may manipulate the user into a certain style, and discourage the writer by illuminating surface errors. Olson (1985), however, believes that computer use sharpens the intellect. Users must be specific about meaning; they must understand what they wish to convey and find the proper words to express their intended meaning. Computers tap many knowledge sources and, although they are unable to differentiate between ambiguous meanings or read between
the lines as humans do, they help the writer change symbols into tangible, understandable meanings for the reader.

English faculty with no background in computers can incorporate CAI into their classes without previous instruction. Less time is spent on correcting surface errors and more on designing lessons for the classroom. The criticisms of the written work are not the idiosyncracies of one teacher but the collective judgment of many grammar experts. Schwartz (1984) developed a writing program for her college students (SEEN—Seeing Eye Elephant Network) which consists of a three-part series of activities designed to remove some of the difficulty of writing. The program allows teachers to store error information on each student and assign remedial work based on the error patterns. Students, who know their grammar will be corrected by the program, are free to concentrate and generate ideas. They do not resent criticism from the computer and are able to access information on any question they might have immediately. There may be some transfer of learning from the corrections of one essay to the creation of another.

Short-term and long-term memory theory is the focal point of a study by Daiute (1983) involving error correction by computer. The computer puts less of a burden on short-term memory and lessens the effects of some physical and psychological constraints of the classroom.
Writers are able to compose more spontaneously and quickly; the program helps them remember grammar rules necessary to create logical, coherent arguments. Errors marked by computer can be channelled from short-term to long-term memory. An interactive, self-monitoring process helps students find particular mistakes and formulate corrections. The writer becomes more conscious of his own cognitive processes. CAI gives the learner more control and allows him more time to form ideas, using knowledge stored in short-term and long-term memory.

CAI can also be beneficial if used only fifteen minutes per day. Wresch (1982) reports that students in Highline Public School in Washington who learned with the computer for as little as one hour per week showed definite gains in grade level as measured by the Stanford Achievement Test (p. 487). Wresch attributes the success to the learning principles of CAI: small amounts of information is presented at one time, students are active participants, feedback is immediate, and students feel in control of their learning. CAI success in writing is further demonstrated by Selfe and Wahlstrom (1983) in their study of the effects of Wordsworth II, a program designed by Selfe, on freshman taking English classes at Michigan Technological University. Students are involved in all phases of writing, even in correction. The teacher is freed to tend to the more difficult tasks of lecturing,
having individual conferences with the students, and
organizing small work groups.

Southwell (1983) maintains that one of the strengths of
CAI is the ability to present grammar facts in context, not
in isolation as in a textbook. Students described in his
study received rhetorical instruction in class and worked
alone in the autotutorial lab on a program of grammar
instruction. Students who were able to visualize the facts
they had learned in context learned important lessons about
the interconnectedness of words—their function in the
sentence. Southwell advocates integrating CAI with
classroom instruction.

Higgins (1985) provides more evidence that CAI
exercises may help students absorb facts that appear to be
disconnected into the subconscious, where the mind can then
organize them into grammar rules to be applied while
writing. In his project to determine if meaningful
messages could be exchanged by machine, he distinguishes
between Learning and Acquisition. Traditional class
exercises concentrate on Learning, while the machine
manipulations are designed to enhance Acquisition.
Higgins believes that the student learns at his own pace
when he receives insights into the language and formulates
the grammar rules for himself. CAI offers the student time
to learn at his own rate, not at the mass pace of a
classroom. Acquisition requires divergent thinking and
creativity on the part of the learner. Hubbard (1985) agrees that writing is a process that does not have to proceed along definite lines, as in traditional writing classes. Students who are able to work individually with a CAI program have their errors identified in a non-judgmental way and arranged into a pattern, so that they can understand their mistakes. Branching features provide mini-lessons unique for each student's learning problems. The disadvantages are that the computer cannot truly understand the text and evaluate the work with the skill of a teacher. However, the program is designed only to supplement the regular class and not to replace the teacher.

CAI, especially in writing, contains features to identify individual errors, present detailed explanations regarding those mistakes, and include the student in an interactive participation with the learning process. For ESL students, the text analyzer provides the flexibility students need to find equivalences, paraphrase, expand on their ideas, and risk creating unique responses in a second language. CAI programs can be adapted to correspond with each learning style: field-dependent/independent, low ambiguity tolerance, too impulsive, too broad a categorizer, etc. The exercises offered by the text analyzer system serve to improve the student's judgment, help him to extract meaning from a multitude of stimuli,
and organize relevant patterns and grammar rules for himself. In addition, CAI when designed well, can be more effective in enhancing student learning than the language laboratory, in which isolated grammar rules are exercised. Students are able to monitor their progress more closely and in privacy.

Software for L2 classes has been created to exercise discrete learning skills. STORYBOARD, in the format of progressively more difficult word omission exercises, tests the student's ability to guess words from context. Students can keep records of their errors, a function which helps teachers to detect weaknesses in individual learner's skills. (Paul and Payne, 1983) Southwell (1982) produced CAI lessons for: sequencing events; checking retention of information; supplying definitions and concepts; checking receptive understanding of new concepts; applying principles correctly; and testing comprehension. Developmental students benefited particularly well from these CAI exercises.

M-SS-NG L-NKS, a cloze exercise program of increasing difficulty level, is designed to help students analyze grammatical elements in written material. The program, which can be adjusted to a student's level of language ability, presents, reinforces and evaluates concepts. Designed to supplement, not replace, the traditional classroom, the program acts as a patient tutor, suggesting
certain grammatical constructions.

Implications for Teaching

Teaching grammar and vocabulary in context, as in story format, has been recommended by researchers (Carrell, 1984; Johnson and Mandler, 1983; Eskey, 1973;) to enhance retention and help students develop inferencing skills. Carrell stresses the importance of context, rather than isolated facts; discourse and comprehension are determined, not only by local effects, but by overall organization of the text. Story structure guides the learner in encoding by providing a framework to structure the incoming information. Johnson and Mandler state that the quality of recall is increased when the story is structured with a rhetorical organization that conforms to the reader's schema for simple stories. Teachers are able to design cloze exercises and tests for every level of reading by following a prescribed formula. These exercises can then be utilized to enhance student use of recall skills. (Gagliano, 1987)

ESL students have more difficulties in organizing information. Practice is needed to develop skills which help the student learn in a holistic way (Eskey). An intensive system designed to increase a student's mastery of the syntax and lexicon of written English should provide him with the vital cross-cultural information needed to
decipher sentences.

An informal learning environment, especially for adults, has been effective in acquisition of English. (Upshur, 1968; Mason, 1971; Carroll, 1971; Oller, 1973; Krashen, 1976) Adult learners supplement their imperfectly acquired competence by consciously learned linguistic knowledge. Informal exposure reinforces explicit rules learned in traditional classroom environments. Plaister (1968) has had success in preparing students with the material they will encounter prior to informal exposure. Bortich (1973) stresses that informal language learning should be accompanied by formal instruction. Davis (1982), in using the cloze exercises as a diagnostic tool, allowed students to complete cloze tests developed from their own written work, making students more conscious of language structure and grammar.
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CHAPTER III

METHODS AND PROCEDURES OF THE STUDY

Description of the Subjects

The subjects involved in this study were thirty-eight community college students enrolled in one of three levels of English as a second language at a community college. The students were from all income levels and ranged in age from nineteen to forty-five. The control and experimental group subjects represented thirteen countries (Mexico-10, El Salvador-3, The Dominican Republic-1, Peru-1, Colombia-1, Chile-1, Taiwan-11, Korea-1, Vietnam-3, Laos-1, Iran-2, Pakistan-1, and Ethiopia-2) of which twenty-three were females and fifteen were males. Various ethnolinguistic groups selected for the secondary study (Spanish versus Chinese native language variable) were from Spanish-speaking countries (Mexico-10; El Salvador-3; Dominican Republic-1; Peru-1; Colombia-1; Chile-1) of which seven were males and ten were females, and from Taiwan (of which three were males and eight were females).

Students were placed in the following levels: beginning (English ALFA Book 2-ten students; low-intermediate (English ALFA Book 3-twelve students; and high-intermediate (English ALFA Book 4-sixteen students).
The subjects in the secondary study focusing on Spanish versus Chinese native language effect were identified by these levels: beginning (English ALFA Book 2—eight students); low-intermediate (English ALFA Book 3—nine students); and high-intermediate (English ALFA Book 4—eleven students). Students are placed in one of the levels of English ALFA based on scores of the English ALFA Placement test. The 100-item exam provides a skill-by-skill placement diagnosis. Students who obtain 20-39 on the first fifty questions are assigned to Book 2. A score of 40-59 out of 75 items is classified as Book 3; Book 4 students have received a score of 60-80 out of 100 questions on the Placement test.

Procedures for Conducting the Study

The Placement score and language percentile score on the criterion-referenced ALFA exam were recorded for each student. The ALFA exam, used to ascertain specific individual attainment, assesses proficiency by means of discrete items in a progressively more complex level of difficulty. A 100-item Form A ALFA test (pretest) for specific level was administered to each subject at the beginning of the course to provide a baseline starting level for comparison after the fifteen-week course. Modeled after the TOEFL (Test of English as a Foreign Language), the ALFA exam measures proficiency of grammar
comcepts in a hierarchy from simpler to more complex. The test is closely aligned with the curriculum and enhances congruence between the curriculum materials and the specified behavioral objectives of the course. (Rothman, 1987)

The final grade and the culture, or first language, of each student were also recorded on the Classroom Summary Roster for ESL. This record was compared with each individual's Home Language Survey Form in order to check for accuracy for inclusion in the population. The subjects were assigned numbers alphabetically/numerically.

Subjects were then assigned randomly to one of two groups: one group utilizing the computer-assisted cloze exercises in conjunction with the English course, the other group completing cloze exercise assignments with the assistance of tutors but without the aid of a computer-assisted program.

The students attended class for two hours a day, four days per week. The course advanced along thirteen carefully structured lessons to be completed by the students. Students mastered the coursework by listening to language tapes and completing the textbook and workbook exercises. A master teacher and three instructors monitored student progress daily; each lesson was corrected by one of the teachers.

The English ALFA, a laboratory-based course, is not
modelled after a single theory of language acquisition; rather, it combines the audio-lingual method with the cognitive-code, or "generative," theory of language learning. The eclectic approach of the material consists of conditioned verbal "responses" as well as exercises to help students internalize aspects of the language. Students apply both grammar rules and inferencing skills to complete the exercises. Although a conscious knowledge of structure does help the student to acquire the second language, the English ALFA method of focusing attention on the grammatical items in contrastive contexts mirrors "real" language use.

Students take a series of three examinations during the semester. The midterm, a test of approximately fifty items, is administered as a diagnostic as well as a progress measure. The second test of about fifty questions is completed after the Book is finished. The final exam, approximately 100 items, is administered as a final progress test and as entrance criteria for the next level. Final grade scores are determined by averaging the three exam scores.

The Experimental Group

The experimental group was composed of twenty students (of which eleven were Spanish and seven Chinese), representing eight males and twelve were females. The experimental students used a series of software programs
for fifteen minutes each day (working the remaining one hour and forty-five minutes in the language laboratory).

STORYBOARD—English Language Version by Christopher Jones (Holt, Rinehart and Winston, 1984a), a text deletion and reconstruction program, has been used with native speakers to teach reading comprehension, foreign language, and even science. The exercises consist of passages of varying readability levels in which parts of the text have been obliterated and replaced by asterisks. Students reconstruct the text by guessing words that might logically belong in the position. Every time a word is typed in, the computer scans the text and prints the word where it occurs in the passage. Students continue guessing in this way until the text is complete. The process of reconstruction helps students gain insights into the structure of the English language and develop an intuitive "feel" for various classifications of words (noun, verb, adjective, article, etc.). The students acquire a knowledge of which words are most frequently used in English and a sense of collocation. The ability to deduce missing words from context requires a high degree of language awareness and calls on all one's structural and communicative knowledge of the language. The program options are flexible enough to allow beginning English as a second language students the opportunity to participate. The "help" functions of the software provide students with hints and clues to aid
in text reconstruction.

CLOZEMASTER—English Language Version by Christopher Jones (Holt, Rinehart and Winston, 1984b) involves cloze exercises in which words have been deleted according to a pattern chosen by the student and/or teacher. The deleted words, replaced by numbers, are typed into the computer. Incorrect answers receive a "Sorry. Try again" response. The "help" functions offer hints for text completion. Students must intuitively guess the words by inferring meaning from the context. The "help" options include: 1) a chance to see the text for a variable length of time before starting; 2) a "word" option, which will reveal any unknown word the learner wants to know in the text; 3) a "letter" option, which will supply the first letter of a word chosen by the student; 4) a "see" option, which will, at any stage, reveal the entire text, and then revert to the position the learner has reached in the reconstructed passage; and 5) an "exit" option, at which time a student may choose another text and/or deletion pattern.

Both STORYBOARD and CLOZEMASTER contain scoring facilities to provide feedback on student progress. An authoring system allows text to be entered by students and/or teachers for inclusion in the exercises.

M-SSING L-NKS (Sunburst, 1983), developed by Dr. Chomsky, Lecturer of Education at The Harvard Graduate School of Education, and Dr. Schwartz, Professor of
Engineering Science and Education at the Massachusetts Institute of Technology, is a series of puzzle exercises which gives students the opportunity to analyze language concepts as they guess words using structural clues. The objectives are to help the student: 1) develop a sense of the author's style; 2) improve comprehension; 3) make inferences using context clues; 4) extend vocabulary; 5) recognize nuances of word meaning; 6) develop a sense of unity and continuity of language; 7) practice correct grammar structures; and 8) improve spelling. (Chomsky and Schwartz, 1983) Students work on completing text in which letters have been deleted according to a pre-determined pattern. As students practice the exercises, they become familiar with the parts of speech and develop an understanding of grammar elements and their position in the English sentence. The possibilities at each point in the sentence are narrowed down by clues about word class, verb tense, articles and prepositions that are required by context, idiomatic expressions, and, of course, topic. The student supplies information from his/her built-in knowledge of language and familiarity with the topic of the text. M-SSING L-NKS also contains scoring options and a break-down of the errors made.

The Comparison Group

The control group was composed of eighteen students (of
which six were Spanish and four were Chinese) representing seven males and eleven females. The control group attended the laboratory-based language classes for two hours daily, four days per week. They completed the thirteen lessons using language tapes, and lessons were corrected by one of the four teachers. These students did not spend fifteen minutes per day doing computer-assisted cloze exercises.

Scoring Procedures and Data Collection

After fifteen weeks of instruction, all students received a posttest of grammar, the English ALFA Form A. Students also completed three exams for their appropriate English Level and Book. The criterion-referenced English ALFA tests were chosen as measurement instruments to detect possible improvements made by students who do not possess a high degree of proficiency in English. Studies involving ESL students to date have focused on the intermediate and/or advanced student. This study, concerned with detecting slight developmental changes in the learner, relied on instruments sensitive to the curriculum material employed in instruction. It was assumed that the test would accurately assess developmental stages in the learners' path from low proficiency to intermediate in relation to the materials used in the classroom. It was believed that a global test would identify only a small number of proficiency levels not related to the curriculum
structure. (Ingram, 1985) Selection of the test was appropriate for what was being taught and what the researcher wanted to determine.

This study was designed to determine if computer-assisted instruction enhanced learning of an experimental group composed of various nationalities typically studying English as a second language at a community college and of a subgroup of Chinese and Spanish speakers when compared to a control group of "similar" students who do not use computer-assisted instruction to complete structured lessons. Further, this study was designed to determine if computer-assisted instruction had a significantly more positive effect on Spanish-speaking as opposed to Chinese-speaking students.

A nonparametric t test (Siegel, 1956) was calculated to compare the means for both experimental and control groups for statistical significance between the pretest scores to determine if there was an initial difference in beginning levels. The Mann-Whitney U nonparametric test for small sample sizes (Siegel) was performed on the posttest scores of the experimental and control groups to determine if the computer-assisted cloze exercises had been significantly effective in instruction. Since the sample size was small, an analysis of covariance, using the pretest scores of the ALFA test as the covariate, could not be performed on the mean scores of the ALFA test of the three levels of
experimental and control group students and on the scores of the Chinese and Spanish native language speakers in the experimental and control groups. The Mann-Whitney U test, though it does not adjust the calculation for pre-treatment differences of certain variables, can detect initial differences between the groups on specified variables. Therefore, the Mann-Whitney U test was used to determine if any variations in posttest scores could be attributed to the treatment.

A scatterplot diagram was produced as visual representation for some of the data. The statistics generated from the analyses were examined to determine if computer-assisted instruction and if culture were predicting factors of achievement in English as a second language.

The statistical analysis was computerized using LOTUS 1-2-3. (Kilpatrick, 1985) The data are presented in tables. From the results, conclusions are summarized, educational implications are stated, and recommendations are made.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION OF THE FINDINGS

The problem of this study was to determine the effect of computer-assisted cloze exercises and the effect of native language on the acquisition of English of selected community college students. It was further designed to determine if instructional level was a variable in computer-assisted instruction in the acquisition of English as a second language.

The subjects were randomly assigned to either a control or an experimental group. A pretest of English language proficiency was administered to all subjects. After fifteen weeks of instruction, a posttest of English language achievement was again administered to all students. Table 1 gives the number of subjects (N), the mean score of each subject on the pretest (M), the variance of each student from the average mean of the group (V) and the standard deviation (SD).

The mean (M), variance (V) and standard deviation (SD) for the combined scores for the ALFA posttest were obtained for all the subjects in the study and recorded on Table 2. Subjects in the control group of Level 2 exhibited the greatest standard deviation on both the pretest and
Table 1
Pretest Score Means, Variances and Standard Deviations

<table>
<thead>
<tr>
<th>BOOK</th>
<th>TYPE</th>
<th>N</th>
<th>M</th>
<th>V</th>
<th>SD</th>
</tr>
</thead>
<tbody>
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<td>C Pre</td>
<td>18</td>
<td>51.61</td>
<td>274.02</td>
<td>16.55</td>
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<td>413.20</td>
<td>20.33</td>
</tr>
<tr>
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<td>5</td>
<td>47.20</td>
<td>152.70</td>
<td>12.36</td>
</tr>
<tr>
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<td>C Pre</td>
<td>7</td>
<td>48.43</td>
<td>247.62</td>
<td>15.74</td>
</tr>
<tr>
<td>All</td>
<td>E Pre</td>
<td>20</td>
<td>54.55</td>
<td>137.42</td>
<td>11.72</td>
</tr>
<tr>
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<td>E Pre</td>
<td>4</td>
<td>51.50</td>
<td>105.00</td>
<td>10.25</td>
</tr>
<tr>
<td>3</td>
<td>E Pre</td>
<td>7</td>
<td>53.00</td>
<td>281.33</td>
<td>16.77</td>
</tr>
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<td>E Pre</td>
<td>9</td>
<td>57.11</td>
<td>61.86</td>
<td>7.87</td>
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Table 2
Posttest Means, Variances, and Standard Deviations

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<td>373.20</td>
<td>19.32</td>
</tr>
<tr>
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<td>C Post</td>
<td>5</td>
<td>64.20</td>
<td>260.20</td>
<td>16.13</td>
</tr>
<tr>
<td>4</td>
<td>C Post</td>
<td>7</td>
<td>61.29</td>
<td>213.24</td>
<td>14.60</td>
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<td>72.80</td>
<td>97.54</td>
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<td>4</td>
<td>80.75</td>
<td>27.58</td>
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</tr>
<tr>
<td>3</td>
<td>E Post</td>
<td>7</td>
<td>70.71</td>
<td>193.24</td>
<td>13.90</td>
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<td>E Post</td>
<td>9</td>
<td>70.89</td>
<td>36.86</td>
<td>6.07</td>
</tr>
</tbody>
</table>
posttest. Students in Level 4 of the experimental group displayed the smallest standard deviation on the pretest and posttest.

As observed in Table 3, the mean scores and the variances of the whole group control scores versus the experimental group scores were used to calculate the nonparametric t test of significant difference. Selected groups of students (grouped either by level or by language) were compared statistically by means of the Mann-Whitney U test. Scores on the pretest and posttest were compared in Table 3 by Level and by group. The scores were used to determine the value of U in the Mann-Whitney U test for determining significant differences in small samples. Values of the Mann-Whitney U test and the t test which signal significance are marked with an asterisk.

The mean scores of the control and experimental groups did not differ significantly before the administration of the treatment (computer-assisted instruction). The pretest scores for the total group of subjects (N = 38; n(c) = 18 and n(e) = 20) were examined for statistical difference by means of the nonparametric t test as described by Siegel (1956). In nonparametric calculations, the results cannot be inferred to a larger population. Therefore, the conclusions are not generalizable to all adult, community college ESL students.

In addition, the Chinese and Hispanic students in the
Table 3

Means, Variances and Standard Deviations of the Pretest, Posttest and Final Grade

<table>
<thead>
<tr>
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<th>TYPE</th>
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<th>M</th>
<th>V</th>
<th>SD</th>
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<td>C Final</td>
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<td>79.11</td>
<td>64.59</td>
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<td>78.57</td>
<td>225.84</td>
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control and experimental groups were singled out for comparison concerning initial differences in pretest scores.

The Mann-Whitney U test for small samples (Siegel), used to test for statistically significant values with small samples, yielded no apparent pretest differences between the two language groups within the control and experimental groups. Table 4 is a matrix of comparison scores for the Chinese and Hispanic control and experimental subjects. A comparison of the Chinese and Spanish native language students in the control and experimental groups yielded no significant difference on any of the tests. Pretest scores were examined by level for all students. As computed in Table 5, Spanish students attained significantly higher scores on the posttest when using the computer-assisted instruction than their counterparts in the control group (U = 16). The Mann-Whitney U test produced values for the remaining measures (pretest and final grades) that might have been obtained by chance and which were, therefore, not statistically different. An examination of Table 6 reveals that there were no initial differences between the Hispanic students' pretest scores within the control group and the experimental group, nor was there a significant difference between the Chinese versus Hispanic students' pretest scores.

Posttest scores for all subjects, listed in Table 7,
Table 4
Matrix of Test Scores for Chinese and Hispanic Students in the Control and Experimental Groups

<table>
<thead>
<tr>
<th></th>
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<th>N</th>
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<th>EXPECTED</th>
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<tr>
<td>SP</td>
<td>C</td>
<td>6</td>
<td>p = .238</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>CH</td>
<td>C</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E</td>
<td>11</td>
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<td>U = 19</td>
</tr>
<tr>
<td>CH</td>
<td>E</td>
<td>7</td>
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<td></td>
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<td>POSTTEST</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>C</td>
<td>6</td>
<td>p = .176</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>CH</td>
<td>C</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E</td>
<td>11</td>
<td>U = 32.5</td>
<td>U = 19</td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
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<td>SP</td>
<td>C</td>
<td>6</td>
<td>p = .176</td>
<td>p ≤ .05</td>
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<td></td>
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<td>U = 19</td>
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Table 5
Control and Experimental Group Scores by Language

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<td></td>
</tr>
<tr>
<td>SP</td>
<td>C</td>
<td>6</td>
<td>U = 18</td>
<td>U = 16</td>
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<td></td>
<td></td>
</tr>
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<td>*SP</td>
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<td>* U = 16</td>
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<td>U = 16</td>
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<tr>
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<td>E</td>
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* Statistically significant
Table 6
Comparison of Chinese and Spanish Scores by Test of the Control and Experimental Groups

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<th>M</th>
<th>V</th>
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</tr>
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<td>9.83</td>
</tr>
<tr>
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<td>70.75</td>
<td>234.25</td>
<td>15.31</td>
</tr>
<tr>
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<td>74.29</td>
<td>86.90</td>
<td>9.32</td>
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<td>340.61</td>
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<td>128.76</td>
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<td>11</td>
<td>92.76</td>
<td>16.95</td>
<td>4.12</td>
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were used to perform the nonparametric t test. The derived
t test values were compared with the statistically
significant values. Although the value produced was near
significance level (1.643 at 36 degrees of freedom), the
value did not meet the significance requirements for the
.05 level (1.685 at 36df). However, when examined by level
(Table 8), Book 4 (intermediate) students using the
computer-assisted cloze exercise program did obtain
significantly higher scores on the posttest of grammar
proficiency (for n1 = 7 and n2 = 9, U = 15, which is equal
to the table value (15) for statistical significance).
Analysis of Chinese and Hispanic students in the control
and experimental groups yielded no significant differences
between treatment and traditional instruction.

Final grades, determined by averaging the three
criterion-referenced "mastery" tests administered to
students by level of instruction, were analyzed for
possible significant differences. For combined groups, the
nonparametric t test yielded a significant value (3.899 >
1.685 at 36 degrees of freedom). Students using the
computer-assisted cloze exercise program obtained
significantly higher scores than did those students in the
control group. Examined by level using the Mann-Whitney U
test, Level 2 produced significant differences (for n1 = 4
and n2 = 6, U value of 2 = .019 < .05) as well as did
Level 4 (for n1 = 9 and n2 = 7, U = 13.5 < 15). However,
Table 7
Observed and Expected t Values of the Control and Experimental Group Scores

<table>
<thead>
<tr>
<th>TEST</th>
<th>SUBJECTS</th>
<th>OBSERVED</th>
<th>EXPECTED</th>
</tr>
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<tbody>
<tr>
<td>C Pre</td>
<td>18</td>
<td>0.637</td>
<td>1.685</td>
</tr>
<tr>
<td>E Pre</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Post</td>
<td>18</td>
<td>1.643</td>
<td>1.685</td>
</tr>
<tr>
<td>E Post</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Final</td>
<td>18</td>
<td>*</td>
<td>3.899</td>
</tr>
<tr>
<td>E Final</td>
<td>20</td>
<td></td>
<td>1.685</td>
</tr>
<tr>
<td>C Gain</td>
<td>18</td>
<td>1.612</td>
<td>1.685</td>
</tr>
<tr>
<td>E Gain</td>
<td>20</td>
<td></td>
<td></td>
</tr>
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</table>

* Statistically significant
Table 8
Observed and Expected Mann-Whitney U Test Values
For the Control and Experimental Groups by Level

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>GROUP</th>
<th>N</th>
<th>OBSERVED</th>
<th>EXPECTED</th>
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<tr>
<td>2</td>
<td>C</td>
<td>4</td>
<td>p = .176</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>4</td>
<td>p = .243</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>3</td>
<td>E</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>7</td>
<td>U = 20</td>
<td>U = 15</td>
</tr>
<tr>
<td>4</td>
<td>E</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>POSTTEST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C</td>
<td>4</td>
<td>p = .176</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>4</td>
<td>p = .319</td>
<td>p ≤ .05</td>
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<td>3</td>
<td>E</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>* 4</td>
<td>C</td>
<td>7</td>
<td>U = 15</td>
<td>U = 15</td>
</tr>
<tr>
<td>* 4</td>
<td>E</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FINAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* 2</td>
<td>C</td>
<td>4</td>
<td>p = .019</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>* 2</td>
<td>E</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>4</td>
<td>p = .074</td>
<td>p ≤ .05</td>
</tr>
<tr>
<td>3</td>
<td>E</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* 4</td>
<td>C</td>
<td>7</td>
<td>U = 13.5</td>
<td>U = 15</td>
</tr>
<tr>
<td>* 4</td>
<td>E</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Statistically significant
an examination of Chinese and Hispanic students' final grades did not produce a statistically significant difference between the two groups. Within the control group of Chinese = 4 and Hispanic = 6 (Table 4), a U value of 7 was .176, which has a greater probability than the .05 level of significance. In the experimental group of Chinese = 7 and Hispanic = 11, the derived U value of 32.5 was greater than the table value of 19 needed for significance. The results of the calculations are presented in Table 9.

Although researchers caution about using gain scores (Cronbach and Furby, 1970), mainly because such scores may contain systematic errors, gain scores were analyzed in this study to produce information about the magnitude of initial and final scores lost in using the Mann-Whitney U test (in which scores are rank-ordered but not analyzed for the particular score value). Politzer and McGroarty (1985) have found that the use of gain scores gives some indication of group trends which might otherwise be difficult to detect. Therefore, while gain scores are not suitable criteria for making individual diagnosis, they can yield valuable group data and indicate possible direction in learning trends. Table 7 lists individual scores on the pretest, posttest and the difference between the two, denoted GAIN. These gain scores were analyzed for combined groups by use of the t test. The obtained value of 1.612
<table>
<thead>
<tr>
<th>BOOK</th>
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<th>M</th>
<th>V</th>
<th>SD</th>
</tr>
</thead>
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<td>80.92</td>
<td>134.78</td>
<td>11.61</td>
</tr>
<tr>
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<td>C Final</td>
<td>6</td>
<td>79.11</td>
<td>64.59</td>
<td>8.04</td>
</tr>
<tr>
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<td>C Final</td>
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<td>86.40</td>
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</tr>
<tr>
<td>4</td>
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<td>78.57</td>
<td>225.84</td>
<td>15.03</td>
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<td>All E</td>
<td>E Final</td>
<td>20</td>
<td>92.15</td>
<td>28.15</td>
<td>5.31</td>
</tr>
<tr>
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<td>E Final</td>
<td>4</td>
<td>90.83</td>
<td>25.39</td>
<td>5.04</td>
</tr>
<tr>
<td>3</td>
<td>E Final</td>
<td>7</td>
<td>93.71</td>
<td>27.94</td>
<td>5.29</td>
</tr>
<tr>
<td>4</td>
<td>E Final</td>
<td>9</td>
<td>91.52</td>
<td>32.92</td>
<td>5.74</td>
</tr>
</tbody>
</table>
at 36 degrees of freedom was not adequately large to yield statistical significance (1.685). However, analysis of Level 2 by use of the Mann-Whitney U test for n(c) = 6 and n(e) = 4 did produce a U value of 1, which has a .01 probability of occurrence (less than the .05 needed for significance). Levels 3 and 4 did not vary by a significant degree; analysis of the Chinese and Hispanic students in both the control and the experimental groups yielded non-significant differences as well.

Figure 1 is a scatterplot of the same data previously presented in table form. The diagram gives a visual representation of the distribution of the experimental and control group test scores in relationship to each other. A departure from a linear model can easily be seen by inspection of the scatter diagram. The existence of "outliers," those students receiving abnormally low or high scores on any of the measurements, can be readily detected as well.

Testing of Hypotheses

The nonparametric t test and the Mann-Whitney U test for small samples were used to test all hypotheses. The nonparametric t test is one of the most stable analysis techniques for detecting differences within a small population. Since the means of both groups are compared statistically with the degrees of variance of the samples,
Figure 1

Scatterplot of Control and Experimental Scores

□ = Control
+ = Experimental
the calculated t value gives some indication of variance due to treatment versus variance occurring by chance in a population. The Mann-Whitney U test, a rank-order method of analyzing differences, does not use all the information offered by the data; the position of either control group or experimental group score in the ordering of the data is used rather than the absolute value of the scores. However, the Mann-Whitney U test can detect patterns of data that are not expected by chance and so are significant differences. Both the t test and the Mann-Whitney U tests were used as a cross-check in the calculations. Significant values obtained by means of the nonparametric t test were also significant values when converted to comparable Mann-Whitney U test values. In order to test the hypotheses, the data were compared by Level and by native language, and calculations were performed on various facets of the scores.

Research Hypothesis One stated that there would be a significant positive difference between those community college English as a second language students who regularly use the computer-assisted cloze exercise program and those students who do the traditional cloze exercises. The result of the analysis of the total group scores in Table 7 shows a non-significant difference at the .05 level between the control and experimental groups (1.673 at 36 degrees of freedom < 1.685 needed for significance). However, further
analysis of the Levels in Table 8 (Level 2 = beginning; Level 3 = low-intermediate; and Level 4 = intermediate) reveals a significant difference in Level 4 students. When achievement is measured by the score on the criterion-referenced ALFA test of English language proficiency, Book 4 students using the CAI cloze exercises significantly outperformed the students in the control group (for n1 = 7 and n2 = 9, U = 15, which is equal to the table value (15) for statistical significance).

When final grades for the combined levels were compared, there was a substantial difference between the control group and the experimental group. The nonparametric t test yielded a value of 3.899 at 36 degrees of freedom; significance value is 1.685. Students utilizing the computer-generated cloze exercises achieved higher scores on the average of the three ALFA mastery tests than did those students completing cloze exercises without the aid of a computer. Analysis by levels reveals that students in Level 2 and Level 4 benefited as a group from computer-assisted instruction. The Mann-Whitney U values for Level 2 (for n1 = 4 and n2 = 6, U value of 2 = .019 < .05) and for Level 4 (for n1 = 9 and n2 = 7, U = 13.5 < 15) detected a positive difference in the group scores between the experimental and the control students (Table 8). However, an analysis of Level 3 final grade scores did not reveal a significant difference (for n1 = 7
and \( n_2 = 5 \), the calculated \( U \) value has a .074 probability of occurrence, somewhat greater than the .05 level chosen for significance in this study.

Gain scores were included in the analysis of the data to cross-check for possible significant values in the magnitude of achievement gains from initial pretest to posttest. As the Mann-Whitney \( U \) test is a rank-ordering of the scores, the absolute value of the scores is not included in the calculation. The gain scores are examined here only for comparison with other criteria of performance. Analysis of the total group scores revealed no significant difference between the experimental and the control group gain scores (1.612 at 36 degrees of freedom < 1.685 needed for statistical significance at the .05 level). However, when examined by Level, Book 2 experimental group students outperformed those in the control group (for \( n(c) = 6 \) and \( n(e) = 4 \), the \( U \) value of 1 had a probability of .01). Level 3 and Level 4 students did not differ significantly in gain scores.

Research Hypothesis Two stated that students whose native language was Spanish would outperform those students who spoke Chinese. In order to determine the significance of native language, Chinese- and Spanish-speaking community college students were singled out of the experimental and control groups for comparison of achievement. Analysis of the two language groups on the criteria of pretest,
posttest, final grade, and gain score revealed no significant differences between the cultures when using either computer-assisted instruction or traditional cloze exercises. However, between the Spanish-speaking students, those in the experimental group did outperform students in the control on the posttest. The lack of significant findings in other Levels could be due to the small sample size, which made it impossible to analyze the nationalities by Level for subtle differences. The two cultures were analyzed both in the control group and in the experimental group for achievement differences that could have been attributed to variables other than CAI. For example, the pretest, posttest, final grade and gain scores of the control group were compared by native language as a comparison to the two-group analysis of the experimental group. In Table 4, the control group posttest scores (Chinese = 4 and Spanish = 6, U value of 7 has a .176 probability of occurrence) and the experimental group posttest scores (Chinese = 7 and Spanish = 11, U value of 32.5 does not meet the required value (19) for significance) did not reveal any differences between groups. Research Hypothesis Two must be rejected in favor of the null hypothesis.

A visual inspection of Figure 1 reveals the position of all the subjects by group (control or experimental) in relation to pretest and posttest scores. Differences in
individual scores, especially the existence of "outliers," become apparent when compared to group achievement.

Since performance on the mastery test of English language proficiency is usually not affected by a single factor, but is rather a complex interaction of factors, identification of the specific variables that enhance learning via computer-assisted instruction would enable the teacher to integrate technological innovations into the curriculum and provide a more versatile methodology for individualized instruction. It is suggested that teaching materials and instructional techniques challenge the student to use a variety of strategies in second language learning. (Snider, 1987) By matching specific instructional programs and student level, individualized instruction can be made more efficient by means of technology. Learning a second language differs in several ways from learning a foreign language; many more variables must be considered, such as traditional or natural settings (Terrell, 1977, 1982), aspects of exposure to a language and its associated culture, feedback (both formal and informal), and the cognitive and affective (Dulay, Burt & Krashen, 1982) idiosyncrasies of the learner. English as a second language students are not exposed to only one form of instruction; the culturally diverse students who participate in the community college ESL classroom come into contact with English in a variety of ways.
kinesthetically, and verbally. (Ballard, 1985) It is difficult to measure that which is composed of so many variables.
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purposes of this study were twofold. The first purpose was to determine the effect of computer-assisted cloze exercises on the acquisition of English as a second language of selected community college students from varied backgrounds. The second purpose was to determine the effect of computer-assisted cloze exercises on the acquisition of English as a second language of selected Chinese and Spanish native language community college students.

The research, or alternate, hypotheses stated that (1) students using the computer-assisted instruction would receive scores on a test of English language proficiency that were significantly higher statistically than those students not using the computer-assisted exercises and that (2) within the experimental group, Spanish native language students would receive significantly higher scores on a posttest of grammar proficiency than Chinese native language students. The null hypotheses stated that (1) there would be no difference between the posttest grades of those students using the CAI program and those same
students not completing computer-assisted exercises and that (2) there would be no significant difference between the posttest scores within the experimental group of Spanish versus Chinese native language students.

Thirty-eight community college students participated in the study, eighteen in the control group and twenty in the experimental group. The subgroup of Spanish and Chinese native language students consisted of ten students in the control group and eighteen in the experimental group. In the spring of 1987 all students received the pretest, the ALFA test of English language achievement. After fifteen weeks of differentiated instruction (treatment versus no treatment), all students received the posttest, the ALFA test of English language achievement. In addition, all students received a final grade based on the average of three tests of grammar proficiency supplied by the ALFA course designer.

The nonparametric t test was utilized to calculate the difference for the whole group, control versus experimental, of the scores for the pretest, the posttest, and the final grade. The Levels (one of three different courses of instruction) and the native language groups were compared statistically by means of the Mann-Whitney U test. A probability of .05 was established as the level of significance.
Results

Results of the nonparametric t test revealed only one significantly higher score of the experimental versus the control group. Final grades of the students using computer-assisted cloze exercises were higher than those of the control group. Although the observed t test value for the posttest scores was near significant (1.643 < 1.685), it did not fulfill the significance requirements for this study (.05 level). However, when examined by Level by means of the Mann-Whitney U test used for the small sample sizes as observed in the subgroups, the students in Level 4 who used the CAI did significantly outperform those students in the Level 4 control group on a posttest of grammar. In addition to this relationship, Levels 2 and 4 experimental group students received significantly higher final grades as measured by the ALFA proficiency test than did those students in the control group. The results indicate that computer-assisted instruction is beneficial to certain students; it does not confirm that computer-assisted cloze instruction will definitely enhance learning in the community college classroom.

This study also revealed no significant difference between cultures in the analysis of posttest, final grade, and gain scores. The students of two native languages, Spanish and Chinese, did not receive higher scores when compared to each other. However, Spanish-speaking students
in the experimental group did receive significantly higher posttest scores than did those students in the control group; computer-assisted instruction appears to benefit those students whose native language is Spanish. Chinese students did not exhibit statistically different posttest scores between experimental and control groups. Exposure to the second language, and idiosyncratic differences such as learning style and the Affective Filter, create an, as yet, unidentified effect on the extent of learning. Although selected individual differences can be accounted for by differentiated instruction (visual versus auditory methodology; formal versus informal learning environments), the variables that encompass computer-assisted instruction have not been completely isolated.

CAI tutorials and drill-and-practice computer-generated exercises programs have met with varying degrees of success; CAI programs stressing higher-order learning operations such as inferencing are just beginning to be integrated into English as a second language classrooms. In addition, the cloze exercise, a well-established method for enhancing inferencing skills, has been utilized with limited success for teaching native English language students as well as foreign language speakers. Technological innovations such as computer-assisted instruction can be used to design programs that account for individual differences and preferences in learning,
programs that are tailored to a specific learning style for each student. However, the results of this study offer inconclusive evidence that selected computer-generated cloze exercises will enhance learning.

Conclusions

Based upon the findings of this study, several conclusions are made. There is a significant difference between the scores on a test of English language proficiency of students in certain levels of instruction who use computer-assisted cloze exercises while completing an English language course and students who do not use CAI. There is no significant difference in achievement scores between total group use of CAI and all the students in the control group who did not use the computer to complete their course assignments. Research Hypothesis One must be rejected.

There is no significant difference between the scores of Chinese and Spanish group students on a posttest of grammar and in a final grade of English language mastery. Moreover, there is no difference between the posttest scores of the Chinese students in the control and experimental groups. However, Hispanic students in the experimental group did receive significantly higher scores than did those in the control group. The two cultures compared in the study made similar gains as measured by the
pretest-posttest difference in both the treatment and the non-treatment groups. Computer-assisted instruction did not enhance (as determined by a statistical test of difference) the learning efficiency of English as a second language community college students by culture as a whole, although Spanish native language students did appear to benefit from the computer-assisted cloze exercise program. Research Hypothesis Two must also be rejected. However, further studies involving various nationalities may point to the efficacy of CAI with respect to certain native language groups.

Generalizability of This Study

The limitations on generalizability of this study concern the subjects who participated and the statistical analysis used to determine results.

The most important limitation of this study is the small sample size. Initially, both the control and experimental groups contained twenty-five students each. An attrition rate of 39% and 25% in the control and experimental groups respectively (seven control and five experimental group students did not complete all the requirements to be included in the data analysis of the study) caused unequal distribution in the various Levels of instruction. Compared to the overall attrition rate of 43% in the community college ESL program in Fall, 1986, the
decreased drop-out rate reflected in this study indicates that students in the experimental group exhibited more interest in learning English than in previous years. The group consisted of thirty-eight community college students of various native language backgrounds. In addition, the subgroups of Hispanic and Chinese students did not contain equal numbers of subjects. Therefore, it is difficult to generalize about the results to similar college-level English as a second language classrooms. A larger sample size and an analysis of two or three distinct language groups might have yielded more definitive results.

The subjects who participated in the study were of low to intermediate proficiency levels. Common measures of English proficiency are for students who already possess a knowledge of English necessary to complete university courses (TOEFL—Test of English as a Foreign Language; the Michigan Test of English Language Proficiency), are measures of English proficiency of Hispanic students (Bilingual Syntax Measure), or are geared toward native English speakers (California Achievement Test). The criterion-referenced ALFA test employed in this study to measure mastery of predetermined grammar points in consecutive levels of instruction is used specifically for measuring the achievement of beginning to intermediate ESL students.

Secondly, in nonparametric statistics for small sample
sizes, a statistically significant finding that might have been determined by the statistical methods used with larger samples is not always realized. The statistical methods employed in this study (the rank-order operation of the Mann-Whitney U test) did not utilize all of the information implied by the data.

Finally, there were no provisions made to test for the effect of the computer itself in instruction. A questionnaire or an observational instrument designed to measure student reaction, both positive and negative, to the computer would have possibly aided in identifying variables not specified in this study.

Recommendations for Further Study

Future research in the area of computer-assisted cloze exercise use with beginning to intermediate English as a second language students should concentrate on larger sample sizes and a more homogenous population.

A research design to determine the affective variables related to computer-assisted cloze exercise instruction would aid in identifying facets of learning not yet explored in second language methodology.

Instruments that are more sensitive to individual differences should be developed to determine the developmental stage of adult beginning to intermediate English as a second language learners.
Computer-assisted exercises other than drill-and-practice and cloze might be used to determine effectiveness in teaching English by means of stimulating higher order mental operations.

A correlation between Level and computer use might yield information on the effectiveness of CAI at specific stages of language acquisition and so enhance the integration of technology and instruction.
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