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Effects of Student Attitudes and Student Time on Achievement Gains in College Developmental Reading

Kathryn K. Welsch
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EFFECTS OF STUDENT ATTITUDES AND STUDENT TIME ON ACHIEVEMENT GAINS IN COLLEGE DEVELOPMENTAL READING

by

Kathryn K. Welsch

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Master of Arts Department of Education and Professional Development

Western Michigan University
Kalamazoo, Michigan
December 1988
The purpose of this study was to provide a new focus on college-level developmental reading programs by examining course content (i.e., instructional activities) in a developmental reading class. Attitudes and time spent on instructional activities were monitored for 47 students in three sections of college level developmental reading. Multiple regression analyses were used to relate these data to vocabulary and comprehension gains on the Nelson Denny Reading Test (J. Brown, Nelson, & Denny, 1976).

Students made significant gains in vocabulary and in comprehension. Student attitudes predicted gains in both vocabulary and comprehension. Because of reliability problems, the time data do not predict gains.

Differences in vocabulary and comprehension performance were also explored. Comprehension gains were superior to vocabulary gains, and these gains are an indication of the efficacy of the instruction that was provided.
ACKNOWLEDGMENTS

I would like to express my thanks to the many people who were instrumental in the completion of this thesis. I would like to first thank the members of my thesis committee, Dr. Ronald A. Crowell and Dr. Nickola W. Nelson, for their advice and encouragement. I wish also to thank members of the Reading Center and Clinic, particularly Joe R. Chapel and Dr. James Burns, for the countless hours of discussion and valuable input which served to help focus my direction.

Deep gratitude goes to my family for their endurance over the past months. To my children, I offer my appreciation that their unfailing support kept me going. To my husband, Bill, I offer my thanks and understanding that the struggle has been a joint one.

Deepest gratitude, however, goes to my thesis adviser, Dr. Paul Wilson, who had the faith in me to provide my greatest challenge and the perseverance to facilitate the accomplishment.

Kathryn K. Welsch
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Western Michigan University, 1988

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS ......................................................... ii
LIST OF TABLES .............................................................. vi
LIST OF FIGURES ............................................................. vii

CHAPTER

I. INTRODUCTION .......................................................... 1
   Background of the Problem ............................................ 1
   Statement of the Problem ............................................. 3
   Outline of the Study .................................................. 4

II. REVIEW OF THE LITERATURE ..................................... 5
   Overview ................................................................. 5
   Nature of Reading ...................................................... 6
   Characteristics of Developmental College Students ....... 8
   Traditional Measures of Success ................................. 10
   Attitudes ................................................................. 11
   Learned Helplessness and Passive Failure ..................... 13
   Time Related to Student Performance .......................... 15
   Cooperative Learning ............................................... 16
   Summary of Related Research ..................................... 19

III. METHOD ................................................................. 20
   Subjects ................................................................. 20
   Instructional Materials .............................................. 21
   Procedures ............................................................. 22
   Vocabulary Activities ............................................... 22
Table of Contents--Continued

Comprehension Activities .............................................. 25
In-Class and Out-of-Class Activities ..................... 30
Assigned Versus Choice Activities. ...................... 31
Measurement ................................................................. 31
Nelson Denny Reading Test. ................................. 31
Attitude Scale .............................................................. 32
Log Form .............................................................. 34
Rating of Activity ...................................................... 36
Summary ............................................................... 36

IV. RESULTS. ................................................................. 37
Improvements in Student Reading Abilities ......... 37
Subject Attitudes and Reading Achievement Gains .. 39
Summary of Attitude Data ........................................ 39
Effects Related to Attitudes ................................. 41
Time Spent on Activities and Reading Achievement Gains 44
Summary of Time Data ........................................ 44
Effects Related to Time on Activities. .................. 49
Other Analyses .......................................................... 49
Summary of Results ................................................. 53

V. DISCUSSION AND CONCLUSIONS ................................. 55
Limitations ............................................................... 55
Data Collection Problems ...................................... 56
Other Instruction ....................................................... 58
LIST OF TABLES

1. ACT Composite Scores by Semester .................. 21
2. Vocabulary Pre-Test and Post-Test Performance. ...... 38
3. Comprehension Pre-Test and Post-Test Performance .... 39
4. Student Attitudes to Instructional Activities........ 40
5. Student Attitudes by Cluster ......................... 41
6. Significant Predictors of Post-Test Vocabulary Scores.. 42
7. Significant Predictors of Post-Test Comprehension Scores... 43
8. Average Daily Minutes Spent on Activities........... 44
9. Average Total Minutes Spent on Activities........... 46
10. Correlations of Vocabulary and Comprehension Post-Test Scores ......................... 50
11. Rates of Gain for Vocabulary and Comprehension Scores... 53
LIST OF FIGURES

1. Student Attitude Scale .............................................. 33
2. Daily Log Form ....................................................... 35
BACKGROUND OF THE PROBLEM

Twenty years ago major concerns in the literature about post secondary developmental studies programs typically involved the issue of assisting the "high-risk" students in the academic setting, particularly the community college (Moore, 1970; J. E. Roueche, 1968). Developmental studies programs, including those targeting reading and study skills, became more widespread throughout the 1970's, as evidenced by the number of post secondary institutions sponsoring such programs (S. Roueche, 1983). Data gathered in a national survey conducted during the 1983-84 academic year reported that four out of five colleges and universities recognized the growing need for remedial courses by offering at least one such course with 16% of all college freshmen taking at least one remedial course that year (Wright & Cahalan, 1985).

As the widespread growth of remedial/developmental programs became apparent, the focus in the literature turned first to the evaluation and assessment of developmental studies programs (Fadale & Winter, 1985; Thompson, 1976). A second line of research concerned the descriptions of specific components of successful programs.

Evaluations of developmental programs have yielded mixed results. This has been partially due to the lack of agreement regarding out-
comes and the related assessment tools. Traditionally, the assessment of remedial programs has been based upon measured outcomes such as improved grade point averages of participating students, improved retention figures as a whole, and the enhancement of basic skills as measured by standardized pre- to post-testing (Boylan, 1983; Heerman, 1982, 1983). These studies examined developmental programs as a whole and did not examine the improvement of specific reading related skills for individual students.

The second issue of focus in developmental programs has been the efficacy of specific components of developmental programs. Tuchowski & Lopardo (1982) compiled a ten-year review of the research in developmental reading as a part of developmental studies at the post-secondary level. In this field alone, peer tutoring, individualized instruction, study skills, vocabulary improvement, and reading rate and comprehension were all measured in various studies. With such latitude and variation in terms of specific components to assess, comprehensive evaluation has proven to be difficult.

Issues auxiliary to instruction which influence developmental studies also have complicated research efforts. Research and resulting recommendations regarding key components of successful developmental programs have centered on such noninstructional (i.e., environmental) issues as administrative support, personal counseling, mandatory testing, and course placement (S. Roueche, 1983; J. E. Roueche & Snow, 1977). Little has been reported concerning course content, such operational characteristics as length of time spent on
instructional activities, and student success related to those activities (Sanders, Lowry, & Theimer, 1982).

A final issue raised in the examination of components of successful programs is the assessment of student attitudes toward learning (Obler, 1983). However, to this point the research on this topic has related to such attitude variables as self-concept, attribution theory, and motivation (Athey, 1985; Wittrock, 1986). It seems that no information has been gathered regarding student attitudes toward specific instructional activities and how those attitudes relate to student success in developmental reading courses.

Statement of the Problem

This study was designed to provide a new focus on college-level developmental reading programs by examining course content (i.e., instructional activities) in a developmental reading class. Student attitudes toward that content and time spent on the activities were examined in their relationship to student success. The perspective in this study was on academic variables; that is, on an examination of variables related specifically to instruction, rather than an environmental perspective, which is the perspective related to noninstructional issues that has traditionally been taken.

There were several questions addressed in this study:

1. Is it possible to improve reading abilities in a developmental reading class as measured by standardized test performance?
2. What relationship can be found between reading achievement gains and attitude variables, both toward college in general and toward instructional activities specifically?

3. What are the effects of time spent on instructional activities on measured student success?

Outline of the Study

In the following chapter, background information is presented regarding the nature of the reading process in the light of recent research, the characteristics of developmental college students, measurement of student success, how attitudes affect student success, the rationale for relating time spent on instructional activities to student performance, and the impact of cooperative learning as an instructional mode. In subsequent chapters, the design of the study is explained, followed by a summary of the findings and conclusions.
CHAPTER II

REVIEW OF THE LITERATURE

Overview

An investigation of successful instructional strategies for developmental reading classes must take into account several factors. In this chapter, the literature will be reviewed in a number of areas in the light of revelations of the newest research about the reading process. First, the new research on the nature of the reading process itself, and its implications for reading instruction will be examined. Second, the interaction of the new research-based definition of reading with the characteristics of the developmental reading student will be considered. Third, issues related to traditional measurement of developmental programs, as well as to student success in reading, will be examined. Fourth, attitudes that affect the reading process will be addressed. Fifth, the association of those attitudes with the characteristics of passive failure and learned helplessness will be considered. Sixth, the rationale for relating time spent on instructional activities to student performance will be developed. Finally, the relationship of the learning context, specifically cooperative learning, to academic success will be addressed.
Nature of Reading

Recent advances in reading and cognitive psychology research have led to the development of new and altered theoretical perspectives about the nature of reading. The new research and theoretical foundation have led to changes in instructional strategies intended to develop reading skills.

Earlier models of reading found their origins in a text-based focus which emphasized the text microstructure, that is, the grammar at the sentence level. The new perspective turns to a reader-based focus which examines how readers actively make sense of the macrostructure, or larger pieces of text (Pearson & Camperell, 1985). This new emphasis has its foundations in cognitive psychology (J. R. Anderson, 1983; Lindsay & Norman, 1977), schema theory (R. C. Anderson, 1985), and psycholinguistics (Goodman, 1969; Smith, 1978). In this view, reading can be defined as having two components: (1) the perceptual process of visually registering written symbols, and (2) the comprehension process of interpreting language, that is, moving from language to thought (Just & Carpenter, 1987). It is the second component of reading, the process of comprehension, which will provide the focus for this study.

In the simplest terms, "reading is the process of constructing meaning from written texts" (R. C. Anderson, Hiebert, Scott & Wilkinson, 1985, p.7). To understand this process fully, one must realize that the reader is an active participant in the dynamic construction of meaning. It is also important to understand how
schema theory relates to the reading process. Schema can be viewed as a framework representing the organizational aspect of knowledge. The reader categorizes and relates bits and pieces of knowledge into a meaningful whole, or schema (Just & Carpenter, 1987).

Comprehension of text, or the second component of reading, is a "matter of activating or constructing a schema that provides a coherent explanation of objects and events mentioned in a discourse" (R. C. Anderson, 1985, p. 375). The crucial point is that the reader plays an active role in the comprehension of text, particularly as related to schema construction and activation.

Recent research has yielded information about the reading process through observation of what fluent readers do. The mature, skillful reader possesses highly practiced, automatic responses for reading (Just & Carpenter, 1987). These responses include word recognition, lexical processes to access word meaning, and semantic and syntactic processes to organize word meaning into a construction of a whole meaning from larger units of text. Not only are fluent readers able to activate these processes automatically and simultaneously, they also employ strategies constantly to monitor, evaluate, and repair their comprehension of text (Paris, Lipson & Wixon, 1983; Pearson, 1984).

It is this continual interaction with the text that yields a viable model for understanding the reading process. As R. C. Anderson (1985) expressed it, "Reading is a process in which information from the text and the knowledge possessed by the reader act together to
provide meaning. Good readers skillfully integrate information on the text with what they already know" (p. 8). This picture of a fluent, active, strategic reader becomes especially clear when contrasted with the less skillful reader, such as one would find in a developmental reading class.

Characteristics of Developmental College Students

Overwhelmingly, the literature surrounding the developmental education students, or the "high-risk students" (Moore, 1970), has been within the context of the community college. This has been because community colleges, with their frequent open-door admissions policies, have carried the greatest responsibility for serving these students (Ahrendt, 1975; Cross, 1971, 1976).

However, recently offerings of developmental courses have become apparent at all levels of post-secondary education (Wright & Cahalan, 1985). Evidence is also accumulating that low-achieving, or academically underprepared students, cannot be characterized exclusively as nontraditional or as economically or socially disadvantaged (S. Roueche, 1983). Roueche reported that remedial students entering college today who lack the basic skill competencies may come from the entire range of socio-economic backgrounds, and inadequate academic preparation for college work can no longer be attributed exclusively to particular groups.

Because the socio-economic characteristics of remedial students are no longer homogeneous, in this study no attempt was made to
characterize the developmental population by those characteristics. Rather, student success in a developmental reading program was examined as related to specific instructional strategies and how the students' perceptions of instruction affected the learning process. Such a perspective necessitated that developmental reading students be characterized by how they engage in the reading act.

The newest research on reading emphasizes the fluent, strategic, ongoing monitoring nature of expert reading performance (R. C. Anderson et al., 1985; Paris et al., 1983). However, students demonstrating difficulties in reading might not possess these attributes. In fact, "the evidence is clear that less experienced and less successful readers tend not to engage in the cognitive monitoring activities characteristic of more proficient readers" (Baker & Brown, 1984, p. 44). Baker and Brown (1985) further emphasized that reading for meaning is an attempt to comprehend and therefore must involve an ongoing process of comprehension monitoring. This monitoring is an active realization of whether or not comprehension is occurring, and the subsequent use of "fix-up strategies" if it is not. Developmental reading students typically do not engage in these self-monitoring activities, and furthermore, often do not possess a repertoire of fix-up strategies if they do recognize that comprehension is not occurring. The current study was built on the hypothesis that active engagement in specific instructional activities and follow-up discussion would support the development of strategic, self-monitoring capabilities in the less fluent reader.
Other factors, beyond the use of comprehension monitoring and repair strategies, also contribute to successful reading. For example, successful comprehension monitoring may also depend upon such individual differences as personality characteristics, cognitive style, and fund of background knowledge. Instruction relating to the cognitive elements of learning cannot account for all differences in student performance. An observation of differences in the affective domain, particularly as those pertaining to attitudes, is crucial when examining the performance of developmental college students. In order to obtain a clearer picture of factors relating to student success, the questions of how developmental programs have been evaluated and of how student success has been measured are addressed.

Traditional Measurement of Success

The evaluation of successful developmental programs has typically examined such variables as academic support centers, mandatory placement, credit-no credit designation for courses, and availability of counseling for students (S. Roueche, 1983). In a comprehensive evaluation of one open-door admissions college in Florida, J. E. Roueche and Baker (1987) described an exemplary program on the basis of management systems, outcomes, climate, leadership, and teachers. Instruction was not considered.

The second major approach for evaluation has involved an examination of the reading component specifically. Evaluations using this format have also slighted issues of content and instruction. Sanders,
Lowrey, and Theimer (1982) conducted a computer search and meta-analysis of college reading programs. They concluded that "The majority of studies did not report either content or operational factors well enough to allow conclusive findings to be drawn.... Any model reading study program must remain conjectural until research provides more data" (pp. 15-16).

When student success is used as the criterion for program evaluation, program success typically has been cited based on group gains on pre- to post-test scores from standardized reading tests (Kersteins, 1986). Specific issues of instruction have not been addressed in most studies. One way to measure instructional emphasis is to gather data on time spent in various types of instructional activities. The current study has been an attempt to move in that direction by addressing the two issues of how both student attitudes toward activities and time spent on those activities can affect student performance.

Attitudes

The role that affect plays on reading and learning has been the focus of scrutiny over the years. Athey (1985) stated there is little disagreement today that affective factors play a role in both reading achievement and reading behavior. Within the affective domain, two parallel strands of thought emerge, one relating to attitudes and the other focusing on motivation. Both of these realms, attitude and motivation, have cognitive as well as affective dimensions. For the
purposes of this current study, only the attitude dimension of the affect was examined.

Good and Brophy (1987) intertwine the motivation and attitude factors by stating that students' motivation depends upon the nature of the activities they are required to do and their attitudes toward those activities in both cognitive and affective domains. Mathewson's (1985) review indicated that "Favorable attitudes toward content, whether pre-existing or experimentally induced, should give rise to heightened attention and improved comprehension of reading material. In addition, favorable attitudes should stimulate greater recall, reflection, and application" (pp. 851-852).

Historically, the role that attitude plays in developmental programs has been established by a number of researchers whose work was reviewed by Dempsey (1985). In tracing the development of these programs, Dempsey emphasized that attempts to remedy self-concept are an integral component of successful programs. This emphasis on the self-concept dimension of the affective domain supports the notion that noninstructional issues have received much of the attention in developmental studies. However, in summarizing reports of evaluation procedures of successful programs, Dempsey acknowledged that only 20.9% of the programs measured self-concept and 30.6% determined attitudinal improvement in general. It is clear that the measurement of attitudes has typically followed self-report format (Weinsten & Underwood, 1985) and has focused on self concept, ego development, and study strategy techniques. No mention is made relative to attitudes toward specific
course content. For the purposes of this study, both student attitudes in general (toward school, toward classes) and attitudes toward content (instructional activities) were examined.

Learned Helplessness and Passive Failure

Developmental college students' attitudes and personalities often contrast sharply with those of strategic, successful readers when the traits are examined that contribute to passive failure. Passive failure is a condition that has been observed among less successful readers. Consideration of the set of traits known as passive failure can lead to a greater understanding of why some students have difficulty reading and what can be done to prevent or remediate that difficulty.

Johnston and Winograd (1985) addressed the effects of poor readers' attitudes on their reading processes. The approach used by Johnston and Winograd was to integrate the newest research on reading as an interactive process with characteristics of poor readers as defined by attitudes (specifically attribution theory). In their model, they also included the metacognitive (self-monitoring) component of the reading process. Their conclusions supported the notion that "many of the problems evidenced by poor readers are related to their passive response to the interactive task of reading....Research in metacognition, attribution theory and other related fields supports this notion by emphasizing the roles that appropriate goal-directed
intentionality and active participation play in effective reading" (p. 279).

To fully understand how the concepts of attribution theory, learned helplessness, and metacognition contribute to reading success or failure, it is necessary to examine each in more detail. Research has shown (Dweck, 1975) that children who experience failure, particularly in the early stages of their learning process, have difficulty transferring knowledge or ability from one task to another. They often do not know what strategies they possess, nor do they know appropriate contexts in which to apply them. They have low expectations of success, and they attribute any success they may experience to "external factors beyond their control such as teacher, luck or relative simplicity of task" (Johnston & Winograd, 1985, p. 281). Furthermore, these students often do not possess the confidence to take the risk of engaging in a difficult task, nor do they persist when they are faced with failure.

Johnston and Winograd (1985) noted that this pattern is established early, and it is nurtured in educational environments where less successful children are met with lower expectations and where competitive tasks put these children at a disadvantage. They become "high-risk" students, and the developmental college student, or the "high-risk" student, very often comes to college expecting to fail, or with unrealistically high expectations of how they will do. Noel, Levitz, and Kaufman (1982) suggested that the most important component of a developmental program deals with student attitude and moti-
vation. They commented that "Students must learn to motivate themselves, to understand their learning strengths and weaknesses, to adapt effective and efficient methods of processing information, and to alter previously established attitudes about their own potential and their sense of self-worth" (p. 7).

However, program emphasis on self-worth and on motivation is not sufficient to improve reading ability. Many "high-risk" students need more than perseverance. It seems that one way to accomplish the goal of improving student performance in reading is to tie reading improvement to the following areas: (1) becoming proficient in reading/learning strategies; (2) learning how to apply these strategies in the context of the reading process; and (3) learning how to monitor the application of these strategies in the face of reading difficulty. Instruction in ED 104, Effective College Reading taught at Western Michigan University, Fall 1987 and Winter 1988, was designed for this study with these goals in mind. That is, research supported learning strategies provided the core components of instruction, and application of the strategies in a supportive classroom environment was required of the students. How time spent on instructional activities effects student performance will next be examined.

Time Related to Student Performance

The efficacy of relating time spent on instructional activities to growth in reading has been established in a study reported by R. C. Anderson, Wilson, and Fielding (1988). In that study, a self-report
log was administered to fifth-grade students who reported, on a daily basis, the time they spent on book reading and on all of their other out-of-school activities. The authors concluded that growth in reading was directly related to the amount of time spent reading and to several other activities. One of the goals of the present study was to extend the Anderson, et al. (1988) work to relate in-class activities to achievement gains.

Because the time spent on instructional activities was designed to encourage the development of active, self-monitoring readers, the mode of instruction in this study also incorporated concepts of cooperative learning. How cooperative learning impacts the reading process will be briefly examined in the following section.

Cooperative Learning

Cooperative learning as a mode of instruction has received much attention in the literature, particularly since the 1970’s (D. W. Johnson & Johnson, 1987; Slavin, 1981). In this structure, students work together in pairs or in small groups toward a common goal. Differences in cooperative learning structures may occur in the types of goals adopted (problem/solution vs content orientation) and organizational patterns (pairs vs. small group), but the recurring theme throughout is that learning is accomplished through cooperation, not competition.

Slavin (1981) summarized the research in cooperative learning since the 1970’s. He found that positive effects at both the
elementary and secondary levels occurred in classrooms in which cooperative learning techniques were employed. These positive results were reported in improved academic achievement, improved self-esteem, and improved attitudes toward school.

Although the effects of the cooperative learning mode of instruction on achievement and learning have been noted, both Slavin (1983) and D. W. Johnson and Johnson (1987) emphasized that the basis for successful experiences within the cooperative learning mode lies primarily in the area of motivation. Internal locus of control (i.e., that students believe that their academic success is directly related to their own efforts) is positively influenced by student participation in cooperative learning activities. D. W. Johnson and Johnson (1987) summarized the positive effects in this way:

The more cooperative students' attitudes are, the more they see themselves as being intrinsically motivated. They persevere in pursuit of clearly defined goals; believe that it is their own efforts that determine their school success; want to be good students and get good grades; and believe that ideas, feelings and learning new ideas are important and enjoyable. (p. 33)

In their work applying cooperative learning principles, A. L. Brown and Palincsar (1986) argued that cognitive growth through assimilation and restructuring of knowledge is a goal of comprehension of written text. They proposed that assimilation of knowledge has occurred when the reader/learning is able to apply knowledge to novel situations; the learner has ownership of the knowledge. Restructuring represents another level of acquisition where a novel situation requires alteration or refinement of knowledge.
In their study applying cooperative learning techniques, A. L. Brown and Palincsar (1986) concluded that the higher levels of learning (i.e., assimilation and restructuring), which are indicative of comprehension of text and of cognitive growth, can be accomplished effectively in the cooperative learning mode. So, although many have acknowledged the positive effects that cooperative learning carries for attitudes and motivation, positive effects on individual knowledge acquisition at all levels have also been noted.

The majority of the studies of cooperative learning have focused on the elementary and secondary levels. However, Dansereau (1987) employed cooperative learning techniques with college students who were encouraged to engage in strategies to recall and elaborate upon texts. His findings supported the use of cooperative learning, particularly with pairs of students. A particularly beneficial result was improvement in their abilities to clarify and apply their knowledge of the material.

It is important to note that students operating under cooperative learning conditions are almost automatically actively engaged in the reading/learning process. They must monitor their own understanding of the material through dialogue with a partner. This mode of instruction, then, is quite consistent with the picture of the strategic reader who is actively engaged with the text, and in consciously constructing meaning. Furthermore, cooperative learning may support the development of such strategies in students who have previously developed the characteristics of learned helplessness.
Summary of Related Research

Evaluation of developmental reading programs in the past has centered around identification of noninstructional components of successful programs. One criterion for identification of successful programs has historically been measured group gains on standardized reading tests. Attitudes have been examined primarily within the context of student feelings of self worth rather than with respect to attitudes to specific instructional activities. There has been little attempt to relate the efficacy of time spent on specific instructional activities to measured student success.

This study attempted to clarify the effects of instructional activities in a college-level developmental reading class on student performance in vocabulary and in comprehension as measured by a standardized reading test. The relationship between student attitudes (both toward college and the course in general, and toward the activities specifically), and student performance was examined. In addition, the influence of time spent on instructional activities on student performance was also examined. This study, therefore, departs from previous research by focusing on instructional rather than noninstructional (i.e., environmental) factors contributing to student success.
CHAPTER III

METHOD

Subjects

The sample for this study comprised students enrolled in ED 104, Effective College Reading, a developmental reading class offered by the Department of Education and Professional Development at Western Michigan University, Kalamazoo, Michigan. Students who score below the 12.6 grade level on the Nelson Denny Reading Test (NDRT) are required by the University to take ED 104. They must demonstrate competency on the Nelson Denny at the end of the semester to receive credit for the course. It is a mandated course, graded by credit/no credit, and it carries no credit toward graduation.

This study covered two semesters, Fall 1987 and Winter 1988. The subjects were 34 students enrolled in two Fall semester sections, and 13 students in one Winter semester section, for a total of 47 subjects on whom there are complete data. The investigator served as instructor for all sections.

Since this study covered two semesters, it is important to note some differences in the population from Fall to Winter. Students who score in the lower range on the (NDRT) are advised to enroll in ED 104 their first semester as an immediate intervention tactic. Transfer students and those scoring in the upper ranges of the cut-off score are advised to take ED 104 Winter semester. As a group, therefore,
the Winter semester students can be expected to come in with relatively stronger reading scores and with the benefit of one semester of college experience. The differences between the Fall and Winter semester students based on ACT scores are summarized in Table 1 below.

Table 1
ACT Composite Scores by Semester

<table>
<thead>
<tr>
<th>Semester</th>
<th>Number of Students</th>
<th>Mean ACT Composite (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>34</td>
<td>12.8 (3.4)</td>
</tr>
<tr>
<td>Winter</td>
<td>13</td>
<td>13.5 (3.3)</td>
</tr>
</tbody>
</table>

Instructional Materials

The overall purpose of instruction in the ED 104 class was to improve the students’ abilities to read. The required text for Fall semester, 1987, was *Mastering Reading Through Reasoning* (Whimbey, 1985). This text focuses on vocabulary development through use of context and on improving reading comprehension through logical steps in reasoning. Whimbey’s approach is untraditional in that the reading process is viewed in a holistic manner, and the components of effective reading are not segregated step by step. Winter semester students used a text entitled *College Reading* (McWhorter, 1986). The McWhorter text follows a more traditional format by emphasizing vocabulary, paragraph structure, main idea, and textbook organization. A
thesaurus and dictionary were required texts for both semesters as well.

Procedures

The procedures for this study consisted of a variety of instructional activities in which the students were engaged. Students were asked to provide ratings of their own attitudes, both toward general aspects of school and toward the course activities specifically. The students were also asked to report time spent on those activities. The set of six instructional activities were divided into two categories, vocabulary and comprehension, and were designed to improve students' capabilities in these areas. Each of the activities were completed in the cooperative learning mode and are described in the following section.

Vocabulary Activities

Research has shown conclusively that comprehension is directly linked to the reader's knowledge of key vocabulary (D. D. Johnson & Pearson, 1984). One could take the importance of a rich vocabulary base one step further, however, and relate vocabulary development to the entire schema of background knowledge that the reader possesses. That is, the more someone knows, the larger that person's vocabulary store likely is, and vice-versa. Vocabulary instruction is most effective, therefore, when it is linked to an enrichment of background knowledge and concept development (Cunningham, 1985). The two types
of vocabulary activities described below were designed to enrich readers' funds of background knowledge as well as to facilitate their vocabulary development.

**Semantic Mapping**

**Description.** The semantic mapping activity involved having the students work in pairs to brainstorm words and phrases related to vocabulary words taken from their texts. Together the students produced related words and phrases for each word, wrote the words and phrases on individual slips of paper, as designed by P. T. Wilson (personal communication, Summer, 1987) for this study, and organized the words and phrases into categories. Each partner had to label the other partner's word categories. A joint discussion of the rationale for the labels of the categories concluded each semantic mapping activity.

**Rationale.** Semantic mapping (D. D. Johnson, 1983; D. D. Johnson & Pearson, 1984) is designed to extend the student's knowledge of vocabulary by relating words to each other in categories. Because this activity was done in cooperative learning mode, students shared with each other their knowledge related to a word, thereby extending each student's knowledge to the pair. The labelling of categories and the concluding discussion was critical because it served to link what the students know with what they don't know.
**Thesaurus Activity**

**Description.** The thesaurus activity also involved the students in categorization of vocabulary concepts (D. D. Johnson & Pearson, 1984). Again, students selected words from their texts. However, in this activity, the students located the words in the thesaurus and listed six or seven related words. The students then arranged the related words into a continuum based on nuances of meaning centering around a common feature. Each student had to then identify or explain the feature to his partner. For example, the word selected might be "despair." Words listed for that entry in Roget's College Thesaurus (Moorehead, 1985) include "hopelessness, sadness, dejection, despondency," and "discouragement" (p. 137). The feature of contrast could be any response or characteristic related to the cluster of above words. For example, the students might plot the words listed above on a continuum related to feeling more or less alone.

**Rationale.** D. D. Johnson and Pearson (1984) pointed out that the development of meaningful vocabulary (i.e., vocabulary for which the student has true ownership) results from an individual organizing bits and pieces of information into concepts. It is this conceptual framework that provides the schema to which comprehension is linked. The activity of linking words together, classifying them, and, finally, ranking them provided the students with the experience of developing and elaborating such conceptual frameworks. This vocabulary activity can help to increase meaning vocabulary and enrich back-
ground knowledge. The focus here is on concepts and meaning within the context of a situation rather than on specific words and word meanings (Vaughn, 1982).

Comprehension Activities

The goal of all comprehension instruction and activities should be to facilitate the "process of constructing meaning from written texts" (R. C. Anderson et al., 1985, p. 7). The activities used in this study were designed to implement the constructionist view of the reading process in which the reader plays an active role using written cues to create meanings from text.

Modified Cloze Procedure

Description. The modified cloze activity required each student to prepare paragraphs in which every seventh word was deleted. The paragraphs were taken either from expository texts that they were currently using in their other courses or from narrative text selections in their ED 104 texts. In many cases, the instructor supplied paragraphs from outside sources. In this activity, students filled in blanks from their partners' paragraphs, and preparers corrected the responses. Discussion following correction was an important component of this activity. Responses that were incorrect according to the original text could still be considered correct if a partner could substantiate response based on both syntax and semantics. Both students in the cooperative learning pair then were
required to write one sentence describing something they had learned from the paragraph.

**Rationale.** The modified cloze activity has been used instructionally to emphasize both vocabulary and comprehension improvement. The fact that various responses were allowed based upon making sense of the paragraph enhanced meaning vocabulary as well as the active construction of textual meaning. However, the instructor reminded the students during the modelling phase of this activity that reading for meaning was the key, not finding synonyms. Therefore, in the context of instruction in ED 104, the emphasis was on development of comprehension.

Research on the effectiveness of cloze technique has historically been related to its efficacy as a measurement tool, rather than as an instructional strategy. Jongsm a (1971) first surveyed the use of the cloze procedure as a teaching technique and discovered limited prior research on its use (nine studies in a ten-year period). Based on those studies, he concluded that cloze was not especially effective as a teaching technique, but cautioned the reader that the studies cited did not demonstrate that any instruction (as we know it today through modelling and practice) took place. In a follow-up review of the research, Jongsm a (1980) examined 26 studies pertaining to the cloze procedure as an instructional strategy, and concluded that cloze can be effective in teaching reading. He argued that it is most effective in dealing with comprehension, least effective in dealing with vocabulary improvement. In addition, cloze is likely to be more effective
when discussion is an integral part of the instruction as it was in
this study.

Main Idea Identification Strategy

Description. When using the main idea strategy, the students
were required to read a passage and prepare three choices for main
idea selection; one good example and two non-examples. Modelling of
this strategy in both semesters followed the format used by Whimbey
(1985) by teaching the students to make one example too broad, one too
narrow, and one comprehensive (the correct choice). The students then
gave the passages and the main idea choices to their partners so that
they could read and select the appropriate main idea title. Students
were then asked to write one or two sentences explaining why they
agreed or disagreed with their partners' choices. Discussion of
responses followed the activity.

Rationale. One of the main components of the reading comprehen-
sion process is the ability to attend to the important information
through identifying the main idea of a piece of text. In an extensive
review of literature on main idea research, Winograd and Bridge (1986)
concluded that "the ability to identify and use important information
in text seems to be an essential difference between good and poor
readers" (p. 20). The procedure used in this current study was
supported by a study reported by Moore and Cunningham (1984) whose
students selected a main idea type from choices and then discussed
those selections. Improvements in comprehension were reported in this study.

Summarizing Activity

Description. The summarizing activity required to students to read a passage and to write a summary following a specific set of steps modelled by the instructor. A. L. Brown, Campione and Day (1980) developed a set of rules for summarizing in their work with junior college students. Those steps were presented to the ED 104 students and several practice sessions were used to encourage correct use of the strategy. The steps used by Brown, Campione, and Day (1980) in their work are as follows:

1. Delete unnecessary material—information that is trivial.
2. Delete material that is important but redundant.
3. Substitute a superordinate term for a list of items.
4. Substitute an encompassing action for a list of subcomponents of that action.
5. Select a topic sentence. The topic sentence, if there is one, usually is the author's summary of the paragraph.
6. If there is no topic sentence, invent your own.

Rationale. Summarizing as an aid to comprehension has been shown to be effective for good and poor readers. Kintsch and Van Kijk (1978) presented model for summarizing and specified explicit rules for this process. In her comments about strategies for learning from texts, A. L. Brown (1985) indicated that summarizing requires judgment.
and effort beyond simple recall. This additional effort requires the students to become more actively involved with the text and moves passive readers and learners into a more active mode. A. L. Brown, Campione, and Day (1980) developed the specific summarizing strategy used in this study. In his discussion of this strategy, McNeil (1984) reported research that showed it to be effective in improving comprehension.

**Sentence-by-Sentence Prediction Strategy**

**Description.** Sentence-by-sentence prediction is an activity which required the students to predict sequential sentences in a paragraph based upon comprehension of the preceding material. For this activity, each student prepared a paragraph by writing each sentence from it on a 3 x 5 index card. Student A showed the first card to Student B, asked Student B to read the sentence and then circle three or four key words in the sentence. Student B next predicted what the following sentence would be based on the key words. Student A then showed the partner the actual sentence and a discussion of what led to the prediction and its closeness to the actual sentence followed. This process continued until all sentences were completed. The partners then switched roles and Student B showed Student A sentences, asking Student A for predictions and rationalizations.

**Rationale.** This activity, as designed by Wilson (personal communication, Summer, 1987) emphasized comprehension at both the sentence level and the passage level. In addition, the activity engaged the
students actively in the reading process through prediction. Prediction plays an important role in the reading process. This importance has become clear through development of theoretical models of reading such as those developed by psycholinguists Goodman (1969) and Smith (1978) and through suggested instructional frameworks as the Directed Reading Thinking Activity (Stauffer, 1969; Tierney, Readance, & Dishner, 1985). The key element of this activity is the active involvement of the student in the reading process through reading and discussion.

In-Class and Out-of-Class Activities

Students engaged in the above-instructional activities both in-class and out-of-class. The activities were modelled by the instructor and subsequently practiced by the students in their groups while the instructor observed and offered comments and suggestions.

For the Fall semester students, after it was determined by the instructor that the students were comfortable with the steps of each activity, they were then assigned those activities as out-of-class work. Other out-of-class work included the preparation required for the comprehension activities. For example, if the students were assigned a cloze activity for the next class period, they were required to prepare a written passage complete with deletions and an answer key.

Winter semester students engaged in the actual activities only during class time. The change in procedures was because students were
having difficulty in getting together with their partners to engage in the activities outside of class. By allowing more in-class time to perform the activities, more consistent engagement was encouraged. All of the students' out-of-class activity was directed toward the preparation of activities for the in-class activity time. Winter semester students had at least one class period per week out of two devoted to these activities.

Assigned Versus Choice Activities

All activities during the initial stages of modelling and practice were assigned. After the instructor determined that the students were correctly completing all steps of each activity (midway through the semester), they were free to choose from the activities either as out-of-class activities for Fall semester or as in-class activities for the Winter semester students.

Measurement

Nelson Denny Reading Test

Student success in improving reading was measured by pre- to post-test gains on the Nelson Denny Reading Test (J. Brown, Nelson & Denny, 1975), the standardized, timed test which is used as an entrance and exit criterion measure for ED 104. The Nelson Denny contains both a multiple choice vocabulary subtest and a comprehension subtest. Gains on these two subtests were recorded separately. Because this test is scored on the basis of correct responses and car-
ries no penalty for incorrect responses, standardized administration directions encourage the students to answer as many items as possible. Due to the inherent chance factor in correctly responding to multiple-choice questions (20% correct due to chance), number of items attempted was also recorded whenever available. Therefore, percentage as well as raw score gains were calculated.

Attitude Scale

The effect of students' attitudes toward themselves and their perceptions regarding instruction were a dependent variable considered in this study. Student attitudes were therefore measured three times during the course of the semester. Figure 1 on page 31 is a sample of the attitude scale that was developed for this study by the investigator. The students responded to each attitude statement using a Likert scale that ranged from 1=strongly agree to 5=strongly disagree. The items were constructed to assess attitudes toward ED 104, toward college in general, toward the instructional activities, and toward cooperative learning. Each item was clustered into one of the four breakdowns listed above to yield attitude values for each of the four clusters in addition to ratings on each individual item. The items were clustered as follows:
Respond to the statements below by circling the response that corresponds most closely with your feelings about the statement.

Use the following key:

1 = strongly agree
2 = agree
3 = neutral
4 = disagree
5 = strongly disagree

1. I feel positive about what I can learn in Ed 104. 1 2 3 4 5
2. College is likely to be a good experience for me. 1 2 3 4 5
3. I am unhappy with my choice of classes this semester. 1 2 3 4 5
4. I resent the fact that I am required to take Ed 104. 1 2 3 4 5
5. Working with a study partner for activities in Ed 104 is likely to be a waste of time. 1 2 3 4 5
6. I think participating in the following activities will help me become a better reader.
   - Cloze
   - Main Idea
   - Semantic Mapping
   - Sentence by Sentence Prediction
   - Summarizing
   - Thesaurus
   1 2 3 4 5
7. I feel that I will do very well in my classes this semester. 1 2 3 4 5
8. I feel that I will do very well in Ed 104 this semester. 1 2 3 4 5
9. College is going to help me get where I want to go. 1 2 3 4 5
10. Ed 104 is likely to be a waste of time. 1 2 3 4 5
11. It's often helpful to study with another person. 1 2 3 4 5

Figure 1. Student Attitude Scale

1. Attitude toward ED 104: Items 1, 4, 8, and 10
2. Attitude toward College: Items 2, 3, 7, and 9
3. Attitudes toward Course Content: Item 6 (the instructional activities)
4. Attitude to Cooperative Learning: Items 5 and 11
The cluster ratings were computed by averaging the ratings of the items they included. Then the cluster ratings were used in the analyses rather than individual item ratings, except for the attitudes toward course content which were of interest individually in relation to the instructional activities.

Log Form

The other important source of data for this study was a self-report log form used to record information on several variables. These variables included time data, whether the activity was performed in- or out-of-class, whether it was assigned or chosen, and the student's rating of the activity. See Figure 2 on page 35 for a sample of the log form.

Time Spent on Instructional Activities

One variable that was examined to account for student gains on the standardized reading test was time spent on instructional activities. The students reported their times spent preparing and completing each activity on the log form (Figure 2). The log form was explained and used several times during class to ensure correct completion. The actual number of minutes the partners engaged in their activities as a pair were to be recorded on this form by the students themselves.
<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 10:00 11:00</td>
<td></td>
</tr>
</tbody>
</table>

**In-Class Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>A/C</th>
<th># of Mins.</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Idea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semantic Mapping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentence by Sentence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prediction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summarizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesaurus</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Homework Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>A/C</th>
<th># of Mins.</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Idea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semantic Mapping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentence by Sentence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prediction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summarizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesaurus</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Free Time**

- **TV Time**
- **Dinner Time**
- **Talking with Friends/Family**
- **Other Homework**

- *How Well I Did* 1 2 3 4 5
- *How Well I Did* 1 2 3 4 5

1 = very well; 2 = well; 3 = average; 4 = poorly; 5 = very poorly

**Figure 2. Daily Log Form**
In-Class Activities Versus Out-of-Class Activities.

The log form contained separate sections for recording in-class and out-of-class time. All activities were listed separately in each section, and time was recorded for each section.

Assigned Versus Choice Activities.

Subjects circled a code to indicate whether each activity was one that had been assigned by the instructor or whether chosen by the partners.

Rating of Activity.

Finally, the students reported on the Likert scale a value from one to five to report their perceptions of how they felt they performed on the activity. The scale ranged from 1=very well to 5=poorly.

Summary

The materials and procedures for this study were designed and selected to support the investigation of three questions, elaborated in Chapter I, about improving students' reading achievement in a developmental reading course, and the effects of attitudes and time engaged in instructional activities on achievement gains. The next chapter will report the results of analyses designed to address these questions.
CHAPTER IV

RESULTS

The three main questions raised in this study were as follows:

1. Is it possible to improve student reading abilities in a developmental reading class as measured by standardized test performance?

2. What relationships can be found between reading achievement gains and student attitude variables?

3. What are the effects of time spent on instructional activities on measured student gains in performance?

Improvements in Student Reading Abilities

The mean pre-test and post-test Nelson Denny (J. Brown, Nelson & Denny, 1976) scores are reported in Tables 2 and 3. Table 2 reports vocabulary score means and standard deviations for all subjects in this study. Both vocabulary raw score and number of items attempted are reported for the pre-test and the post-test.

Table 2 shows a gain on vocabulary score from pre- to post-testing of 4.3 points. A t test was used to determine that this gain was significant. The 2-tail probability of the t value of -4.82, with 46 degrees of freedom, was p<.0005.
Table 2
Vocabulary Pre-Test and Post-Test Performance

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Score (s.d.)</th>
<th>Mean Items Attempted (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=47</td>
<td></td>
</tr>
<tr>
<td>Pre-Test</td>
<td>16.9 (5.5)</td>
<td>39.5 (17.1)</td>
</tr>
<tr>
<td>Post-Test</td>
<td>21.2 (5.4)</td>
<td>51.4 (15.5)</td>
</tr>
<tr>
<td>Gain Score</td>
<td>4.3* (6.2)</td>
<td>11.9* (13.5)</td>
</tr>
</tbody>
</table>

p<0.0005

Table 2 also shows a gain in number of items attempted, from pre- to post-test of 11.9 items attempted. A t value of -5.84 with 43 degrees of freedom was p<0.0005.

Table 3 summarizes the results of pre-test to post-test comprehension scores for the sample. Table 3 indicates a gain in comprehension score from pre- to post-testing of 8.9 points. A t test was used to determine that the reported gain in comprehension was significant. The 2-tail probability of the t value of -7.71, with 46 degrees of freedom, was p<0.0005.

Table 3 also shows a gain in number of comprehension items attempted of 9.7 items. A t test was used to determine that the gain in comprehension items attempted was significant. The 2-tail probability of the t value of -6.49, with 43 degrees of freedom, was p<0.0005.

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Table 3
Comprehension Pre-test and Post-test Performance

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Score (s.d.) n=47</th>
<th>Mean Items Attempted (s.d.) n=44</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>26.8 (7.1)</td>
<td>49.6 (10.3)</td>
</tr>
<tr>
<td>Post-Test</td>
<td>35.7 (6.3)</td>
<td>59.3 (10.8)</td>
</tr>
<tr>
<td>Gain Score</td>
<td>8.9* (8.0)</td>
<td>9.7* (9.8)</td>
</tr>
</tbody>
</table>

The results of these analyses indicate there were significant gains in student performance for vocabulary and comprehension. Students made significant gains in both raw score and number of items attempted.

Subject Attitudes and Reading Achievement Gains

Summary of Attitude Data

The data collected from the attitude scales are summarized in Tables 4 and 5. The values reported in Tables 4 and 5 represent the means and standard deviations from the three attitude scales collected from the subjects throughout the semester. The scale ranged from 1-5; the lower the number, the more positive the attitude. Table 4 represents the attitudes to each instructional activity.
Table 4

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mean Rating (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze</td>
<td>2.4 (0.91)</td>
</tr>
<tr>
<td>Main Idea</td>
<td>1.8 (0.83)</td>
</tr>
<tr>
<td>Semantic Mapping</td>
<td>2.4 (0.86)</td>
</tr>
<tr>
<td>Sentence-by-Sentence</td>
<td>2.3 (0.93)</td>
</tr>
<tr>
<td>Predictions</td>
<td></td>
</tr>
<tr>
<td>Summarizing</td>
<td>2.0 (0.80)</td>
</tr>
<tr>
<td>Thesaurus</td>
<td>2.2 (0.91)</td>
</tr>
</tbody>
</table>

The attitudes reported in Table 4 were generally positive toward the instructional activities. Students were most positive toward Main Idea Strategy (1.8) and more neutral toward Cloze and Semantic Mapping (2.4).

Table 5 shows the values for the clustered attitudes. Students reported the most positive attitude toward college (1.9) and toward ED 104 (2.0). They reported slightly more neutral attitudes toward course content (2.2) and toward cooperative learning (2.3).
Table 5
Student Attitudes by Cluster

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Mean Rating (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Content</td>
<td>2.2 (0.64)</td>
</tr>
<tr>
<td>ED 104</td>
<td>2.0 (0.65)</td>
</tr>
<tr>
<td>Cooperative Learning</td>
<td>2.3 (0.92)</td>
</tr>
<tr>
<td>College</td>
<td>1.9 (0.55)</td>
</tr>
</tbody>
</table>

Effects Related to Attitudes

Vocabulary

Multiple regression analyses were used to assess the influence of attitude on vocabulary gains. The results demonstrate that aspects of student attitudes accounted for significant variance in student success (i.e., gain) on the vocabulary subtest of the Nelson Denny (J. Brown, Nelson & Denny, 1976). Table 6 summarizes the effect of the significant variables on the post-test vocabulary scores.
Table 6
Significant Predictors of Post-Test Vocabulary Scores

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>% of Variance Accounted For</th>
<th>Significance i.e., p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>20.9</td>
<td>0.0012</td>
</tr>
<tr>
<td>Semester</td>
<td>8.2</td>
<td>0.0240</td>
</tr>
<tr>
<td>Attitude to Semantic Mapping</td>
<td>9.1</td>
<td>0.0123</td>
</tr>
<tr>
<td>Attitude to Thesaurus</td>
<td>7.5</td>
<td>0.0154</td>
</tr>
<tr>
<td>Attitude to College</td>
<td>7.4</td>
<td>0.0115</td>
</tr>
</tbody>
</table>

The pre-test score accounted for 20.9% of the variance in post-test vocabulary score. When semester entered the equation, it accounted for an additional 8.2% of the variance. Second semester students gained more on the post-test after adjusting for the pre-test score. Attitude toward Semantic Mapping accounted for an additional 9.1% of the variance. Students who rated Semantic Mapping more neutral gained more on the post-test. An additional 7.5% of the variance can be attributed to Attitude toward the Thesaurus activity. The more positive the Attitude toward Thesaurus Activity, the greater the post-test vocabulary gain. The final significant variable accounting for variance is Attitude toward College, the cluster of items from the scale relating to college in general. Students who rated college more positively gained more on the post-test.
Comprehension

Similar multiple regression analyses were used to assess the influence of attitude variables on comprehension gains. The variables that predict gain in post-test comprehension scores are summarized in Table 7. The analyses were not as successful in identifying variables that predicted vocabulary gains; however, the results are interesting.

Table 7
Significant Predictors of Post-Test Comprehension Scores

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>% of Variance Accounted For</th>
<th>Significance i.e., p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>6.5</td>
<td>0.0461</td>
</tr>
<tr>
<td>Attitude to ED 104</td>
<td>7.9</td>
<td>0.0279</td>
</tr>
</tbody>
</table>

As this table illustrates, the pre-test comprehension score accounted for 6.5% (p<0.0461) of the variance of comprehension gain. Attitude to ED 104 accounted for an additional 7.9% (p<0.0279) of the variance in gain.

We should note that Attitude toward ED 104 on its own would account for 14.8% (p<0.0044) of the post-test comprehension score. The final effect of the pre-test score is reduced when Attitude toward ED 104 enters the equation.
Time Spent on Activities and Reading Achievement Gains

Summary of Time Date

Tables 8 and 9 report the summary data for the amounts of time that subjects spent on the in-class and the out-of-class activities. Table 8 shows the average daily minutes per subject spent on activities. Table 9 shows the average total minutes per subject spent on activities over the entire semester. These data were compiled from both semesters.

Table 8

Average Daily Minutes Spent on Activities
Mean Times, Standard Deviations, and Ranges

<table>
<thead>
<tr>
<th>Activity</th>
<th>In-Class Mean (s.d.)</th>
<th>Out-of-Class Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[range]</td>
<td></td>
</tr>
<tr>
<td>Cloze</td>
<td>2.11 (1.8)</td>
<td>3.44 (2.86)</td>
</tr>
<tr>
<td></td>
<td>[0-6.8]</td>
<td>[0-16.8]</td>
</tr>
<tr>
<td>Main Idea</td>
<td>1.67 (0.95)</td>
<td>2.54 (2.2)</td>
</tr>
<tr>
<td></td>
<td>[0-5.0]</td>
<td>[0-9.0]</td>
</tr>
<tr>
<td>Semantic Mapping</td>
<td>2.11 (2.19)</td>
<td>2.53 (2.33)</td>
</tr>
<tr>
<td></td>
<td>[0-12.0]</td>
<td>[0-7.56]</td>
</tr>
<tr>
<td>Sentence-by-Sentence</td>
<td>2.04 (1.82)</td>
<td>2.41 (2.50)</td>
</tr>
<tr>
<td></td>
<td>[0-11.0]</td>
<td>[0-12.5]</td>
</tr>
<tr>
<td>Summarizing</td>
<td>1.83 (1.35)</td>
<td>1.10 (1.35)</td>
</tr>
<tr>
<td></td>
<td>[0-5.13]</td>
<td>[0-6.0]</td>
</tr>
</tbody>
</table>
The average daily minutes spent on activities seems to be quite low considering that the students spent 50 minutes in each class. One reason for this apparently low figure is that averages are computed across all of the days on which a subject completed logs. Subjects completed, on average, approximately 11 log forms each. Thus, a subject who reported five occasions of cloze activities at five minutes each would have an average of 25/11=2.3 minutes per day. In terms of the actual data, subjects averaged 2.10 minutes per day (or per log) on the cloze activity in class.
Because the average minutes might not provide an easily interpretable overall picture of time spent on activities, Table 9 provides the averages for total minutes spent on each activity.

Again referring to the example above, the subject would have 25 minutes reported as the total time spent on the cloze activity. In terms of the actual data, the subjects in this study spent a total of 23.09 minutes (the amount from Table 9), on average, during the semester, doing the cloze activity in class.

Table 9
Average Total Minutes Spent on Activities: Mean Times, Standard Deviations, and Ranges

<table>
<thead>
<tr>
<th>Activity</th>
<th>In-Class Mean (s.d.) [range]</th>
<th>Out-of-Class Mean (s.d.) [range]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloze</td>
<td>23.09 (22.08) [0-102.0]</td>
<td>35.96 (22.18) [0-95.0]</td>
</tr>
<tr>
<td>Main Idea</td>
<td>18.55 (11.82) [0-60.0]</td>
<td>28.81 (25.06) [0-90.0]</td>
</tr>
<tr>
<td>Semantic Mapping</td>
<td>22.55 (20.48) [0-80.0]</td>
<td>29.38 (28.49) [0-90.0]</td>
</tr>
<tr>
<td>Sentence by Sentence</td>
<td>21.96 (16.31) [0-75.0]</td>
<td>23.79 (21.03) [0-75.0]</td>
</tr>
<tr>
<td>Summarizing</td>
<td>20.60 (16.64) [0-77.0]</td>
<td>12.53 (14.69) [0-60.0]</td>
</tr>
</tbody>
</table>
Table 9--continued

Average Total Minutes Spent on Activities:
Mean Times, Standard Deviations, and Ranges

<table>
<thead>
<tr>
<th>Activity</th>
<th>In-Class Mean (s.d.)</th>
<th>Out-of-Class Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[range]</td>
<td>[range]</td>
</tr>
<tr>
<td>Thesaurus</td>
<td>27.81 (22.45)</td>
<td>16.55 (14.31)</td>
</tr>
<tr>
<td></td>
<td>[0-82.0]</td>
<td>[0-46.0]</td>
</tr>
<tr>
<td>TV Watching</td>
<td>408.92 (358.14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0-1800.0]</td>
<td></td>
</tr>
<tr>
<td>Eating Dinner</td>
<td>374.28 (312.68)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[15.0-1419.0]</td>
<td></td>
</tr>
<tr>
<td>Talking with Friends</td>
<td>1118.34 (754.14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[5.0-2820.0]</td>
<td></td>
</tr>
<tr>
<td>Other Homework</td>
<td>1132.98 (842.38)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0-3660.0]</td>
<td></td>
</tr>
</tbody>
</table>

Again referring to the example above, the subject would have 25 minutes reported as the total time spent on the cloze activity. In terms of the actual data, the subjects in this study spent a total of 23.09 minutes (the amount from Table 9), on average, during the semester, doing the cloze activity in class.

It is important to also note in Tables 8 and 9 that the ranges of minutes reported by the students are included. This was done to illustrate an important fact: in the ranges both for average daily minutes and for average total minutes, the minimum value is always
zero. It would be understandable in a credit/no credit developmental class for some students to never report any time on an activity outside of class. However, since all activities were practiced in class, it is not possible that some students would have spent no time in class engaged in some of the activities. The minimums of zero are not realistic given the conditions and the procedures of the study. The probable causes of the zero minimums are reliability problems with the time data, most specifically, under-reporting. The reliability issue will be addressed in Chapter V.

In the multiple regression analyses using time on activities to predict gain in achievement, the average daily minutes was used as predictor. It is important to note two points about using average daily minutes. First, because there were few differences among subjects in numbers of logs completed, the computations yield little difference between average daily minutes and average total minutes. Second, and more important to this analysis, average daily minutes had turned out to be a better predictor of gain than average total minutes in previous research (R. C. Anderson, et al., 1988). It should be noted that, as in the cited study, the influence of total times on gains was tested, but with no improvement in the prediction. Therefore, it can be concluded that average daily minutes is a better predictor of gains.
**Effects Related to Time on Activities**

**Vocabulary and Comprehension**

Multiple regression analyses were used to assess the influence of time on activities on vocabulary and comprehension gains. No significant effects were found related to time spent on activities, either in class or out of class. This lack of findings may be attributable to the reliability problems with the time data. Because there were no main effects for time, the effects of the assigned versus choice contrast and the student self-ratings on the activities were not explored.

**Other Analyses**

Upon examination of the correlation matrices accompanying the multiple regression analyses for achievement gains in vocabulary and comprehension, an interesting phenomenon came to light. The relevant correlations for vocabulary and comprehension are reported in Table 10.

First, the low correlations between the pre-test and post-test scores became apparent, and those correlations were lower for comprehension than for vocabulary. The correlation tables report a pre-test and post-test vocabulary score correlation of $r=0.478$, $p<0.001$. The pre-test to post-test correlation for comprehension was $r=0.342$, $p<0.012$. 

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Table 10

Correlations of Vocabulary and Comprehension Post-Test Scores with Pre-Test Scores and Post-Test Items Attempted

<table>
<thead>
<tr>
<th>Measure</th>
<th>Post-Test with Pre-Test (p&lt;)</th>
<th>Post-Test with Items Attempted (p&lt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>0.478 (p&lt;0.001)</td>
<td>0.571 (p&lt;0.0005)</td>
</tr>
<tr>
<td>Comprehension</td>
<td>0.342 (p&lt;0.012)</td>
<td>0.371 (p&lt;0.007)</td>
</tr>
</tbody>
</table>

The Nelson Denny Examiner's Manual (J. Brown, Nelson & Denny, 1976) was consulted to check the expected correlations for alternate form reliability since the subjects took alternate forms for pre-test and post-test. The expected correlations for alternate forms are as follows: for vocabulary, correlations in the range of 0.82-0.87; for comprehension, correlations in the range of 0.66-0.68. Alternate forms reliabilities are usually calculated with a short time interval between tests. In this case, the time interval was several months. However, the longer interval itself should not reduce the correlation between the alternate forms because students are expected to gain at similar rates according to their pre-test scores.

The finding of these lower than expected correlations suggested an effect of instruction that was not equivalent for all students. In other words, if all students had similar achievement gains, the correlations for subjects in this study would be similar to those reported in the Nelson Denny Examiner's Manual (1976). In the present study,
it seems that the instruction helped to reduce differences between students. Since most students did gain during the study, the explanation must be that some of the students who started out with lower pre-test scores gained more than some of the students who started out with higher pre-test scores. This might, of course, be due to ceiling effects in the learning abilities of developmental students, i.e., that it is easier to raise the scores of those who start lower. In any case, student gains seemed to become of additional interest, beyond the original purposes of the study. Thus, the decision was made to explore the ways in which students made their gains; this, in turn, necessitated some further analysis of the relationship between vocabulary and comprehension performance.

Although the correlations between pre-test and post-test scores for vocabulary and comprehension were interesting, the correlations between items attempted on the post-test and actual post-test scores were also revealing. For vocabulary, items attempted on the post-test correlated with post-test vocabulary score $r=0.571$, $p<0.0005$. For comprehension, items attempted on the post-test correlated with post-test comprehension score $r=0.371$, $p<0.007$. It is clear from Table 10 that post-test scores correlate more highly with items attempted on the post-test than with pre-test scores for both vocabulary and comprehension. In order to determine whether the gains students achieved were attributable to improved reading abilities or simply to increase in numbers of items attempted, a rate of gain score was computed for both vocabulary and comprehension.
The relationship between vocabulary and comprehension performance was examined in terms of rate of gain, that is, the gain in score per gain in items attempted. Rate of gain was computed by dividing the number of points gained by the increase in items attempted. The rates of gain for vocabulary and comprehension are reported in Table 11. Because the data on items attempted for the pre-tests was not available for all subjects, the table reports results for n=38.

The rate of gain, or gain in score per gain in items attempted, for vocabulary was 0.19 points. The rate of gain for comprehension was 0.64 points. There is some discrepancy noted between these rate of gain results and the rate of gain results obtained through hand computations using the results from Tables 2 and 3, n=47. Hand computation to calculate the ratio between gain in raw score per gain in items attempted yields a rate of gain score of 0.36 for vocabulary and 0.81 for comprehension. A frequencies analysis revealed negative gain scores for several subjects. These negative values were included in the 38 subjects for whom there were complete data, while some positive gain scores were lost due to incomplete data. These negative values reduced the rate of gain scores; therefore, the rate of gain that might incorrectly be computed for n=47 (because of missing data) was, in fact, greater than the rate of gain values for n=38.

A t test was used to determine that the rate of gain for comprehension was significantly greater than for vocabulary. The 2-tail probability of the t value of -1.87, with 37 degrees of freedom, was p<.035 which is reported in Table 11.
Table 11
Rate of Gain for Vocabulary and Comprehension Scores:
Points Gained from Pre-Test to Post-Test as a
Function of Additional Items Attempted

<table>
<thead>
<tr>
<th>Measure</th>
<th>Rate of Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>0.19</td>
</tr>
<tr>
<td>Comprehension</td>
<td>0.64*</td>
</tr>
</tbody>
</table>

* p<0.035

The instructional impact on student success can be summarized in terms of the subjects' rates of gain on vocabulary and comprehension. Students gained more in comprehension than in vocabulary. The gain rate in comprehension was 0.64 points per additional item attempted, and this was better than the gain rate for vocabulary, which was 0.19 per additional item attempted. The greater instructional effect throughout the semester was on comprehension.

Summary of Results

There were significant gains in student performance as measured by raw score gains for both vocabulary and comprehension. Attitude variables significantly predicted both vocabulary and comprehension gains. Time engaged in instructional activities did not significantly predict gains. The correlations between pre-test and post-test scores were remarkably low for both vocabulary and comprehension. The rate of gain in terms of additional points per additional item attempted
was significantly greater for comprehension than for vocabulary. The low pre-test to post-test correlations for vocabulary and comprehension combined with the rate of gain scores for vocabulary and comprehension suggest there was a clear instructional effect in improving student reading abilities in vocabulary and in comprehension. This effect was greater for comprehension than for vocabulary. These results will be discussed in the next chapter.
Data Collection Problems

The problem inherent in collecting self-report time data cannot be overlooked. These problems relate to the following issues: (a) lack of time spent and reported on activities, (b) the lack of variability in the amount of time reported, (c) the lack of reliability of reported data, and (d) the other instruction provided in ED 104 as well as concurrently in other classes.

Lack of Activity Time

Class time for ED 104 was restricted to two fifty-minute class periods per week. This restriction resulted in less than optimum frequency of engagement and less total time engaged in the activities. Further compounding the problem, as seen in Chapter IV, students reported less time than they actually spent on the activities. The fact that the average number of logs completed per student was only 11 suggests that logs should have been collected more frequently and regularly.

Lack of Variability

Related to the lack of time spent and reported on activities is the concomitant lack of variability of time. As seen in Chapter IV, the average daily minutes for all in-class activities ranged from 1.67 to 2.10; the average total minutes ranged from 18.55 to 27.81. That the analysis was not able to predict gains based upon time was due, in part, to the fact that there was so little variation in these amounts.
Lack of Reliability

The limitations related to data collection have most impact when considering the issue of the reliability of the reported data. It was noted in Chapter IV that the calculated minimum average daily and total minutes for all the instructional activities was zero. The zeroes would mean that some students never engaged in some of the activities. While this finding was possible (though not desirable) for the at-home reporting, it was simply not credible for the in-class reporting. While students absences may account for some zeroes, they cannot explain the consistent pattern of zeroes. All of the activities were assigned a number of times in class so that every student had ample opportunity to engage in each one several times. It appears that this pattern of zeroes is due to chronic under-reporting of times for in-class activities.

The under-reporting phenomenon is supported by examining the total time reported in class. Average total time for all in-class activities was 134.56 minutes (from adding the in-class activity means in Table 9). During each semester, there were about 1,500 minutes spent in class. Of that time, approximately 600-750 minutes was allocated to the instructional activities. The average total minutes (134.56 minutes) represents only 20%-25% of the time allocated to activities. This strongly supports the conclusion that time was not reliably reported. In fact, it was severely under-reported. While there is no benchmark with which to compare out-of-class activities,
where the primary training was directed at speeded skills (Kersteins, 1986). Yet, this kind of evaluation might obscure a lack of real cognitive or academic gains. With a timed test, student gains could be explained simply in terms of increasing the students' academic aggressiveness, i.e., their capacity to complete more items, without in any way influencing their ability to comprehend and learn better from text. This study was uniquely able to minimize this difficulty by examining success based upon rate of gain in points per additional item attempted, rather than simply by gain score, as discussed in Chapter IV.

Discussion

The instructional effect on student success was observed for both vocabulary and comprehension, i.e., there were significant gains in both areas. While this study was able to predict some gains, a large proportion of variance was left unaccounted for. Factors relating to the successful prediction and unaccounted gains will now be examined.

Differential Instructional Effect

Alternate forms reliability data for the Nelson Denny Reading Test (1976) indicate that the correlation for pre-test and post-test vocabulary scores should be in the range of 0.82-0.87 (J. Brown, Nelson & Denny, 1976). The actual correlation for the present experimental sample was $r=0.478$. Similarly, while the expected correlation for the pre-test and post-test comprehension scores should be
...in the range of 0.66-0.68; the correlation for this sample was \( r=0.342 \).

It is clear from these comparisons that a low proportion of variance can be accounted for through pre-test scores. The low correlations point not only to a significant instructional effect, but also to the likelihood that instruction is influencing students differentially, i.e., that some students who start with lower scores are gaining more than students who start with higher scores. What might have accounted for considerable gain in one student did not hold true for the entire group. This finding suggests that there might be interactions between pre-test scores and the students' ability to benefit from the instructional activities. However, given the lack of prediction from the time spent on activities, the reliability problems with the time data, and the relationship between limited degrees of freedom and the need to keep experimentwise error rate to a minimum, the decision was made not to explore the many interaction possibilities. Therefore, a clear-cut analysis of the effects of instructional activities on academic gains must await future research.

**Attitude Effect**

This study was successful in using attitude variables to predict vocabulary and comprehension gains. Attitude toward Semantic Mapping, toward Thesaurus, and toward College were predictors of vocabulary gain. Attitude toward ED 104 predicted comprehension gain. There were two different kinds of attitude effects. First, when students'
attitudes towards Thesaurus and College were more positive, post-test vocabulary scores were higher. Second, when students’ attitudes toward Semantic Mapping were more neutral, post-test vocabulary scores were higher. When students’ attitudes toward ED 104 were more neutral, post-test comprehension scores were higher.

The more positive attitude effect has a straightforward explanation. Students felt more positive toward a vocabulary activity, and they felt more positive toward being in college in general, so the test taking situation was less stressful for them. They were able to be more academically aggressive, to complete more items and to score higher.

The more neutral attitude effect is more difficult to explain. It is suggested here that one explanation may be realism. Students who rate an activity or aspect of their course experience as more neutral may have a more realistic self-assessment of how they are doing in school. The more neutral rating may emerge out of a feeling of confidence that they do not have to please the instructor with a positive rating. Student success is based on their own ability rather than on outside factors such as the instructor. Students who, with some sense of eagerness to please, give a more positive rating may, in fact, be more anxious, complete fewer items on the test, and score lower.

Using the data from the present study, it may be hard to reconcile the apparently conflicting positive and neutral attitude explanations. However, subjective evidence from the instructor’s observa-
tions may be illuminating. The instructor observed that students seemed to have a lot of fun with Semantic Mapping. They engaged in plenty of discussion and give-and-take, and seemed to regard this activity more as a free-time activity. For this reason, they may have felt that it was not really like work; their concept, then, might be that it would not transfer to success on the Nelson Denny. This could explain their neutral rating. In contrast, with the Thesaurus activity, the instructor observed that students had to struggle to come up with terms to explain the continuums on which they arranged their words. This task seemed to be quite a bit harder for them. Thus, a positive attitude toward Thesaurus could reflect a genuine self-awareness of how a difficult task requiring them to think about the nuances of vocabulary could translate to their academic success. Students who felt better about doing this could approach the vocabulary test with a more positive, academically aggressive point of view. Thus, the argument here is that positive and neutral attitudes to activities can co-exist within a sample of subjects, and both point to the same outcome of being able to do better on the post-test.

Academic Aggressiveness and Cognitive Gains

In this chapter, the term "academic aggressiveness" has been used to explain how it is that developmental students may have improved scores on their post-test. It is important to have some understanding of what is involved in academic aggressiveness. Kersteins (1986), without using the term, suggested that there is a fluency component to
academic aggressiveness. His argument was that developmental courses often focus on fluency skills such as skimming and reading speed. Thus, students are able to complete more items on the post-test and score higher, without really having improved any aspect of their reading skills other than speed. The findings of the present study regarding the effects of attitude suggest that there is also an affective component to academic aggressiveness, and that attitude as well as mechanical speed is related to improvements in post-test scores. One of the bases for this argument is the research on learned helplessness (Johnston & Winograd, 1985). Students who have a low self-concept and who lack self-monitoring strategies do poorly on timed and standardized tests because they have attitudes that inhibit their abilities to work efficiently. The subjects of this study were more academically aggressive at the end of the semester than at the beginning. The instruction in reading strategies enabled them to engage in the reading task at a more fluent, accurate level. The potential for success that they attributed to their own capabilities rather than to outside factors may have enabled them to perform more efficiently on the post-test.

Further work can be done to investigate the intricacies of attitude effects. One of the achievements of the present study is that it has demonstrated effects related to attitudes toward specific instructional activities that do not emphasize fluency, as well as attitudes to the developmental program and to the college environment.
There is, however, a deeper issue to be addressed about how and why developmental courses may be successful. Beyond influencing students' speed at completing items, and their attitudes towards timed tests, is it possible to improve the students' abilities to comprehend and learn from text? Examining the data from this study, we can begin to give a positive answer.

In order to address this issue, it is important to note the differences observed between the relative rates of gain between vocabulary and comprehension. As previously reported, students gained an average of 0.19 point per additional item completed in the vocabulary score; the average gain per item completed on comprehension was 0.64. The argument posed here is that if gains in post-test scores were simply due to academic aggressiveness, or completing more items, then the rate of gain would be the same for vocabulary and comprehension. However, comprehension has a significantly higher rate of gain. Students have learned strategies to comprehend and learn from text, skills which are not tested on an isolated word vocabulary test. Therefore, the results from this study indicate that instruction can contribute to improvement in academic aggressiveness as well as to cognitive gains.

**Recommendations**

Subject to the limitations noted above, this study demonstrated that instruction can affect student success in reading, particularly in comprehension. Further research along this line of study is recom-
mended, and several suggestions follow. More frequent reporting of time spent on activities is recommended. Daily logs covering the entire semester with consistent engagement in activities would allow for the variation in time spent on different activities necessary to predict gains.

More reliable data collection procedures also are recommended. The students should be required to complete the form as a pair and periodic checks to determine reliability between forms would reduce reporting errors. The under-reporting substantiated above could have been a result of students reporting only their own participation in the paired activities, rather than the total time spent by the pair. If the students were to report as a pair, then the total time they spent on the activities would be accounted for. A log form requiring the students to note the beginning and ending times for each activity would also cause them to be more aware of accurate time reporting. Periodic checks by an in-class observer other than the instructor is also suggested. These checks would serve to verify student reports as well as to account for time spent on other instructional activities.

This study was able to measure student success in a timed test situation. However, an untimed pre-test and post-test would clarify the extent of effect of instruction on comprehension skills gains. Students interact with text most frequently in untimed situations; gains in that situation should also be measured.
Conclusions

The findings of this study suggest that students can improve their reading abilities in a developmental reading class at the college level. Attitudes are a factor in the improvement of reading abilities. This improvement in reading abilities can be observed by their academic aggressiveness (fluency as well as attitude improvements), as well as their cognitive ability to deal with text through specific instruction. The determination of how most effectively to engage students in instructional activities that will improve their reading abilities is a major direction for future inquiry.
BIBLIOGRAPHY


