DIFFERENT APPROACH, DIFFERENT RESULTS: A STUDY OF MASTERY LEARNING INSTRUCTION IN A DEVELOPMENTAL READING CLASS AT AN URBAN COMMUNITY COLLEGE

by

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ABSTRACT

PATRICIA L. HILL-MILLER. Different approach, different results: A study of mastery learning instruction in a developmental reading class at an urban community college. (Under the direction of DR. ROBERT RICKELMAN)

Mastery learning is an instructional strategy that was popular at one time and recently resurfaced in higher education environments. Mastery learning attempts to capture the most effective components of individualized tutoring and replicate those strategies in a group setting. This study explored the effectiveness of mastery learning instruction. More specifically, mastery learning and non-mastery learning instruction were compared using 73 students in four sections of a developmental reading class.

A Solomon four-group research design was employed. One instructor taught two sections using mastery learning and a different instructor taught two sections with non-mastery learning instruction. Each section included identical course objectives, course content, and unit exams. The independent variable was instructional method. The dependent variables included academic achievement, reading skill, and reading attitude. Quantitative data were collected in the following forms: final grades, unit exam scores, reading skills assessment scores and reading attitude survey results.

In terms of academic achievement, the results indicated that there was a statistically significant difference between groups on three of the five unit exams and retest opportunities resulted in improved achievement in the mastery learning conditions. In addition, statistical analysis revealed that there was no statistically significant difference in the reading attitudes of students in the mastery and non-mastery learning conditions.

DEDICATION

This doctoral dissertation is dedicated to several members of my family. First and foremost, to my mother, Catherine M. Hill, who instilled in me a value of education at a very early age. She is the source of my inspiration and a constant cheerleader in all that I do. As a single-parent of six, she is a great role model and the epitome of what I believe a good mother should be. When I grow up, I want to be just like her. I love you, Mom!

This dissertation is also dedicated to my siblings, Cynthia Ricks, Letitia Harris, Katrena Robbins, Vanessa Reaves, and Thaddeus Hill, who have always bent over backwards to support and encourage me in all of my pursuits. Unselfishly, they have always given of their time, blood, sweat, and tears to help when needed. I love and appreciate you all so dearly.

I would also like to make a special dedication to my children, Richard II, Braeden, Madison, and Aidan. This is all for you! I hope that my hard work is not in vain and that one day you too will understand and appreciate the value of education as I do. I love you all! This also includes an extra special dedication to my dissertation baby, Aidan, for having perfect timing and thriving during all of this dissertation mayhem. We truly share a unique bond.

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CHAPTER 1: INTRODUCTION

Armed with open admissions policies, cost-effective tuition, workforce development and quality instruction, community colleges are of great appeal to today's students. According to reports compiled by the National Center for Education Statistics (2008), in 2006-07, approximately 6.2 million students were enrolled in over 1,045 community colleges. This number translates into approximately 35 percent of all postsecondary enrollments for that year. Figuratively speaking, community colleges are bursting at the seams in terms of enrollment. As the enrollments continue to grow, so does the number of underprepared students. Consequently, as the number of underprepared students attending community college increases, so does the demand for quality instruction. As a result, community colleges often face the challenge of addressing the needs of many with fewer resources.

For many community college students, developmental education is an integral part of their college experience. Since a majority of community college students arrive unprepared for college-level work, many community colleges employ developmental education programs. Typically, the terms *developmental* and *remedial* are used interchangeably to refer to this system of instruction that is provided to community college students who enter college underprepared. However, the term *developmental* will be used primarily in this study. According to a survey of beginning college students in

2003-04, approximately 29 percent of community college students reported taking remedial courses during their first year of school (National Center for Education Statistics [NCES], 2008). At that time, enrollments in remedial math courses were highest with 22 percent of beginning community college students registering for these courses. In addition, the survey also indicated that approximately 10 percent of beginning community college students were enrolled in a remedial writing class. However, in 2008, it was reported that 59 percent of students in colleges participating in the Achieving the Dream: Community Colleges Count initiative enrolled in at least one developmental education course. This national initiative launched in 2004 and funded by the Lumina Foundation and others involves at least eighty-three community colleges in at least fifteen states. These percentages are expected to continue to grow steadily as more and more students show up to colleges and universities ill-prepared (Bailey, 2009).

Statement of the Problem

According to Bailey (2009), developmental education is one of the most difficult issues that community colleges face today. Since community colleges provide the majority of instruction for developmental students, these institutions have been thrust into the national spotlight (albeit not by choice) and are the subject of much debate. One area of great interest in the developmental education arena is developmental reading. According to data collected as part of the Achieving the Dream: Community Colleges Count initiative, nearly 33% of the students in the sample were required to take a developmental reading class. This sample included data on more than 250,000 students from fifty-seven colleges in 7 states (Bailey, 2009). In order to reconcile these facts,

developmental educators are taking a long, hard look at the programs and services that are available to developmental reading students.

Members of the academic community are not the only scrutinizers of developmental education; other stakeholders have also taken notice. The national initiative, Achieving the Dream: Community Colleges Count, includes goals for developmental students. The over-arching theme of this initiative, funded by the Lumina Foundation and others, is to help more community college students succeed. One specific goal of the program is to help more students successfully complete developmental courses and advance to college-level courses (Achieving the Dream [ATD] , N.D.). The success and retention rates of developmental students are of great interest to the program developers as well as other members of the academic community. Nationally, these rates are not good and many stakeholders are looking at quality instruction as one of the vehicles to motivate and retain developmental students.

Developmental educators have made efforts to increase the retention and success rates of students attending developmental classes. Specifically, developmental reading educators have explored various instructional methodologies to address the needs of this population. Historically, the pendulum in developmental reading instruction has shifted from the traditional, behaviorist approach to a more modern, psycholinguistic approach (Wood, 2003). This paradigm shift required that reading instruction move away from the "reading as a product" approach to more of a "reading as a process" approach. However, the pendulum is once again swinging back to more traditional methods to address the needs of the students.

Today, many developmental reading educators are revisiting past approaches that have roots in behaviorism. Recent trends indicate that developmental reading educators are exploring the more traditional methods of self-paced learning, accelerated learning, mastery learning, differentiated instruction, direct instruction and individualized instruction as means of addressing the varying needs of developmental students. Many of these strategies support what some consider as the old notion of teaching reading. However, it seems as if developmental educators may need to look to the past to address the problems of today.

Significance of the Study

One instructional approach that was very popular during the 1970s is mastery learning. However, it seems that this approach is currently experiencing some sort of resurgence in higher education. More and more, many two-year and four-year institutions are utilizing mastery learning as a viable solution to increase student learning. Even though there is extensive research in the area of mastery learning as an instructional method, there is little research that examines mastery learning instruction in community college developmental reading classes. Even Bloom (1968) initially expressed reluctance in using mastery learning with students who have deficits.

> "For such subjects (subjects that are late in a long sequence of learning ie 6^{th} grade reading, 8^{th} grade arithmetic, advanced mathematics etc.), it is unlikely that mastery learning can be attained within a term for a group of students who have had a long history of cumulative learning difficulties in the specific subject field." (p. 8)

While mastery learning is no stranger to higher education, it is more commonly used in subject areas other than reading. However, since the initial introduction of Bloom's *Learning for Mastery* model much research has been conducted. Also, many variations of the model have been developed to address specific content areas that were not originally intended to be used by the model. Some of these mastery learning models have proven to be effective in the areas of developmental English and developmental math (Blackburn & Nelson, 1985; Sheldon & Miller, 1973).

To date, little research has been conducted to determine if Bloom's *Learning for Mastery* model or a variation is effective in developmental reading classes. This study serves as a first step towards adding to that limited research base and offers a better understanding of the role of direct instruction in reading. This study explored the implementation of mastery learning in a developmental reading class at an urban community college and provided some insights as to whether or not this approach is effective with this population. This study has the potential to impact developmental reading students, educators, administrators, and other community college stakeholders. Now, more than ever, there is great interest in developmental reading instruction and addressing the needs of this population.

Purpose of the Study

The primary purpose of this study was to compare academic achievement in a developmental reading class taught with mastery learning to academic achievement in classes that use non-mastery learning instruction. A secondary purpose of this study was to compare the reading skills and reading attitudes of students in developmental reading classes taught with mastery learning with those in non-mastery learning environment.

The knowledge gained from this study will add to the limited literature base that exists concerning the effectiveness of mastery learning instruction in developmental reading classes.

Research Questions

This study addressed the following research questions:

Research Question 1: What is the difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Research Question 2: What is the difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Research Question 3: What is the difference in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Definition of Terms

1. *ACCUPLACER* is a collection of computer-adaptive placement tests used in many community colleges to assess the reading, writing, and math skills of incoming students.
2. *Developmental education* is defined as "a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum" (National

Association for Developmental Education, 1995). Typically, community colleges offer developmental education programs.

3. *Developmental reading* is the reading instruction provided for developmental reading students. Typically, developmental reading students are placed in developmental reading courses based on weak reading test scores, and they are expected to successfully complete these courses as a prerequisite before taking college-level classes leading toward a degree.
4. *Mastery Learning* is an instructional philosophy whose roots can be traced back to the 1920s. Primarily, there are two types: group-based and individualized. Bloom's Learning for Mastery (LFM) is the most common. It is a group-based, teacher-paced model. In LFM, whole group instruction is supported by enrichment and corrective instruction to meet the needs of the students. Keller's Personalized System of Instruction (PSI) is an individual-based, self-paced approach. In PSI, students learn independent of classmates.
5. *Myreadinglab* is an online application that includes diagnostic assessments, practice exercises, and tests to improve student reading skills and reading level. Reading skills are improved through a mastery-based format of practice exercises. These practice exercises include objective-based items, short answer items and combined skills exercises. One of the most widely used reading measures today, Myreadinglab is the end result of the collaboration of two premier publishers: Longman and Prentice Hall.
6. *Reading attitude* is defined as a cognitive and affective state which makes reading more or less likely to occur (Smith, 1992).

7. *RED 090* is an upper-level developmental reading course offered in community colleges in North Carolina. According to the course description listed in the Common Course Library of North Carolina Community College System: The course is designed to improve reading and critical thinking skills. Topics include vocabulary enhancement; extracting implied meaning; analyzing author's purpose, tone, and style; and drawing conclusions and responding to written material. Upon completion, students should be able to comprehend and analyze college-level reading material.

CHAPTER TWO: LITERATURE REVIEW

The purpose of this study was to compare academic achievement in mastery learning instruction and non-mastery learning instruction developmental reading classes. The study also examined differences in reading skill and reading attitude between these two groups. This literature review explores the use of mastery learning as an instructional approach. A brief history and explanation of the model are discussed. Both developmental reading instruction and reading attitude are discussed in historical and theoretical contexts. This review is divided into the following sections: mastery learning, mastery learning in higher education, criticisms of mastery learning, developmental reading, and reading attitude.

Mastery Learning

A Brief History of Mastery Learning

Mastery Learning is no stranger to the world of academia. It was developed as a way for educators to provide more appropriate and higher quality instruction for students (Guskey, 1987). Early introductions can be traced as far back as the 1920s when Washburne and his associates (1922) developed the Winnetka Plan. The Winnetka plan promoted the notion of allowing students more time to achieve mastery and attempted to individualize instruction. Students were allowed to work at their own pace to achieve mastery and if they needed more time, they were given more time. The premise was that within the curriculum, time should be the variable and achievement should be the

constant. Early on, Washburne's form of mastery learning placed time allowed to learn as an integral component of mastery learning (Washburne, 1922).

In 1963, the mastery approach resurfaced when Carroll introduced a "Model of School Learning". In this model, Carroll challenged long standing beliefs concerning aptitude (Guskey, 1997). Traditionally, student aptitude was viewed as the level at which a student could learn. It was also believed that students with high aptitude could learn more complex concepts and students with low aptitude could only learn the basic fundamentals. Instead, Carroll argued that all students have the potential to learn even more complex concepts, but that the difference is the time each individual student requires to learn the information or skill (Guskey, 1997). Carroll proposed that these differences among students were a function of the following five characteristics: time allowed, perseverance, aptitude, quality of instruction, and ability to understand instruction (Block, 1971). The well-known formula that Carroll used is listed below:

$$\text{Degree of Learning} = f\left(\frac{\text{1. time allowed 2. Perseverance}}{\text{3. Aptitude 4. Quality of Instruction 5. Ability to Understand Instruction}}\right)$$

Carroll's conceptual model proposed that if a student's aptitude, the quality of instruction, and innate ability to understand instruction were high, then little additional learning time would be necessary. However, if a student's aptitude, the quality of instruction, and innate ability to understand instruction were low, then additional learning time would be necessary (Block, 1971). Carroll's model was limited in that it did not address the problem of how to provide adequate time or how to improve the quality of instruction (Guskey, 1997).

Despite Carroll's efforts, it seems that mastery learning did not gain in popularity until a few years later when Bloom (1968) published his famous work, *Learning for Mastery*. Building upon the work of Washburne (1922) and Carroll (1963), Bloom focused on what he determined to be the most effective elements of one-to-one tutoring and individualized instruction. Specifically, Bloom examined how he could transfer the merits of these effective instructional methods to whole group instructional settings (Guskey, 1997). Bloom was able to develop what many consider to be an effective working model for mastery learning (Block, 1971). Bloom's *Learning For Mastery* (LFM) model is most widely recognized and is credited as the core foundation for other models developed later.

Primarily, mastery learning can be categorized as two types: group-based and individualized. The most common form of mastery learning, Bloom's *Learning For Mastery* (LFM) model, is a group-based, teacher-paced model. In this model, whole group instruction is supported by enrichment and corrective instruction to meet the needs of the students. The second form, the *Personalized System of Instruction* (PSI), or the Keller Plan, is an individually based, self-paced approach in which students learn independently of their classmates. Typically, students work at their own rate and move on to new material after they have demonstrated mastery of each unit. In this form, students can take as many tests as they desire to document that they have achieved mastery (Guskey, 1997). In this study, the term *mastery learning* referred to the group-based, teacher-paced model that is primarily associated with Bloom and his work.

The Bloom Method

The mastery learning strategy proposed by Bloom was originally designed for classroom use where the time allowed for learning was fixed. Mastery is defined in terms of a set of objectives or criteria students are expected to master. The subject matter is broken down into learning units and the unit objectives are defined. The instructor teaches each unit using typical whole group instructional methods. Following the initial unit instruction, a quiz or a test is administered to the entire group. Each test covers each unit's objectives. This assessment is designed to give students feedback on their learning (Guskey, 1997). These feedback devices are brief, diagnostic (formative) evaluations and they also include direct instructions and suggestions to students concerning what they can do to remedy any learning deficits identified by the instrument. Students are placed in groups based on the results of the formative test. The test results assess each student's level of mastery or non-mastery. Corrective and enrichment activities supplement the basic instruction, to ensure that each student receives high quality instruction. If students do not attain mastery after the initial formative test, additional instructional correctives are administered to help students overcome learning problems. Once students complete these corrective activities, a second parallel, formative test is administered that addresses the same concepts and objectives as the initial test. This allows students another opportunity for success and another attempt at achieving mastery. However, if students do attain mastery after the initial formative test, enrichment activities are administered to expand student learning. Both corrective and enrichment activities take place before the whole group instruction resumes on the next unit.

Bloom believed that by providing students with favorable learning conditions, many students could learn and truly master unit concepts (Guskey, 1997). The old adage, "same actions, same results," can be applied to the premise of Bloom's model. In much of his early work, Bloom attacked the popular use of the normal distribution as the sole determinant to assess student performance. Bloom suggested that educators have utilized the normal curve for so long that grade expectations and grading policies are set to confirm the normal distribution. Much of Bloom's contention centered on the strong beliefs he held concerning the relationship between aptitude and achievement. Bloom disputed that if students were normally distributed with respect to aptitude for a subject and if students were provided the same instruction in terms of quality and learning time, then achievement would be normally distributed. The relationship between aptitude and achievement would be high yielding the same results and expectations. Conversely, if students were normally distributed with respect to aptitude but each learner received high quality instruction and the learning time necessary, then a majority of the students could be expected to achieve mastery. There would be little or no relationship between aptitude and achievement (Block, 1971). Hence- different actions, different results.

Meta-Analyses and Syntheses of Research

Since the publication of Bloom's model, *Learning for Mastery* (LFM), extensive research has been conducted at all levels of education. Nationally and internationally, numerous studies have been devoted to the topic of mastery learning. Many researchers have attempted to synthesize the information presented in these studies by conducting meta-analyses and syntheses of research articles. This section will discuss the meta-analyses and syntheses of research articles that focus on mastery learning. Specifically,

group-based mastery learning instruction in higher education was explored since this was the focus of the study.

Historically, one of the earliest reviews of mastery learning was conducted by Block and Burns (1976). These researchers set the stage for subsequent reviews by categorizing mastery learning research into classes or types. According to the researchers, mastery learning research can be classified into four types of studies. These research types have subsequently evolved over time as more individuals studied mastery learning.

The first type, labeled Type 1, includes many of the initial mastery learning studies. These studies examined the effectiveness of the approach and addressed the question, "Does mastery learning work?" Type 1 research focused on cognitive outcomes such as student achievement and retention. Block and Burns (1976) examined 17 Type 1 LFM studies. Out of those 17 studies, only four examined mastery learning instruction with postsecondary students. These four studies will be discussed in more detail later in the literature review: Block & Tierney (1974); Glassnap, Poggio, & Ory (1975); Jones, Gordon, & Schechtman (1975); and Poggio (1976). Of those four studies, however, none were conducted in developmental reading classes. According to Block and Burns, the results of the Type 1 studies suggested that mastery approaches to instruction do work.

A second type, labeled Type 2, included studies that examined the other effects of mastery learning strategies. Block and Burns (1976) suggested that these studies addressed the following questions: Did mastery learning strategies have positive effects on students? Did the strategies help students learn? The authors reviewed nine Type 2

LFM studies. Out of those 9 studies, only four studies examined the affective consequences of mastery learning with postsecondary students. The following four studies included in the review will be discussed in more detail later in the literature review: Block & Tierney (1974); Jones, Gordon, & Schechtman (1975); Ely & Minars (1973); and Poggio, Glassnapp, & Ory (1975). Out of those 4 studies, none were conducted in developmental reading classes. The findings concerning Type 2 studies did not clearly indicate the affective consequences of mastery learning. However, the results do seem promising. Block & Burns (1976) asserted that more research is necessary to truly determine whether favorable responses are a function of mastery learning or a fleeting moment of enjoyment.

A third type, labeled Type 3, included studies that examined why mastery approaches worked and attempted to identify conditions that yielded success or failure in the application of the approach. Most of the Type 3 studies examined student-entry characteristics (prior learning and feelings about the subject matter that students possess) and/or an analysis of the various components of mastery learning strategies. The authors suggested that there were too many Type 3 studies to list in the article. However, the following two studies conducted in higher education and included in the review were specifically mentioned and will be discussed in more detail later in the literature review: Block & Tierney (1974); and Poggio, Glassnap, & Ory (1975). Of those two studies, neither was conducted in developmental reading classes. The results of the Type 3 student-entry characteristics studies meshed with the Type 3 component studies and suggested that the unit mastery requirement and the attainment of that preset level of mastery had major influence on student learning.

The fourth type, labeled Type 4, included studies that addressed the question of "How does mastery learning work?" This area of research focused on creating and distributing teacher-training materials that would assist teachers with teaching for mastery (Block & Burns, 1976). In this section, only two studies examining mastery teacher-training materials for LFM were discussed. Neither of them were developed to assist teachers in implementing mastery learning instruction in higher education.

Subsequently, Guskey & Gates (1986) followed the lead of Block and Burns (1976) when they conducted one of the first syntheses of research articles focused on mastery learning instruction with school-aged children. Specifically, Guskey & Gates (1986) analyzed and synthesized the research on the effects of mastery learning in elementary and secondary classrooms. No mastery learning studies conducted in higher education or developmental reading classes were included in this review. Even though most researchers of mastery learning will often include a discussion of both the group-based and the individualized mastery learning models in the analysis and synthesis of information, Guskey & Gates (1986) focused only on studies that examined the effects of group-based mastery learning programs. Their findings indicated that mastery learning instruction produced strong positive effects on student achievement.

Similar to the work conducted by Guskey & Gates (1986), Slavin (1987) also examined the research on achievement effects of group-based mastery learning programs in elementary and secondary schools. No mastery learning studies conducted in higher education or developmental reading classes were included in this review. In addition, Slavin used a review technique coined as "best-evidence synthesis". In this process, Slavin (1987) combined characteristics of both analytical and traditional narrative review

types. Surprisingly, Slavin (1987) found no evidence to support the effectiveness of group-based mastery learning on standardized achievement measures. However, on researcher-made or teacher-made assessments, Slavin (1987) found that achievement effects were positive but moderate in magnitude. He also found that the marginal achievement effects did not last over time. His review sent shockwaves through the field of mastery learning research as it refuted previous research that reported consistently positive effects for mastery learning as an effective strategy to increase student achievement.

In contrast, Guskey & Pigott(1988) presented a meta-analysis of group-based mastery learning programs and reported positive effects on both cognitive and affective student learning outcomes. The researchers included 46 studies that contained findings on program effects in the following areas: student achievement, student learning retention, time variables, student affect, and teacher variables. Of those 46 studies included in the meta-analysis, only 12 were conducted in higher education. The following 12 studies included in the meta-analysis will be discussed in more detail later in the literature review: Blackburn & Nelson (1985); Block & Tierney (1974); Clark, Guskey, & Benninga (1983); Denton, Ory, Glassnap, & Poggio (1976); Duby (1981); Guskey, Benninga, & Clark (1984); Guskey & Monsaas (1979); Jones, Gordon, & Schechtman (1975); Omelich & Covington (1981); Sheldon & Miller (1973); Wire (1979); and Yildiran (1977). Of those 12 studies, none were conducted in developmental reading classes.

In terms of student achievement, only 43 of the 46 studies reported outcomes of student achievement. Additionally, many of the 43 studies discussed showed positive

effects for the implementation of group-based mastery learning strategies. However, in three of the college studies, students in the control group scored higher on achievement measures than the students in the mastery group. In addition, five studies investigated student retention. Of those five, only two were conducted in higher education and none involved developmental reading students. Overall, the results showed that group-based mastery learning does have a positive effect on student retention. Also, eight studies examined time variables. Specifically, these studies examined time on task, student attendance and course attrition, and time spent. Mastery learning, by nature, requires much time on task. Therefore, mastery learning does have positive effects on time on task, time spent, course attrition, and student attendance. In terms of student affect, 13 studies were discussed. Results of these studies indicated that mastery learning procedures have a positive effect on student affect. Only four studies examined teacher variables. Of those four studies, none were conducted in higher education or developmental reading. The findings indicated that the successful implementation of mastery learning can have strong effects on many teacher variables (Guskey & Pigott, 1988).

Kulik, Kulik, & Bangert-Drowns (1990) analyzed 108 studies in their meta-analysis. The analysis revealed that mastery learning had positive effects on student achievement. Of the 108 studies included in the meta-analysis, only 36 were categorized as utilizing Bloom's *Learning for Mastery* approach and only 19 of those studies involved college students. As a result, the following 19 studies included in the meta-analysis will be discussed in more detail later in the literature review: Benson & Yeany (1980); Blackburn & Nelson (1985); Clark, Guskey, & Benninga (1983); Decker (1976);

Dustin & Johnson (1974); Fehlen(1976); Goldwater & Acker (1975); Guskey, Benninga & Clark (1984); Guskey, & Monsaas (1979); Honeycutt (1974); Knight, Williams, & Jardon (1975); Lewis (1984); Martin & Srikameswaran (1974); Myers (1976); Nation, Knight, Lamberth, & Dyck (1974); Nation, Massad, & Wilkerson (1977); Nation & Roop (1975); Sheldon & Miller (1973); and Yeany, Dost, & Matthew (1980). Of those 19 studies, none were conducted in developmental reading classes. Upon closer examination, four of those 19 studies: Knight, Williams, & Jardon (1975); Nation, Knight, Lamberth, & Dyck (1974); Nation, Massad, & Wilkerson (1977); and Nation & Roop (1975) employed a Programmed Student Achievement model which required students to demonstrate 100% mastery of unit material. The Programmed Student Achievement model included many of the components associated with Bloom's *Learning for Mastery* and was considered a mastery learning approach by Kulik, Kulik, & Bangert-Drowns (1990). Therefore, discussion of these studies will also be included in the literature review.

More recently, Anderson (1994) synthesized the research on mastery learning and examined outcomes in the areas of achievement, retention, student affect and other related variables. This review included a discussion of both group-based and individualized mastery learning studies conducted in elementary, middle, secondary, and college classrooms. In the area of achievement, the researcher examined seven reviews (Block and Burns, 1976; Guskey & Gates, 1985; Guskey & Pigott, 1988; Kulik et al 1990a; Kulik et al 1990b; Slavin, 1990; and Willett et al, 1983) that analyzed 279 studies conducted between 1970 and 1990. Regarding retention, three reviews (Block & Burns, 1976; Guskey & Pigott, 1988; and Kulik et al, 1990) examined 43 studies that included

retention data. Five reviews (Block and Burns, 1976; Duby, 1981; Guskey & Pigott, 1988; Kulik et al 1990; and Willett et al, 1983) that analyzed 60 studies with student affect outcome data were discussed. Other variables included student aptitude, curriculum, mastery level, time teacher variables, type of test, and pacing (Anderson, 1994). The examination conducted by Anderson (1994) revealed that a majority of the studies indicated that mastery learning had a positive effect on achievement and student affect.

As previously stated, much research has been conducted on mastery learning and the literature base is vast. The number of meta-analyses and syntheses of research conducted are indicative of not only the level of interest, but also the level of usage in elementary, secondary and postsecondary classrooms. In the section that follows, the research that has been conducted concerning mastery learning in higher education and identified in the meta-analyses and the syntheses mentioned earlier will be discussed in more detail.

Mastery Learning in Higher Education

Historically, much of the research in mastery learning has occurred at the elementary and secondary school levels. However, the very first studies conducted by mastery learning theorists were often conducted in higher education settings. It should be no surprise that some of these first studies were conducted in Chicago, since Bloom served as a Professor of Education at the University of Chicago. One such study involved the faculty of Olive-Harvey College in Chicago. These instructors worked firsthand with Bloom to implement mastery learning in their classrooms during the fall of 1972. This approach served as a last resort to address the needs of the many

underprepared students entering Olive-Harvey College at that time. The participants were students enrolled in the following classes: Economics, Biology, Social Science, Business, English, Mathematics, Spanish, Humanities, and Chemistry. The results reported by Jones et al. (1975) indicated that the implementation of mastery learning instruction led to significant improvements in student achievement, reduced rates of attrition, and fostered more positive attitudes toward learning for both students and instructors.

Similarly, Littlejohn (1973) examined mastery learning in undergraduate educational psychology courses at Winthrop College. In this study, students were allowed to retake alternate forms of quizzes until mastery was achieved. The researcher indicated that mastery learning itself was very time-consuming, but the gains in student affect were worth the effort. According to Littlejohn (1973), student reactions to the mastery learning approach utilized in this study were favorable.

Likewise, Sheldon & Miller (1973) found positive results when they conducted research on mastery learning in five community colleges in southern California. The participants were students enrolled in elementary Algebra and remedial English courses at the following institutions: Cerritos College; Los Angeles City College; Rio Hondo College; San Diego City College; and San Diego Mesa College. The researchers examined the effects of teaching one additional lesson per unit to students who did not achieve mastery. In addition, the effects of providing students with behavioral objectives were also examined. These non-mastery students were subjected to a testing and remediation cycle.

The results indicated that the Algebra students who received testing and remediation earned significantly higher final exam scores than students in the control group. However, there was no significant difference between mastery rates for experimental and control group students. On the other hand, the English students who received detailed behavioral objectives earned significantly higher final exam scores than the students in the control group who did not receive the objectives (Sheldon & Miller, 1973).

Conversely, Ely & Minars (1973) investigated mastery learning to determine if this approach had an effect on students' self-concept. The researchers examined an instructional system called Preprofessional Individually Paced Instruction (PIPI) that was developed and implemented at Oklahoma State University. PIPI consisted of a forty credit hour integrated curriculum that included freshman and sophomore level math, chemistry, English, speech, physics, computer science, and computer graphics. The PIPI system utilized mastery learning concepts, but was self-paced. The researchers hypothesized that PIPI students would have a higher self-concept than students in traditional, non-PIPI classes. One hundred six prospective engineering students participated in the study. Of this number, fifty-three students were randomly assigned to the PIPI group and the remaining fifty-three were assigned to the traditional group. Two weeks before the end of the semester, students were administered the Tennessee Self-Concept Scale. As was hypothesized, the PIPI students had a higher mean score and therefore had a higher self-concept.

In contrast, Block & Tierney (1974) examined a component of mastery learning to determine the impact on college students' grades, achievement and attitudes.

Specifically, the researchers investigated the aspect of "correction" procedures used in both Bloom (LFM) and Keller's (PSI) mastery learning strategies. The sample included 44 college students enrolled in a European historiography course. These students were randomly assigned to three treatment groups: control group, redirected study group and small-group study group. Subjects in the control group received traditional lecture/discussion instruction. These students attended 50-minute lectures three times a week and read six required books. Subjects in the redirected study group used the traditional approach plus a Keller-type correction procedure- returning the student to the original instructional materials for the content that he or she is having difficulty. Subjects in the small-group study group used the traditional approach plus a Bloom-type correction procedure. Three measures were used to assess impact: final letter grade; raw score on a 50-item achievement test; and 10-item Likert-type attitude scale adapted from the Attitude Toward Mathematics subscale. The results indicated that periodic correction can improve student achievement if it is used within Bloom's LFM strategy. In addition, the findings also suggested that pretesting can impact student achievement and attitude.

In another study, Martin & Srikameswaran (1974) examined the correlation between frequent testing and student performance. The subjects were 304 students enrolled in a first-year introductory chemistry course. The students in the experimental group were exposed to a frequent testing procedure and students in the control group were not. The frequent testing procedure involved allowing students three attempts to achieve mastery. Mastery proficiency was set at 75% and students who did not achieve mastery were retested. Tutorial assistance was available for these students. Common to both groups was the course content, tutorial and lab sessions, and the lecturer. The

researchers concluded that the students in the experimental group performed better than the students in the control group and that this was most likely because of the frequent testing method employed.

In 1974, Honeycutt was one of the first researchers to explore computer-managed instruction (CMI) in a mastery learning environment. In this study, CMI served as an information system, keeping track of and providing information about student progress. More specifically, Honeycutt (1974) examined the effectiveness of CMI as a support to the mastery of factual content in comparison to the method of frequent, pre-announced quizzes. Participants included junior and senior students enrolled in early and middle childhood education courses at the Ohio State University. Two sections of the class served as the experimental and control group. A CMI program was developed based upon the principles of mastery learning. A mastery level of 90% was established. Students in the experimental group received CMI. Students in the control group were administered four pre-announced quizzes and a final examination in class. In-class tests were comprised of questions from the same test pool as the CMI program. Students who achieved mastery were allowed to proceed to the next unit of study. Students who did not meet the level of mastery were assigned supplemental readings and then allowed to retest. The results indicated that CMI was a very effective tool for supporting student mastery of factual content.

However, Nation, Knight, Lamberth, & Dyck (1974) did not use CMI to compare two mastery learning programs in psychology. Instead, the researchers investigated the avoidance hypothesis as it related to Programmed Student Achievement (PA). The avoidance hypothesis suggests that students avoid failure by achieving mastery and

exhibiting a high level of performance. According to the authors, Programmed Student Achievement (PA) is a mastery learning program that includes a motivation and reward system. The participants were 159 students enrolled in four sections of an Introductory Psychology course. These students were assigned to one of four groups. The PA-Full (PA-F) treatment required students who failed to demonstrate 100% mastery on each weekly quiz to retake parallel forms of the quiz as many times as necessary to reach mastery. If a student did not demonstrate mastery by the end of the week, the student earned a grade of "F". The PA-Partial (PA-P) treatment included the loss of a letter grade if a student failed to achieve 100% mastery on at least three of the seven weekly quizzes. A mid-term and final exam were administered to students in both the PA-F and PA-P groups. The Standard Control (S-C) Group was required to take the weekly quizzes, the mid-term and final with no set mastery requirement. The Normal Control (N- C) group was only required to take the mid-term and the final examination. The results indicated that the PA treatment increased student performance. Students in both PA groups outperformed students in the non-PA groups. Also, students in PA groups outperformed students in the non-PA groups on an unannounced retention test. In addition, the results suggested that an avoidance interpretation of Programmed Student Achievement may be inappropriate. It could not be proven that students avoided failure by performing better. The researchers suggested that the better performance shown in the PA groups could have been a result of positive reinforcement.

In a similar study, Nation & Roop (1975) compared Programmed Student Achievement (PA) and Total Mastery Learning (TML). In the PA treatment group, students were required to achieve perfect mastery (100%) on quizzes throughout the

semester. Students who failed the quizzes were required to take alternate quizzes on the same material until mastery was achieved. In terms of grading, the students only received the score that was earned on the first attempt. Conversely, Total Mastery Learning (TML) involved the articulation of clearly defined performance objectives. In TML, students were allowed to improve quiz scores by completing an alternate examination on the same content material. However, in TML, students received the higher of the two quiz grades (Nation & Roop, 1975).

The participants in the study were 302 students enrolled in 3 sections of Introductory Psychology. The individual sections formed the three treatment groups: PA group, TML group and the Standard Control group. In all three groups, the students received the same instruction. Weekly quizzes, a pretest, and mid-term and final examinations were the assignments in common. In this study, students in the PA group were allowed to retake the quizzes as many times as necessary to achieve mastery; the students in the TML group were allowed one retest and the control group students were not allowed to retake any quizzes.

The pretest results indicated that students in the PA group had the lowest basic understanding of psychological concepts. However, these same students in the PA group had better performance on the last four quizzes and showed the largest gains from the initial quiz to later quizzes than the other groups. The researchers concluded that students in the PA group outperformed students in the TML group on both the weekly quizzes and the mid-term. Also, the PA group students outperformed the students in the control group on the weekly quizzes. The results also indicated that the TML students' performance was not statistically different than the students in the control group on the

weekly quizzes, mid-term or final examination (Nation & Roop, 1975). This study asserted that mastery learning is most effective when the standard is set high and students are afforded multiple opportunities to achieve mastery.

In another study, Knight, Williams, & Jardon (1975) also examined Programmed Student Achievement (PA). The subjects were 95 students enrolled in three sections of an introductory psychology course. Each section was randomly assigned to a treatment condition. The PA group used a testing technique which required the student who did not achieve 100% mastery on a weekly quiz to retake the same quiz a second or third time if necessary. However, if after three attempts 100% mastery was not achieved, students were subjected to one of two consequences. One section was under a PA-Full (PA-F) treatment where failing one weekly quiz resulted in a grade of "F" for the course. Another section used a PA-Partial (PA-P) contingency which used the loss of a letter grade as the consequence to be avoided. A third section was a control (C) condition where no level of mastery was required. All students received identical quizzes and exams. Students in the PA-P and PA-F groups were allowed three attempts to retake quizzes, but only the grade earned on the first attempt was used to compute the final course grade. The results showed that PA students performed significantly better than students in the control group on weekly quizzes and exams. However, there were no significant differences between the PA groups.

In addition, Goldwater and Acker (1975) examined the value of a system that included both a level of mastery and short assignment length within the constructs of instructor-pacing and mass-testing. The participants in the study were 234 students who registered for an introductory psychology course at the University of Victoria.

Approximately half of these students were assigned to the experimental group and the other half were assigned to the control group. The students were assigned to the one group for one term and then reassigned to the other group for the second term. Data were collected during the first term only. Students in both groups attended common lectures during the first hour of class. During the second and third hour of the class, students in the experimental group were administered a 10-item quiz. Students in the experimental group were required to pass one of the two weekly quizzes with 80% mastery. These students were given two opportunities to pass each weekly quiz. Tutorial services were provided for all students. Students in the control group spent the second hour in small discussion groups. A second lecture was offered during the third class hour and both students from the control group and students that passed the weekly quiz from the experimental group could attend. Attendance at both lectures was optional. At the end of the first term, both groups were administered a 100-item test. A course evaluation and questionnaire accompanied this examination. The results indicated a significant advantage for the students in the experimental group. The data suggests that a weekly quiz procedure and an established mastery criterion are enough to produce significant gains in student performance (Goldman & Acker, 1975).

Unlike Goldman & Acker (1975), Deaton et al (1976) investigated grade expectations of students in mastery and non-mastery undergraduate measurement courses. The purpose of the study was to examine grade expectations between groups and to analyze within-mastery effects on self-perception of performance. The experimental group of 144 students was taught using a mastery learning model. The control group of 112 students was taught using a traditional lecture-recitation format.

Students in the experimental group were given the opportunity to take up to 11 formative exams and their final grade was based only on the final exam results. Students in the control group were administered three exams during the semester and a final exam at the end of the semester. Their final grade was based on their performance on all four of these assessments. Data collection involved using self-reported pre-instruction grade predictions, post-instruction grade expectations, grade point average and the number of formative exams taken. The results indicated that students' grade expectations became more accurate as instruction progressed. The researcher suggested that the feedback component of mastery learning allowed the students the opportunity to make realistic self-assessments of their performance (Deaton et al, 1976).

Decker (1976) examined the effectiveness of four instructional strategies used to produce mastery. The four instructional strategies were: conventional instruction with no make-up opportunities; unlimited make-up opportunities with the end of the semester as the deadline; unlimited make-up exams over a two-week period; and unlimited make-ups with a two-week deadline and weekly booster sessions with academic advisors. The subjects included Vocational-Technical students enrolled in a Physics course and Liberal Arts students enrolled in a Physical Science course. The results indicated that students with unlimited test opportunities had better performance than those without; those students with two-week deadlines outperformed the students with the end of the semester deadlines; students that received advisor input performed better than those without advisor input; and IQ was not a significant determinant of student performance.

Additionally, Fehlen (1976) investigated the use of selected mastery techniques in a mathematics class for prospective elementary teachers. The sample included seventy-

seven students enrolled in two sections of mathematics for prospective elementary teachers at the University of Minnesota and fifty students enrolled in two sections of mathematics for prospective elementary teachers at Mankato State College. First, the mathematics course was divided into units and objectives were established for each. At the completion of each unit, a test was administered that addressed the unit objectives. Mastery level was set at 90%. All groups were taught in a traditional lecture format. All students were pre- and posttested with an achievement test that measured course objectives, Dutton's attitude scale (Dutton, 1962) and Aiken's Likert-Type attitude scale (Dutton, 1962). The only treatment difference was in the use of retesting and tutorial services. Students in the Treatment 1 Group were allowed up to three retakes of a unit test if they did not achieve mastery. Students in Treatment Group 2 who did not achieve mastery on a unit test were required to spend one hour receiving tutorial help on the objectives missed before they were allowed to take a retest. Students in Treatment Group 3 were not allowed to take retests or receive special tutorial help. All students could receive the customary assistance and support from the class instructor. The results indicated that an established mastery level combined with the use of retesting or the use of tutorial services with retesting produced consistently higher mean achievement scores and higher mean attitude scores than when retesting was not utilized. The results also indicated that it did not matter whether tutorial services were provided or not. The most important factor seemed to be the retest opportunities that were made available. These results suggest that mastery learning techniques can be effective when applied in a traditional lecture classroom environment.

In 1977, Nation, Massad, & Wilkerson examined the effects of Programmed Student Achievement yet again. The subjects were 214 students enrolled in two sections of an introductory psychology course. During the first eight weeks of the semester, students in the PA class were required to retake quizzes as many times as necessary if they did not achieve 90% mastery on each quiz. If the PA students did not achieve mastery by the end of the week, they would receive a grade of "F". Students in the Standard Control (S-C) group were required to take quizzes without retest opportunities. In addition, during the first 8 weeks, both groups were required to take a mid-term exam. At the beginning of the 9th week of the semester, students in the PA group were told that the PA contingencies were being dropped. During the 9th-16th weeks of the semester, the PA group and the S-C group operated in the same manner. The findings indicated that in order to achieve optimal results, PA contingencies must be maintained throughout the entire semester.

One study conducted by Denton & Seymour (1977) examined the acquisition of higher order intellectual processes for teaching candidates enrolled in a teaching methods course. Specifically, the study tried to determine if unit pacing and other mastery learning strategies influenced the acquisition of higher order thinking skills in these students. The participants included 123 junior and senior university students. Approximately half (57) of these students were also involved in student teaching. The study involved four treatment groups: a 6-week mastery and a 15-week mastery; and a 6-week active control and a 15-week active control. All four groups were subjected to the same curriculum and were administered the same formative tests. A higher order cognitive achievement test was administered to all treatment groups at both the beginning

and the end of the semester. All treatment groups were paced by respective course instructors. Students in mastery groups that did not attain mastery on formative tests, experience a brief remediation period and were then administered an alternate form of the test. This remediation-retest cycle was repeated throughout the duration of the course. Students in the active control group did not receive any additional instruction or remediation. Instead, they were given the option to complete reports. The reports were due at the same time that the remediation-retest cycles ended for students in the mastery group. The results suggested that curriculum compression that involved decreasing the number of meeting days, but not the class meeting time (hours) reduced higher order thinking skill performance.

Another study by Denton & Seymour (1978) examined the acquisition of higher order intellectual processes for teaching candidates enrolled in a teaching methods course. This study is very similar to the previous study, Denton & Seymour (1977), in that it also tried to determine if unit pacing and other mastery learning strategies influenced the acquisition of higher order thinking skills in these students. However, the results of this study suggested that remediation strategies which specified in detail how to correct learning is optimal for instruction with few time constraints. However, less specific remediation works best for intense, brief instructional periods (Denton & Seymour, 1978).

Glassnap, Poggio, and Ory (1978) analyzed both end-of-course and long-term retention outcomes for mastery and non-mastery instruction. The sample included 207 students in five mastery sections and 189 students in five non-mastery sections. The course objectives and course outlines were the same for students in both groups. In the

non-mastery group, the grading was norm-referenced and the course grade was calculated using standard scores on three summative exams and a final exam. In the mastery group, the grading was criterion-referenced and based on student performance on an end-of-semester summative assessment. Three parallel formative exams were available for each unit of content. Students were allowed to take any of the formative exams at any point during the semester between the first day of class and the day before the summative final examination. Corrective procedures for the treatment group included individual and/or group tutoring and textbook resources. The researchers acknowledged that voluntary class attendance impacted the results of the study by increased student procrastination and decreased student participation. However, performance on knowledge, comprehension, and application items for mastery students was as high as for non-mastery students that experienced a more structured learning environment. The researchers also noted that mastery student performance at the higher levels of Bloom's taxonomy was significantly greater than non-mastery student performance. The researchers suggested that a positive aspect of this study was that students in the mastery group, which allowed for more student freedom, performed as well as the students in the traditional non-mastery group, which provided more structure.

At Durham College in North Carolina, Wire (1979) reported some success in first attempts at mastery learning. At the time, Durham College was a historically black college and they were experiencing increased numbers of underprepared students. During this project, eight faculty members developed mastery learning materials for courses at the institution. The findings indicated a slight improvement in student performance during the study. Seventy-eight percent of the mastery students achieved

final grades of A-B as compared to 75 percent of the control group. The researchers concluded that as the faculty became more experienced in the area of mastery learning, further study could yield even more positive results.

A study conducted by Guskey & Monsaas (1979), examined student achievement levels and attrition rates in the City Colleges of Chicago. During this study, 37 instructors implemented mastery learning techniques in introductory courses in the following nine subject areas: biology, Spanish, English composition, counseling, history, mathematics, nursing, psychology, and reading. Data were collected from 77 classes with 2,249 students. The results indicated that in almost all of the subject areas, students in mastery learning classes scored higher on final examinations, earned higher final course grades, and were less likely to withdraw than students taught in the traditional manner (Guskey & Monsaas, 1979).

In addition, Yeany, Dost & Matthews (1980) assessed the effects of diagnostic prescriptive teaching strategies and locus of control on three cognitive levels of science achievement for introductory biology students. The researchers also examined the interaction between the instructional strategy and students' locus of control. Student attitudes were also studied. The participants were freshman and sophomore students enrolled in two sections of an undergraduate biology course for preservice elementary teachers at the University of Georgia. These two sections formed the experimental and the comparison group.

The treatment period was a two-week unit study of Organic Evolution. Both groups were taught by the same instructor, were provided with the same unit objectives, and followed the same time schedule. However, the comparison group experienced

instruction that included lecture-discussions, a slide presentation, two lab sessions, and one homework assignment. This type of instruction was considered normal for this course. In addition to the previously mentioned items, subjects in the experimental group completed regular diagnostic assessments and received remedial assignments when necessary. Two remedial assignments were available for each unit objective. No class time was used to reteach objectives. Remediation was prescribed through the diagnostic remedial strategies and students were responsible for completing these on their own. Achievement data were collected both before and after the treatment period. Data on the locus of control were collected using the Rotter LOC (Rotter, 1966) measure during the week before the treatment period began. Student attitude data were collected using an affective instrument that contained Likert-type items. The results indicated that the experimental group had documented significantly higher achievement levels than students in the comparison group. This study provided evidence that science achievement of university students can be increased with the use of diagnostic prescriptive instruction. In addition, the greatest gains were seen on low-levels of Bloom's Taxonomy areas such as recall. No effects of locus of control were observed. Attitudes were generally positive for both groups and there was no significant difference between groups.

In a similar study, Benson and Yeany (1980) examined the effect of diagnostic-prescriptive instructional strategies on the student achievement of 43 preservice elementary education majors enrolled in an introductory biology course. Locus of control was also studied in conjunction with student achievement. Students were assigned to one of two groups: treatment group and control group. Both groups used the

same materials and were identical in nature with the exception of diagnostic-prescriptive materials that were used with the treatment group. Students in the treatment group were prescribed individual remedial assignments when they failed to demonstrate mastery on a diagnostic test. Treatment group students received immediate feedback on their performance and pre-written assignments were disseminated to those in need of remediation. Remediation assignments were to be completed outside of class. The students were then retested. If a student did not achieve mastery on the second attempt, the student was advised to meet with the instructor for individual tutoring. The results indicated that the diagnostic-prescriptive treatment had varying effects on student achievement in the two groups. No significant difference was found in achievement between the two groups during the first unit of study. However, there was a significant increase in achievement by the treatment group students in the second and third units of study. The students in the treatment group also performed significantly better and earned higher scores on the final exam than the students in the control group. The locus of control was shown to be of little importance in determining student achievement. The researchers felt confident that the use of diagnosis with remediation resulted in increased student achievement. The authors also suggested that students benefit most from the diagnostic-prescriptive strategy once they have fully become familiar with the process.

The role of attributions in achievement environments and whether attributions could be changed by the implementation of specific instructional conditions was the focus of a study conducted by Duby (1981). The participants were 189 first and second year community college students from four different content areas attending classes at four different campuses of a community college in Chicago. Four instructors taught

seven classes using mastery learning instruction. Six control group classes were taught using non-mastery learning approaches. The Adult Achievement Responsibility Scale (Duby, 1981) was administered to students in all treatment groups to gather attributional information. The findings showed that causal attributions are related to achievement measures, involvement, and effort. More specifically, increases or decreases that took place in students' attributions were parallel to gains or losses in the amount of information learned, rates of involvement, and frequency of absenteeism. The researchers also suggested that attributions could be changed on a short-term basis. The findings also indicated that there is a strong linkage between teacher imposed learning conditions and the development of attributional perceptions (Duby, 1981).

Omelich & Covington (1981) investigated the psychological costs of repeated test taking procedures in mastery learning and non-mastery learning classes. Specifically, the researchers examined the end-of-course reactions of undergraduate psychology students who experienced various instances of test-taking failures. These subjects were assigned to a mastery group and a conventional group. The students in the mastery group experienced multiple study/test options and relative grading standards. The students in the conventional group experienced one attempt on each mid-term with relative grading standards. The pool consisted of 425 undergraduate students enrolled in an introductory psychology course. These students were randomly assigned to a norm-referenced or criterion-referenced grading condition and within those conditions, students were assigned to a one-test or two-test condition. As a result, four conditions existed: one-test, criterion-referenced (C1); one-test, norm-referenced (N1); two-test, criterion-referenced (C2); and two-test, norm-referenced (N2). Out of the 425 students enrolled in the class,

approximately 219 students experienced failure on two mid-terms while participating in the study. The subjects then became 74 students who experienced subjective failure on both of two mid-terms in the conventional group and 145 students who failed multiple times (two, three, or four times) under repeated test conditions. A final course evaluation was administered to assess the impact of repeated failures. The results indicated that despite the number of repeated failures experienced by the students in the mastery group, there was no greater deterioration of feelings of personal control, achievement, or sense of enjoyment. Specifically, the mastery students expressed significantly greater levels of confidence and aspirations. They also seemed to assess the mastery system as more fair. The authors concluded that behavioral instruction appears to be beneficial for all students especially slow learners (Omelich et al, 1981).

Similarly, Guskey et al (1983) examined the effect of mastery learning on achievement and student attributions for learning outcomes. The participants were 122 undergraduate students enrolled in seven sections of a required general education course. Of this number, 34 students were enrolled in the two mastery learning sections and 88 were enrolled in the five control sections. All groups were taught the same content and administered the same tests. However, only two class sections received regular checks on learning progress and specific corrective feedback. Also, all students were administered a pre-test, a final exam, and a revised version of the Adult Achievement Responsibility Scale (Duby, 1981). The results indicated that mastery learning did enhance the achievement of these students. However, the research also showed that mastery learning did not significantly change student attributes. These findings are

contrary to Duby (1981) who suggested a strong relationship between positive changes in achievement and attributions (Guskey et al, 1983).

In a similar study, Clark et al. (1983) and Guskey, Benninga, and Clark (1984) attempted to determine the effectiveness of mastery learning in undergraduate education courses at the university level. 197 undergraduate education students participated in the study. Of this number, 55 students were in the mastery learning group and 142 students were in the control group. These students were enrolled in six classes and two of the six classes were taught using mastery learning instruction. All groups were taught the same content and administered formative tests. In addition, all groups were administered: a pretest, academic self-concept questionnaire, and affect toward education questionnaire. The results indicated that students in classes taught using mastery learning had higher levels of achievement. Specifically, the analysis showed that students in mastery learning sections scored higher on the final exam, earned higher final course grades, and were absent less often than their counterparts in the sections taught using traditional methods. However, there was no statistically significant difference between groups in terms of pretest scores, academic self-concept, and affect toward education (Clark et al., 1983; Guskey, Benninga, & Clark, 1984).

Also, Blackburn & Nelson (1985) investigated student achievement and attitudes towards mathematics in developmental mathematics courses. Specifically, the researcher compared student attitude and achievement in classes using a mastery learning approach and classes using a traditional approach. The participants were 36 students enrolled in a developmental math course at the University of Georgia. The same instructor taught both sections of the course. Two instruments were used to assess student affect as it pertained

to mathematics. They were as follows: The Inventory of Affective Aspects of Schooling by Haladyna and Shaughnessy (1982 as cited in Blackburn & Nelson, 1985) and the V Scale Aiken (1974 as cited in Blackburn & Nelson, 1985). Students in the traditional group were taught using the traditional format. These students were presented with lectures and scheduled tests during regular class time. Students in the mastery learning group went to a math lab for testing. At the math lab, peer tutors administered and graded the tests. After administering and grading the tests, the peer tutors provided immediate, corrective feedback to the students. If students did not achieve mastery, they were required to return to the lab and take a similar version of the test. The students continued this process until mastery was achieved. Students in both groups took a teacher-made mid-term and final exam. No retests were permitted for the mid-term or the final exam. The results indicated that students in the mastery learning group performed significantly better on the final exam. These students also appeared to feel an increased awareness of the importance of mathematics. Also, mastery learning students tended to have a more positive post-instruction attitude toward mathematics

In addition, Mevarech & Werner (1985) conducted a study to determine if mastery learning strategies were beneficial for problem-solving skill development. Participants were fifty-eight sophomores majoring in physical therapy. All of these students were enrolled in an Introduction to Gerontology class. Students were randomly assigned to three treatment groups: Frontal Lecture Strategies (FLS), Mastery Learning Strategies (MLS), and Experiential Mastery Learning Strategies (EMLS). FLS students were exposed to thirteen 2-hour lectures presented by field experts. MLS students were exposed to the same lecture series as FLS students, but they were also required to read

articles and answer questions. Students who did not achieve 80% mastery were required to complete corrective activities that included redoing the work. The EMLS group received the same corrective treatment as the MLS group, but they did not listen to the lecture series. Instead, the students in the group interviewed senior adults, visited convalescent homes and facilities for geriatrics, participated in group discussions, played simulation games, and viewed films concerning gerontology.

Problem-solving was assessed by three instruments: a visual device, case study reports, and an end-of-semester exam. The end of semester exam contained items that were classified into Higher (HMP) and Lower Mental Processes (LMP) according to Bloom's Taxonomy (1956). Overall, the results indicated that mastery learning strategies tended to increase achievement on the HMP subtests. Specifically, the EMLS group had much higher problem-solving scores than the other two groups. The students in the EMLS group had the highest scores on all measures of problem-solving. However, the FLS students scored higher on LMP tasks.

For approximately 10 years, mastery learning research conducted in higher education seemed to be at a stand-still. Then, in 1996, Livingston & Gentile caused a little bit of a stir when they examined Bloom's decreasing variability hypothesis as it relates to mastery learning. Student performance on unit tests in mastery learning classrooms was used to test two variations of Bloom's well-known hypothesis. Basically, Bloom hypothesized that under favorable mastery learning conditions, differences in faster and slower learners will decrease over successive units leading to the following: a) smaller variances on successive units and b) smaller correlations between an initial measure of aptitude and achievement on successive units. Data for the study was

collected during four semesters. A total of 376 students enrolled in a graduate class were participants in this study. The course was divided into three units. After each unit, students were administered one of three forms of a mastery test during class time. One form was administered to the entire class and the other two forms were used as retests following remediation. Students who did not achieve mastery were required to attend remedial sessions conducted by the instructor and/or graduate assistants. The student was then administered a retest. If a student still did not achieve mastery, an appointment was scheduled to individualize instruction. This process was repeated until the student achieved mastery. The results did not support Bloom's decreasing variability hypothesis. Instead, no change occurred over time. The findings show little evidence that mastery learning reduces initial differences in learning rates among students.

Additionally, Aviles (1998) seemed to breathe new life into mastery learning research in higher education when he examined mastery learning instruction in an undergraduate social work course. He specifically compared mastery learning instruction to non-mastery learning instruction. The participants included 137 students that registered for four sections of a junior-level introductory social work course. These four sections formed two groups: mastery and non-mastery. All sections included the same course content, outlines, readings, texts, exams, enrollment numbers, and meeting days. Non-mastery instruction consisted of a combination of lecture and discussion methods. Mastery learning was implemented using a) curriculum alignments, b) three written study guides, c) six ungraded quizzes, d) three graded exams, e) one retest for each exam, and f) instructor-led feedback and correctives, both in-class and outside class. The findings indicated that the mastery group outscored the non-mastery group on all three exams

when make-up scores were considered. The mastery group also had slightly higher retention. There were no differences between groups in terms of attitude toward course topic. The mastery learning instructor spent more outside class time with students. The author concluded that mastery learning is an effective method of instruction in a social work course.

Criticisms of Mastery Learning

Mastery learning does not remain unscathed and free from criticism. Like any other instructional approach, it has its fair share of non-supporters. One initial source of skepticism lies in the belief that mastery learning stifles individuality. Glickman (1979) crystallized this view of mastery learning when he suggested that mastery learning supported a "utopian traditional vision of education wherein which all students are equal and should be treated the same" (p. 100).

Another criticism is that mastery learning is time consuming (Honeycutt, 1974). Most supporters and detractors will agree that implementing a mastery learning program is time intensive. However, since time is an integral component of mastery learning, this factor can be viewed as both a positive and a negative. It is positive in that it requires more of a time commitment for both students and educators, but also negative in that the demands for more time might not intersect well with individual schedules and plans.

In addition, many critics suggest that mastery learning benefits slower learners at the expense of fast learners. The proponents of this criticism contend that master students stop learning and wait for the students that did not achieve mastery to attain the desired level of mastery (Palardy, 1986; Glickman, 1979). This does not sit well with

many detractors as it seems to impose limitations on the learning of more advanced students as they wait for less advanced students to achieve mastery.

Other detractors contend that mastery learning promotes grade inflation. However, Denton & Henson (1979), suggested that grade inflation is not a problem. These researchers contend that the instructional design of mastery learning "positively influenced" the grade inflation problem. Specifically, more students attained desired levels of mastery and therefore, earned higher grades.

In the language arts, many critics do not feel that mastery learning is effective. Lee Cronbach (as cited in Barone, 1978) argued this point when he stated that:

> "In subjects…such as reading comprehension, achievement is multidimensional. There is the level of knowing what the author said, and the level of knowing what the author meant, and the level of understanding things the author said that the author wasn't aware he had said. These aspects of reading comprehension are developed continuously and the child who has been "brought up to mastery" on only one of the dimensions probably hasn't mastered the other dimensions. Nor does the teacher know what to do to cause him to "master" reading in all these ways. The teacher can only hope that repeated interactions with material, discussed at whatever level the pupil can discuss these obvious meanings, will successfully move the child along." (p. 188)

Barone (1978) supports Cronbach's assertions by suggesting that very few studies have examined mastery learning instruction in language arts classes and those that had did not show significant positive results. Additionally, other critics suggest that mastery learning

is rigid, mechanistic, training strategies that can only give students the simple skills required to live in a closed society (Cronbach, 1972).

Despite the criticisms, many researchers contend that the positives outweigh the negatives. This is evident by a resurgence of recent interest in the approach, the increasing utilization in higher education environments, and the vast body of research that has been conducted concerning this topic.

Developmental Reading

> "If one skill is needed in college, it is reading. Students know how to avoid mathematics, and they can reduce writing to the barest necessity; but reading is something they cannot avoid." (Waters, 1980, p.91).

No one knows the depth of truth in this statement more than a developmental reading instructor. While the number of students that enter college and require developmental reading courses steadily climbs, there is little research that exists to aid in the development of quality programs that are effective for developmental students (Paulson, Laine, Biggs, & Bullock, 2003). Many reading instructors are left with the monumental task of discerning on their own what works for those students who appear in their classrooms.

Since most of the reading research is primarily conducted with school-aged children, developmental reading instructors are sometimes left with very few strategies in their toolkits (Nash-Ditzel, 2010). Research articles that focus on community college developmental reading programs are pretty much nonexistent, despite the increasing spotlight on the success of the students in these programs (Nash, 2008). In addition, it is problematic that the field of developmental reading does not have a universal approach to

effectively address the needs of developmental readers (Reynolds & Werner, 2003). The sparse literature base on developmental reading programs revealed three basic types of instruction: skills-based, content-based, and strategy-based (Nash, 2008).

Content-based Programs

Very few studies have examined the concept of content area reading in developmental reading classes (Olson, 1995). Typically, content area courses are paired with developmental reading courses and the materials from the content course are used to guide the reading instruction. Usually, these programs are teacher directed and content-centered. These programs have yielded mixed results.

Strategy-based Instruction

Strategy-based instruction is another developmental reading model that is found in the research literature. In this model, students are taught critical thinking strategies to bolster their reading development. Typically, strategy-based instruction focuses heavily on metacognitive strategies. Metacognition refers to a student's awareness and prior knowledge that they already possess. Strategy-based instruction is more student focused and the instructor attempts to incorporate student needs in the learning experience. Many studies have been conducted concerning the implementation of metacognitive reading strategies. However, the definition of metacognitive reading strategy varies between studies. This is a definite shortcoming of strategy-based instruction.

Pressley and Afflerbach (1995) asserted that strategic readers use a finite set of cognitive and metacognitive processes including prediction, imaging, interpretation, and comprehension.

Skills-based Instruction

Despite many developmental educators suggesting that student-centered approaches like reader-response (Chamblee, 2003) are key to student success, a direct instruction, skills-based approach continues to have firm footing in college developmental reading programs. This is most evident by the many college reading textbooks that emphasize skill building. According to Wood (2003), the existence of these textbooks reflect the type of teaching that exists in our developmental reading classrooms today (Paulson, 2006). Typically, the skills-based model focuses on teaching specific reading skills in order to prepare students for college-level reading material (Nash, 2008). These discrete skills may include vocabulary development, comprehension, and word attack skills (Maxwell, 1997). Often, these skills are taught through isolated reading passages designed to practice a specific skill.

In addition, the resurgence of skills-based textbooks supports the notion that developmental reading instruction is experiencing an evolutionary process that is cyclical in nature. This cycle began with behaviorist direct instruction and moved to socioconstructivist indirect instruction in an attempt to address the needs of developmental reading students. However, the continual shift in developmental reading mirrors the continual shift that is taking place in reading classrooms across America. Reading educators are reverting back to the implementation of many behaviorist approaches that were implemented so many years ago.

Reading Attitude

According to Good (1973), an attitude is a "predisposition… to react specifically towards an object, situation, or value [which is] usually accompanied by feelings and

emotions" (p. 215). Fishbein and Ajzen (1975) defined attitude as a learned predisposition to respond to a given phenomena in a consistent manner, and they claim that learners' beliefs, attitudes, intentions, and behavior, are intertwined. More specifically, Smith (2001) defined reading attitude as a state of mind accompanied by feelings and emotions that make reading more or less probable.

Despite the varying definitions, most reading theorists would agree that a student's reading attitude does impact reading behavior. Wixson and Lipson (1991) acknowledged that "the student's attitude toward reading is a central factor affecting reading performance" (p. 626). It is commonly accepted that readers who have positive attitudes toward reading, usually enjoy reading. Conversely, it is assumed that readers with negative attitudes toward reading tend to be disinterested in reading and dislike engagement in reading activities (Tse et al., 2006).

Reading Attitudes and School Aged Children

Historically, most of the research pertaining to reading attitudes has been conducted primarily with school-aged children. One of the most notable studies was conducted by McKenna and Kear (1990). These researchers are well-known for creating The Elementary Reading Attitude Survey (ERAS). This instrument is one of the most widely used measures of reading attitude, and it has enabled teachers to estimate attitude levels efficiently and reliably. McKenna and Kear (1990) found that students' reading attitudes toward academic and recreational reading steadily declined across the elementary school years. One of the most comprehensive studies completed on the reading attitudes of elementary students was conducted by McKenna, Kear, and Ellsworth (1995). Participants in this study consisted of a national sample of over 18,000

students enrolled in grades one through six. Findings included the following: 1) recreational and academic reading attitudes begin at a positive point in Grade 1 and end in indifference by Grade 6; 2) increasingly negative recreational attitude is closely related to ability; 3) girls possess more positive attitudes than boys at all grade levels; 4) ethnicity appears to play little role in the negative trend in either recreational or academic reading attitude; and 5) a teacher's reliance on basal readers does not appear to be significantly related to recreational or academic reading attitude.

Reading Attitudes and Adults

Ivan Quandt (1972) pondered the following: "It is one thing to be aware that reading attitudes are important. Do certain conditions foster more positive attitudes?" (p. 1). In an attempt to address Quandt's question, many of the research studies conducted with adult learners were cross-sectional designs that compared the reading attitudes of one group of adults with another (Dwyer & Joy, 1980). For example, a study conducted by Dwyer and Joy (1980) examined reading attitude across the lifespan using a cross-sectional design. The researchers compared six groups of both children and adults across three age categories: two groups of 6^{th} graders (1971, 1978 cohorts), two groups of university students (remedial students and freshmen); young adults that had never attended college but were the same age as the university students; and adults aged 60 years and older. The findings indicated that there were no differences between the children and old adults, but significant differences existed among the older adults and the freshmen and the non-college students. The students who did not attend college displayed the least positive reading attitudes, and the older adult group had the most positive reading attitudes. The findings suggested that there was a positive change in

attitude from youth to older adulthood. Dwyer and Joy (1980) suggested that changes in attitude in the non-college students were due to factors and situations that occurred after 6th grade.

A study conducted in 1984 (Ferguson and Bitner) examined the differences in reading attitudes between developmental reading students and non-developmental, college-level freshman English students. The study also examined self-concept and learning styles. The sample consisted of mostly Caucasian students between the ages of 17 to 21 years of age. The participants completed the Mikulecky Behavioral Reading Attitude Measure (MBRAM), (Mikulecky, 1976) which details five stages (Attending, Responding, Valuing, Organization, and Characterization) that an individual passes through in developing reading attitudes. Both groups responded similarly to many items; however, differences showed up on items in the Responding stage. The developmental students indicated an unwillingness to read, chose not to read and did not enjoy reading. The opposite was true for the non-developmental freshman English students. The researchers concluded that while developmental reading students understood that reading is a valuable skill to possess, they still tried to avoid participation in reading activities. Interestingly, at least 64% of the developmental students blamed themselves for their poor reading abilities and only 34% blamed educators.

In 1988, Smith examined the development of reading comprehension skills, metacognitive reading skills, and reading attitude among 84 individuals from childhood to middle adulthood. The participants completed The Adult Survey of Reading Attitude (ASRA), which was an adaptation of a questionnaire created by Wallbrown, Brown, and Engin (1977), as well as other questionnaires regarding reading behavior, reading habits,

reading perceptions, and perceptions of how their reading skills changed over time. Fifty-six of the students also completed an abbreviated version of the Nelson-Denny Reading Tests to correlate reading ability. The findings indicated that adults with positive reading attitudes spent more time reading and read a larger variety of materials than the adults with negative reading attitudes. Smith concluded that a positive attitude played an important role in adult reading behavior (Brooks, 1996).

In a landmark longitudinal study, Smith (1990) examined the development of reading attitude from childhood to adulthood. More specifically, the study examined the development of reading attitudes among a group of 84 individuals, many of whom were followed for over 40 years. All of the subjects were Caucasian and were participants as children in two previous longitudinal studies (Kreitlow, 1962, 1966). Reading attitude assessments were given to participants in (a) 1st, 6th, 9th, and 12th grades, (b) 5 years after high school graduation, and (c) either 21 or 26 years after high school graduation. The participants completed The Adult Survey of Reading Attitude (ASRA), which was an adaptation of a questionnaire created by Wallbrown, Brown, and Engin (1977), as well as other questionnaires regarding reading habits and perceptions. Smith (1990) found that the early adult measures accounted for one third of the variance on the adult attitude measure. Although childhood measures seem to be poor predictors of adult attitude, there was evidence of stability in reading attitude over time (Smith, 1990).

In yet another study, Smith (1992) compared the reading attitudes of adult readers at a large mid-western university. Specifically, the study examined differences in the reading attitudes of good and poor readers. Participants in the sample included freshman developmental reading students, upper division undergraduate teacher education students

and non-faculty employees representing a broad spectrum of educational and occupational backgrounds. The participants completed The Adult Survey of Reading Attitude (ASRA), which was an adaptation of a questionnaire created by Wallbrown, Brown, and Engin (1977). The ASRA was divided into the following five subscales: 1) reading activity and enjoyment, 2) reading anxiety and difficulty, 3) social reinforcement, 4) learning modes, and 5) assisting others. Significant differences were found among the groups on four out of the five subscales. The developmental students reported higher levels of reading anxiety and difficulty, less enjoyment and an indication of a preference for modes other than reading for learning in comparison to the other two groups.

Another study involving developmental students was conducted by Gillespie (1993). This researcher examined the various aspects of adult reading attitude. She suggested that affective factors that might motivate students to read were being ignored. The sample included 191 students enrolled in a developmental reading class at a mid-western university. The participants completed an open-ended questionnaire concerning attitudes toward reading, self-concepts related to reading, and recollections of learning to read at home and at school. The results indicated that over 50% of the respondents believed reading to be skills-based. Approximately, 50% of the students labeled themselves as non-readers. None of the students seemed to have developed strong attitudes toward reading at home. These students also felt that their reading skills were sufficient for college level work and that they should not be enrolled in the developmental reading class. Many of the students reported that they found time to read for pleasure and time to read for class assignments. Many also reported that their worst experiences prior to college included oral reading and book reports. Based on these

many findings, Gillespie (1993) concluded that attitude assessment was critical in that it provides guidance for instruction and can inform practice. The researcher contends that cultivating positive attitudes and encouraging reading for pleasure will promote the development of life-long readers.

Brooks (1996) examined the differences in attitude toward reading between adult remedial readers enrolled in developmental reading classes, and proficient adult readers enrolled in traditional English Composition classes. The sample consisted of 129 adult learners from both high school and college populations. A reading attitude survey was administered to the participants. Attitude differences were found to be significant within the high school population. Remedial high school readers were found to have a negative reading attitude, and proficient high school readers were found to have a positive reading attitude. Both the proficient college readers and the developmental college readers indicated positive attitudes toward reading. In addition, the reading attitudes of high school remedial readers were also compared with developmental college readers. Even though the high school remedial readers indicated a negative attitude and the developmental college readers indicated a positive attitude, there was no statistical significance between the two groups.

Many of the studies that focused on the reading attitudes of community college students also explored how participation in a particular program or reading intervention impacted reading attitude. For example, Manning (1997) investigated the relationship between critical thinking and reading attitude. The study was conducted with 31 students enrolled in a Critical Reading class. Two groups were included in the study: a regular curriculum group and a critical thinking group. Both groups were given pretreatment and

posttreatment reading attitude and critical thinking assessments. The results indicated that no statistically significant correlation existed between attitude toward reading and critical thinking.

Although most of the research conducted concerning reading attitudes focuses on school-aged children, the gap in the literature pertaining to the adult learner population can no longer be ignored. In a society where the current trends indicate that individuals are reading less as they age, and the number of students enrolling in developmental classes is increasing, the implications for adult learning is enormous, especially, in the developmental education arena. It is imperative that we gain a deeper understanding concerning how instructional methods impact reading attitude and reading skill in these settings. Therefore, an examination of the literature pertaining to mastery learning is a first step in the right direction toward achieving this goal.

For the most part, proponents of mastery learning view it as an effective tool to produce positive effects on student achievement and student affect. Their beliefs are supported by the research that has been conducted, however, the research base has not touched all areas. Today, very little mastery learning research has been conducted in reading classes and no mastery learning research has been conducted in developmental reading classes at community colleges. This gap becomes even more obvious when the research literature abounds with mastery learning studies that were conducted in subject areas other than reading.

This study examined mastery learning instruction in developmental reading classes. Specifically, the researcher examined the three domains that psychologists use to understand people and that educators use to learn more about readers. The three domains

are as follows: affect, behavior, and cognition. The first domain, affect, involves whether an individual likes to read or is interested in reading. The second domain, behavior, involves whether an individual engages in the act of reading. Since reading is an invisible process, behavior is usually self-reported. The third domain, cognition, is the domain that most educators focus on. It includes what an individual believes, thinks, and knows about reading. These three domains are interrelated as we can infer affect and cognition from behavior (Mizokawa & Hansen-Krening, 2000). The cyclical relationship of these three domains to reading was the basis for the methodology of this study. All of the variables examined in the study were included because together they present an accurate picture of the reader. The reading attitude survey used in this study examined reading affect, reading behavior, and reading cognition. In addition, the myreadinglab assessment, unit exams, and final grades examined the cognitive domain of reading for this study.

CHAPTER THREE: METHODOLOGY

Chapter Organization

This study compared student achievement and the reading attitudes of developmental reading students enrolled in developmental reading classes at an urban community college. The purpose of the study was to determine if students enrolled in a developmental reading class with mastery learning instruction had higher achievement success than students enrolled in a developmental reading class that did not use mastery learning instruction. The study used a quantitative approach to measure the academic achievement, reading skill, and reading attitude of students. The methodology of this study included the use of a Solomon four-group design to compare the achievement, reading skill, and reading attitudes of developmental reading students.

This chapter describes the research questions, the sample population, the methodology of the research, the data collection process, the data analysis process, and a concluding summary.

Research Questions

This research was guided by the following research questions:

Research Question 1: What is the difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Null Hypothesis 1: There are no significant differences in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Alternative Hypothesis 1: There is a significant difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Research Question 2: What is the difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Null Hypothesis 2: There are no significant differences in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Alternative Hypothesis 2: There is a significant difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Research Question 3: What is the difference in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Null Hypothesis 3: There are no significant differences in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Alternative Hypothesis 3: There is a significant difference in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Population and Setting

The population in this study consisted of developmental reading students who attended a large, public, urban community college located in the southeast region of the United States. At this community college, developmental reading students are students who earn a score of 34-79 on the ACCUPLACER Reading Comprehension Placement Test. The range of scores on this test is 20-120. At this particular institution, developmental students that score 34-56 on this test are considered moderate readers (RED 080) and students that score 57-79 are considered intermediate readers (RED 090). Specifically, this study was conducted with developmental reading students who were registered for RED 090, an upper level developmental reading course. In order for a student to be eligible to take RED 090, the student must earn a score within the range of 57-79 on the ACCUPLACER Reading Comprehension Placement Test. The site of the study was one of the six campus locations of the large, public, urban community college. This community college boasted enrollments of more than 61,403 students during the 2008-09 academic year (Fact Book, 2008-09). Of this figure, 57% of these students were female and 43% were male. Also, 52% of this population were members of racial/ethnic minority groups (self-reported, non-white) and 48% were members of racial/ethnic majority groups (self-reported, white, non-Hispanic). The primary researcher teaches developmental reading at this institution.

Sampling

To be included in this study, all participants must have been enrolled in developmental reading classes (RED 090) during spring semester, 2011. In order for students to register for RED 090, they had to have had an acceptable score on the ACCUPLACER Placement test. After meeting these criteria, students registered for specific course sections based on how the class fit into their schedules and seat availability. Written consent forms were used to inform students about the nature of the study (see Appendix A). The sample consisted of four intact groups of up to 20 students each (4 developmental reading classes-RED 090) for a total sample size of 73. A convenience sample was used. The four classes became the following four groups: Group PT (n = 19)-students received the myreadinglab pretest, reading attitude survey-pre administration, and the mastery learning treatment; Group T (n = 20)-students received only the mastery learning treatment; Group P (n = 18)-students received only the myreadinglab pretest and reading attitude-pre administration; and Group N (n = 16)-students did not receive the pretests or the mastery learning treatment. In order to avoid instructor bias, instructor names did not appear with the course offerings. Instead, instructor names were posted after the official registration period ended. The course sections were taught twice a week at the same exact times: two sections met on Monday and Wednesday and two sections met on Tuesdays and Thursdays.

Sample Description

The sample included 73 students registered in one of four sections of a developmental reading class. Five students officially withdrew from the course early during the semester, so they were not included in the analysis. In addition, 22 students

did not complete the course or stopped attending the course so they also were not included in the analysis. The sample included 40 females and 33 males. More than half of the sample (63%) were black with a mean age range of 18-20. Also, more than half (59%) of the sample attended school full-time. The average ACCUPLACER score ranged from 58.72-62.50 for all groups included in the sample.

Research Methodology

This study primarily used a Solomon four-group research design and the developmental reading classes were four conditions arranged as a factorial (Sarafino, 2005) as indicated in Figure 1. One factor is the presence or absence of a pretest, and the other factor is the presence or absence of a treatment. All subjects received posttests (both myreadinglab and reading attitude survey-post administration). Therefore, mastery learning instruction and non-mastery learning instruction were compared using four sections of the same 16-week developmental reading class (RED 090). The four sections were taught during spring semester, 2011. One RED 090 section was taught using mastery learning instruction and administered both a myreadinglab pretest and a reading attitude survey-pre administration (Group PT). Another RED 090 section was taught using mastery learning instruction only and no myreadinglab pretest or reading attitude survey-pre administration (Group T). A third RED 090 section was taught in the traditional manner and administered the myreadinglab pretest and reading attitude survey-pre administration (Group P) and a final RED 090 section was not administered the myreadinglab pretest, reading attitude survey-pre administration or the mastery learning treatment (Group N). All groups were administered a myreadinglab posttest and a reading attitude survey-post administration.

Mastery Learning Treatment	Myreadinglab Pretest and Reading Attitude Survey Pre-Administration: Yes	Myreadinglab Pretest and Reading Attitude Survey Pre-Administration: No
Yes	Group PT (n = 19) Myreadinglab pretest, reading attitude survey- pre administration + mastery learning	Group T (n = 20) Mastery learning only
No	Group P (n = 18) Myreadinglab pretest and reading attitude survey- pre administration only	Group N (n = 16) No Myreadinglab pretest, reading attitude survey- pre administration or mastery learning

Figure 1. Solomon Four Design. This figure illustrates the Solomon four-group research design used in the study.

This research design was ideal as it helped control variance by testing for potential confounding variables (Sarafino, 2005). Not only was the effect of the treatment assessed, but also the effect of the pretests and the interaction between the two factors was also assessed. Quantitative data were also collected from the following sources: ACCUPLACER test scores, myreadinglab pre-test and posttest scores, unit test scores, reading attitude survey-pre and post administration, and final grades.

The four RED 090 sections included in the study had similarities as well as differences. Items in common included the following: course objectives, syllabi, content, exams, readings, textbooks, grading scale, reading attitude inventory, meeting days and times. Items that were different included the instructional method (mastery and non-mastery) and the instructors. Group equivalence minimized the following three threats to internal validity: history, maturation, and instrumentation (Campbell & Stanley, 1963).

To further reduce the threat of instrumentation, the primary investigator explained, distributed, and collected consent forms, myreadinglab assessments, and reading attitude survey instruments.

Additionally, the mastery learning instructor (and primary investigator) is an African American female with 20 years teaching experience and the non-mastery learning instructor is a white female with 30 years teaching experience. Both instructors have taught developmental reading at the same community college for twelve years. Both instructors have Master's degrees in Education and have prior elementary school teaching experience. The variables of instructor and instruction were confounded in this study. Controlling for the variable of instructor and instruction was not possible.

Instrumentation

The instruments utilized in this study included both instructor-created and existing instruments. A description of these instruments is included in the next section.

Quantitative Measures

No standardized achievement measures existed in the RED 090 courses being studied. Therefore, academic achievement was measured by five, 50-item exams that were created by the Reading staff of the urban community college. Exams were administered for the following five units: Unit 1-Active Learners; Unit 2-Reading as a Process; Unit 3-What's the Main Idea?; Unit 4-Thinking Critically; and Unit 5-Reading for Information. All tests contained objective, multiple-choice and true/false type questions. Objective test formats are considered more reliable than subjective test formats (Roid & Haladyna, 1982). The Unit 1-Active Learners exam consisted of 50 multiple-choice items that assessed active learning and test taking skills. The Unit 2-

Reading as a Process exam consisted of 50 multiple-choice items that assessed the stages of reading and vocabulary skills. The Unit 3-What's the Main Idea? exam consisted of 50 multiple-choice items that assessed main idea and patterns of organization. The Unit 4-Thinking Critically exam consisted of 50 multiple-choice items that assessed critical thinking and inference skills. The Unit 5-Reading for Information exam assessed textbook organization and graphic illustrations. All exams were worth 100 points each. A final grade was determined by computing an average of the five unit exam scores. Another parallel form of each 50-item exam was used for the retest cycles in the mastery learning group. The content covered in both forms of the exams was similar. In this study, mastery was defined as an exam score of 70 or higher. Mastery was set at 70 or higher because the grading scale at this urban community college defined an acceptable passing grade as "C" or above. Any student that did not achieve mastery could retake the unit exam. The highest grade of any two attempts was used to compute the final grade average. Both forms of the exams were pilot-tested during fall semester 2010 in developmental reading classes at the large, public, urban community college.

Validity

Validity of the achievement measures were addressed by expert review and participant feedback. First, the faculty of the Reading department at the urban community college created the unit tests. Each test was reviewed by each faculty member and they all agreed that the test items addressed the content to establish face validity. The three faculty members have all taught at the same community college together for at least 13 years. They all have earned Master's degrees in Reading and they equally participate in the curriculum development of the courses at this institution.

Reliability

The reliability of the five exams were checked using Cronbach's alpha. This approach examined the measure of internal consistency of the mean of the items at the time of administration during fall 2010. (Sarafino, 2005). Cronbach's alphas for the unit exams were as follows: Unit 1 Exam, α= .86; Unit 2 Exam, α= .90; Unit 2 Exam, α= .93; Unit 4 Exam, α= .80; and Unit 5 Exam, α= .82.

Another instructor-created measure used in the study was the reading attitude survey. This instrument is an adaptation of The Adult Survey of Reading Attitudes (ASRA) developed by Wallbrown, Brown, and Engin (1977). The ASRA was selected because it has been shown to have high reliability with Cronbach's alpha=.93 and test retest=.87 (Smith, 1991). The reading attitude survey included 48-items that measured student attitudes toward reading. Items 1-14 on the instrument assessed the affective construct of reading. Items 15-20 assessed the cognitive aspects of reading attitude and Items 21-34 assessed reading behaviors. Items 1-33 used a 5-item Likert Scale and the raw score was equal to the sum total of the responses. The range of scores is 0-165. Items 35-48 were demographic and for informational purposes only. This instrument was pilot-tested using groups of developmental reading students in RED 090 courses during fall 2010. The instrument was administered pre/post instruction to show score changes. Instrument reliability and stability were checked using Cronbach's alpha. The Reading Attitude pre administration was found to be highly reliable (33 items; α = .91). The Reading Attitude post administration was also found to be highly reliable (33 items; α = .90). The instructor created survey is included in Appendix B.

Existing publisher-created measures used in the study to assess reading skill were the myreadinglab-pre and posttest instruments. Myreadinglab is an online application that includes diagnostic assessments, practice exercises, and tests to improve student reading skills and reading level. Reading skills are improved through a mastery-based format of practice exercises. These practice exercises include objective-based items, short answer items and combined skills exercises. One of the most widely used reading measures today, myreadinglab is the end result of the collaboration of two premier publishers: Longman and Prentice Hall. Instrument reliability was checked using Cronbach's alpha. The myreadinglab pretest was found to be reliable (32 items; $\alpha = .86$). The myreadinglab posttest was also found to be reliable (32 items; $\alpha = .80$).

Teaching Procedure

Instructional content was selected and divided into five instructional units: Unit 1-Active Learners; Unit 2-Reading as a Process; Unit 3-What's the Main Idea?; Unit 4-Thinking Critically; and Unit 5-Reading for Information. A sample of the Unit 4 materials is included in Appendix C. Each unit was completed within a two-week period followed by one-week of correctives or enrichments. These units were taught in the same order and sequence for both the mastery and the non-mastery learning groups. Once a group had completed a unit of instruction then the corresponding unit test was administered. Students in the non-mastery learning group had no opportunities for a retest. However, students in the mastery learning group who did not score at least a 70 on a unit exam were provided with corrective activities and then had the opportunity to take a retest. Students in the mastery learning group that achieved mastery on the initial attempt were provided enrichment activities to promote continuous student learning.

Both corrective and enrichment activities lasted for one week and occurred directly following the initial two weeks of unit instruction.

Both the mastery learning and the non-mastery learning groups were administered the same five exams. Once the exams were collected and graded, all students participated in an in-class discussion of the exam. This review included the disclosure of the correct answers for all items on the exam. At this point, the exams were recollected and enrichment and corrective assignments were announced.

Corrective activities included mandatory, group review sessions conducted both inside and outside of class meeting times. These review sessions occurred the next two class sessions immediately following the review of the unit exam. During the next two class sessions, the instructor met with students in the corrective group and proceeded to reteach unit content material using different examples and readings. Outside class, students were required to attend individual tutoring sessions at the campus learning center. In addition, students were required to complete skills-based assignments in myreadinglab for more practice. After attending the review sessions and completing corrective activities, students in the corrective group were allowed to take the retest. The instructor recorded the highest of the two grades on both attempts.

During that same two-class session (one week) period, students that achieved mastery on the initial unit exam were exposed to enrichment activities. These students were assigned independent and group assignments related to the unit theme. The projects not only required these students to demonstrate their achieved level of skill mastery, but also involved thinking critically at the highest levels of Bloom's Taxonomy (Bloom, 1956).

Data Collection

Data collection procedures are summarized in this section. Quantitative data were collected from both groups (at least five times from the non-mastery group and up to ten times from the mastery group) during the 16-week semester. Each instructor administered and collected exam materials for each of their respective course sections. However, retests for the mastery learning groups were taken at the campus testing center. All exams were scored by the primary researcher.

Myreadinglab pre and posttesting instruments were administered to Group PT and Group P during the second week of classes and the last week of classes, respectively. In addition, a reading attitude survey was also administered to these groups during the second and the last week of classes.

Data Analysis

All quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS). A multivariate analysis of variance (MANOVA) coupled with a t-test were used to determine if differences existed in achievement, reading skill, and reading attitude based on instructional method. The independent variable was instructional method- mastery learning versus non-mastery learning instruction. The dependent variables were the myreadinglab pre and posttest scores; the reading attitude- pre and post administration results, the unit exam scores, and final grades. A total of seven independent statistical tests were performed. Sidak (1967) correction ($\alpha_i = 1-(1-\alpha_{fw})^{1/c}$), where α_{fw} is the family-wise error rate, α_i is the test-wise error rate, and c is the number of tests was applied to control possible inflation of Type-I error with multiple tests. In this case, c = 7. A family-wise error rate of .15 was used in this

study as recommended by Keselman, Cribbie, and Holland (2002). Therefore, the test-wise error rate was .02.

Summary

The methodology chapter presented the research methodology which included the following: the research questions, sample information, the research design, the instruments utilized, data collection, and data analysis procedures. Chapter Four will include the results of the quantitative analyses.

CHAPTER FOUR: RESULTS

This chapter opens up with a restatement of the purpose of the study. The three primary research questions are discussed along with the quantitative data associated with each question.

Research Questions

The purpose of this study was to determine if students enrolled in a developmental reading class with mastery learning instruction had better achievement success than students enrolled in a developmental reading class that did not use mastery learning instruction. Three major research questions guided the study. Quantitative data collection procedures were utilized to address each of the following questions:

1. What is the difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?
2. What is the difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?
3. What is the difference in the reading skill of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Quantitative Results

In the sections that follow, quantitative results that addressed the following variables are discussed: academic achievement, reading skill, and reading attitude. The results include a discussion of the data as it pertains to all groups, within groups, and between groups differences in the study.

Academic Achievement

A MANOVA was used to analyze data to address the first research question: What is the difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods? This analysis involved examining unit exam scores and final grades. The null hypothesis stated that there would be no significant difference in the academic achievement of these two conditions. A MANOVA statistical analysis revealed that there was a statistically significant difference between groups on three of the five unit exams. Specifically, Unit 1 Exam ($F(1, 71) = 52.03$; $p < .02$; partial $\eta^2 = .42$); Unit 2 Exam ($F(1, 71) = 7.60$; $p < .02$; partial $\eta^2 = .10$); and Unit 5 Exam scores ($F(1, 71) = 5.40$; $p < .02$; partial $\eta^2 = .07$). In examining the results, students in the mastery learning condition had higher mean exam scores on two out of five unit exams initially. Group PT had a higher mean exam score on the Unit 3 Exam ($M = 86.47$, $SD = 6.23$) and Group PT and Group T had higher mean exam scores on the Unit 5 Exam ($M = 87.74$, $SD = 5.75$) and ($M = 82.60$, $SD = 11.00$), respectively. However, retest opportunities resulted in improved achievement in the mastery learning conditions. When final grades were examined, the results showed that both groups had similar mean final grades.

Consequently, the null hypothesis was rejected that there is no difference in the academic achievement of students in the mastery learning versus non-mastery learning conditions.

Several analyses were conducted to address the first research question concerning academic achievement. The first analysis examined the academic achievement of students in the mastery learning versus non-mastery learning conditions. This analysis involved examining student performance on the five unit exams. There was a statistically significant difference between the academic achievement of students in the mastery learning groups versus students in the non-mastery learning groups, $F(4, 67) = 15.74$, $p < .02$; Wilk's $\lambda = .46$, partial $\eta^2 = .54$.

The next analysis examined how the unit exam scores differed based on the instructional method. This analysis involved checking for homogeneity of variances using Levene's Test of Equality of Error Variances. All unit exams had homogeneity of variances ($p > .05$). The results of the MANOVA are presented in Table 1.

Table 1

MANOVA Results: Academic Achievement

Source of Variation	*SS*	*df*	*MS*	*F*
Unit 1 Exam	2690.50	1	2690.50	52.03
Unit 2 Exam	332.36	1	332.36	7.60
Unit 3 Exam	60.03	1	60.03	.76
Unit 4 Exam	79.15	1	79.15	.84
Unit 5 Exam	489.43	1	489.43	5.40

Table 1 indicates that the mastery learning condition had a statistically significant impact on academic achievement. Specifically, Unit 1 Exam ($F(1, 71) = 52.03$; $p < .02$; partial $\eta^2 = .42$); Unit 2 Exam ($F(1, 71) = 7.60$; $p < .02$; partial $\eta^2 = .10$); and Unit 5 Exam scores ($F(1, 71) = 5.40$; $p < .02$; partial $\eta^2 = .07$). There was a statistically significant difference between groups on the following Unit Exams: Unit 1, Unit 2, and Unit 5. However, there was no significant difference between groups on the Unit 3 Exam or the Unit 4 Exam.

Additional analysis examined achievement data for all groups with all original scores and then the achievement data were examined a second time for all groups when the retest scores replaced the original exam scores in the mastery learning groups (Group PT and Group T). The non-mastery learning groups (Group P and Group N) did not take retests. These results are discussed first (Table 2).

Table 2

Mean Exam Scores for All Groups Combined-Retests Included and Excluded

	All Groups-Retests Excluded		All Groups-Retests Included	
	M	*SD*	*M*	*SD*
Unit 1 Exam	82.03	9.40	83.70	7.75
Unit 2 Exam	85.48	6.91	85.48	6.91
Unit 3 Exam	84.31	8.86	84.55	8.46
Unit 4 Exam	76.77	9.68	77.70	8.54
Unit 5 Exam	82.68	9.81	82.95	9.19

The descriptive statistics show that the mean exam scores were similar for all groups. The mean score for the Unit 2 Exam remained the same for all groups with retests excluded and retests included in the calculation. This is a strong indication that no students completed a retest on that exam. There were very moderate increases between the mean scores for Unit 1, Unit 3, Unit 4, and Unit 5 exams. The mean exam scores that included retests were slightly higher than the mean exam scores without retests. Sixteen retests were taken by 11 students in the mastery learning groups during the semester (Group PT and Group T). The difference in the mean scores of all groups was very nominal.

Additional analyses examined the mean scores on the Unit Exams between groups. This analysis included the mean scores on all five exams for each group and excluded retests for the mastery learning conditions (Table 3).

Table 3

Mean Exam Scores for All Groups Uncombined-Retests Excluded

	Mastery Groups				Non-Mastery Groups			
Unit Exams	Group PT (n = 19)		Group T (n = 20)		Group P (n = 18)		Group N (n = 16)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Unit 1 Exam	76.68	9.37	76.05	7.80	88.17	5.42	88.94	5.35
Unit 2 Exam	84.74	6.34	82.30	7.41	86.56	6.02	89.13	6.37
Unit 3 Exam	86.47	6.23	80.60	9.37	85.33	9.25	85.22	9.79
Unit 4 Exam	76.00	11.96	75.60	7.63	77.56	10.26	78.25	8.91
Unit 5 Exam	87.74	5.75	82.60	11.00	78.61	9.53	81.38	10.58

A side-by-side comparison shows not only how the mastery learning groups performed on the Unit Exams, but also how each individual group or class section performed as well. The mastery learning groups (Group PT and Group T) had lower mean exam scores on the following exams: Unit 1, Unit 2, and Unit 4. However, at least one of the mastery learning groups (Group PT and Group T) had a higher mean exam score than at least one of the non-mastery learning groups (Group P and Group N) on the Unit 3 and Unit 5 Exams. No retest scores were included in these calculations.

However, further analysis examined the mean exam scores for all groups and included retests for the mastery learning conditions (Group PT and Group T). These calculations include scores for the 16 retests that were taken by 11 students during the semester (Table 4).

Table 4

Mean Exam Scores for All Groups Uncombined-Retests Included

	Mastery Groups				Non-Mastery Groups			
Unit Exams	Group PT (n = 19)		Group T (n = 20)		Group P (n = 18)		Group N (n = 16)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Unit 1 Exam	79.84	7.26	79.15	7.10	88.17	5.42	88.94	5.35
Unit 2 Exam	84.74	6.34	82.30	7.41	86.56	6.02	89.13	6.37
Unit 3 Exam	86.47	6.23	81.50	8.23	85.33	9.25	85.22	9.79
Unit 4 Exam	78.21	11.96	76.90	5.41	77.56	10.26	78.25	8.91
Unit 5 Exam	87.74	5.75	83.55	8.71	78.61	9.53	81.38	10.58

Even after the inclusion of the retests for the mastery learning conditions, the results indicate a subtle change. The mastery learning groups (Group PT and Group T) had lower mean exam scores on the following exams: Unit 1 and Unit 2. However, at least one of the mastery learning groups (Group PT and Group T) had higher mean exam scores than at least one of the non-mastery learning groups (Group P and Group N) on the Unit 3, Unit 4, and Unit 5 Exams. Retest scores were included in these calculations for the students in the mastery learning conditions (Group PT and Group T).

Additional analysis of the academic achievement data examined the 11 students who took the 16 retests in the mastery learning conditions only (Group PT and Group T). A Paired Samples t-test was used to compare student performance on the original tests and the retests. The retest scores for the 11 students (M = 78.86, SD = 4.83) were significantly higher than the original exam scores for these same students (M = 75.23, SD = 3.46), $t(10) = 5.55$, $p < .02$.

The analysis also included the examination of final grades. The MANOVA results indicated that there was a statistically significant difference between the final grades of students in the mastery learning conditions versus students in the non-mastery learning conditions, F (1, 69) = 1.97, $p > .02$; Wilk's $\lambda = .95$, partial $\eta^2 = .05$.

Additional analysis examined how the final grades differed based on the instructional method. This analysis involved checking for homogeneity of variances using Levene's Test of Equality of Error Variances. All final grades had homogeneity of variances ($p > .05$). The results of the MANOVA are presented in Table 5. Additional analysis examined achievement data for all groups with all original scores and then the achievement data were examined a second time for all groups when the retest scores

replaced the original exam scores in the mastery learning groups (Group PT and Group T). The non-mastery learning groups (Group P and Group N) did not take retests. Achievement results before retest scores replaced original exam scores and after retest scores replaced original scores (in the mastery learning groups) are discussed first (Table 5).

Table 5

MANOVA Results: Final Grades- Retests Included and Excluded

Source of Variation	*SS*	*df*	*MS*	*F*
Final Grade-no retests	88.55	1	88.55	2.44
Final Grade-retests	46.14	1	46.14	1.46

Table 5 indicates that the mastery learning condition had a statistically significant impact on final grades.

The next analysis examined the mean final grade averages between the mastery and the non-mastery learning groups. This analysis included a calculation of the average of all five unit exams that were used to determine the final grade for both the mastery and non-mastery learning conditions (Table 6).

Table 6

Final Grade Averages for All Groups Uncombined-Retests Included and Excluded

	Mastery Groups				Non-Mastery Groups			
	Group PT (n = 19)		Group T (n = 20)		Group P (n = 18)		Group N (n = 16)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Final Grades (without retests)	82.33	5.71	79.43	6.35	83.24	5.81	84.58	5.99
Final Grades (with retests)	83.40	5.15	80.68	5.41	83.24	5.81	84.58	5.99

A side-by-side comparison shows not only the mean final grades for the students in mastery learning groups, but also the mean final grades for each individual group or class section. The mastery learning groups (Group PT and Group T) had lower mean final grades before retests than the students in the non-mastery learning groups (Group P and Group N). However, after retests were included in the final grade calculation, at least one mastery learning group (Group PT) had higher mean final grades than the students in at least one non-mastery learning condition (Group P). Additionally, the inclusion of the retests in the final grade calculations increased the mean final grades for both mastery learning groups, Group PT and Group T.

Reading Attitude

A MANOVA was used to analyze data to address the second research question: What is the difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning

instructional methods? The null hypothesis stated that there would be no significant difference in the reading attitudes of the students in these two conditions. A MANOVA statistical analysis revealed that there was no statistically significant difference between groups. Therefore, the null hypothesis is accepted that there is no difference in the reading attitudes of students in the mastery learning versus non-mastery learning conditions.

Several analyses were conducted to address the second research question concerning reading attitude. The first analysis examined the reading attitude of students in the mastery learning versus non-mastery learning conditions. This analysis examined the post administration of the reading attitude survey. The reading attitude surveys were administered at the end of the semester to all groups. There was no statistically significant difference between the reading attitude of students in the mastery versus non-mastery learning groups, F (5, 136) = 1.13, $p > .02$; Wilk's $\lambda = .91$, partial $\eta^2 = .48$.

A Solomon-four group research design was used in this study to determine if the pre administration of the reading attitude survey influenced the post administration of the reading attitude survey. Only two groups (Group P and Group PT) took the reading attitude survey at the beginning and the end of the semester. The results of a MANOVA indicated that the pre administration of the reading attitude survey had no influence on the post administration of the reading attitude survey, F (3, 32) = .61, $p > .02$; Wilk's $\lambda = .93$, partial $\eta^2 = .07$. This analysis also involved checking the homogeneity of variances using Box's Test of Equality of Covariance Matrices. Assumptions are met ($p > .05$). The results of the MANOVA are presented in Table 7.

Table 7

MANOVA Results: Reading Attitude for Pre and Post Administration Groups

Source of Variation	*SS*	*df*	*MS*	*F*
Reading Attitude Pre	.16	1	.16	.72
Reading Attitude Post	.08	1	.08	.37

This analysis also involved checking for homogeneity of variances using Levene's Test of Equality of Error Variances. All reading attitude post administration scores had a homogeneity of variances ($p > .05$). MANOVA results for post administration of reading attitude showed no statistically significant difference among the four groups, $F(3, 69) = 0.37$, $p > .02$.

A Paired Samples t-test was used to compare student performance on the pre administration of the reading attitude survey and the post administration of the reading attitude survey. The analysis involved the 37 students in Group P and Group PT. The reading attitude survey used a 5-item Likert scale. The pre administration mean scores ($M = 3.43$, $SD = .48$) were not significantly different than the post administration mean scores for these same students ($M = 3.44$, $SD = .46$), $t(36) = -.19$, $p > .02$. The descriptive statistics show that the mean scores on the pre and post administration of the reading attitude survey were very similar.

Additional analyses examined the mean scores on the post administration for all groups. The results are included in Table 8.

Table 8

Mean Post Administration Reading Attitude Scores for All Groups

	Mastery Groups				Non-Mastery Groups			
	Group PT (n = 19)		Group T (n = 20)		Group P (n = 18)		Group N (n = 16)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Post	3.40	.52	3.54	.38	3.49	.39	3.41	.58

A side-by-side comparison shows not only how the mastery learning groups performed on the post administration of the reading attitude survey, but also how each individual group or class section performed as well. One mastery learning group (Group T) had a slightly higher mean score than all other groups on the post administration of the reading attitude survey.

Reading Skill

A MANOVA was used to analyze data to address the third research question: What is the difference in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods? The null hypothesis stated that there would be no significant difference in the reading skills of the students in these two conditions. A MANOVA statistical analysis revealed that there was no statistically significant difference between groups. Therefore, the null hypothesis is accepted that there is no difference in the reading skills of students in the mastery learning versus non-mastery learning conditions.

Several analyses were conducted to address the third research question concerning reading skill. The first analysis examined the reading skills of students in the mastery learning versus non-mastery learning conditions. This analysis examined the posttest scores on the myreadinglab reading skills test. The myreadinglab posttests were administered at the end of the semester to all groups. There was no statistically significant difference between the reading skills of students in the mastery learning versus non-mastery learning conditions, F (5, 136) = 1.13, $p > .02$; Wilk's $\lambda = .91$, partial $\eta^2 = .48$.

A Solomon-four group research design was used in this study to determine if the myreadinglab pretest influenced the myreadinglab posttest. Only two groups (Group P and Group PT) took the myreadinglab reading skills test at the beginning and the end of the semester. The results of a MANOVA indicated that the myreadinglab pretest had no influence on the myreadinglab posttest, F (3, 32) = 0.61, $p > .02$; Wilk's $\lambda = .93$, partial $\eta^2 = .07$. This analysis also involved checking the homogeneity of variances using Box's Test of Equality of Covariance Matrices. Assumptions are met ($p > .05$). The results of the MANOVA are presented in Table 9.

Table 9

MANOVA Results: Reading Skill for myreadinglab Pretest and Posttest

Source of Variation	*SS*	*df*	*MS*	*F*
myreadinglab Pretest	150.93	1	150.93	1.36
myreadinglab Posttest	19.13	1	19.13	0.15

A Paired Samples t-test was used to compare student performance on the myreadinglab pretest and the myreadinglab posttest. The analysis involved the 37 students in Group P and Group PT. The myreadinglab pretest and posttest scores ranged from 0 to 100. The myreadinglab pretest mean scores (M = 50.70, SD = 10.58) were statistically significantly different than the myreadinglab posttest mean scores for these same students (M = 55.59, SD = 11.06), $t(36) = -2.675$, $p < .02$. Therefore, the

Additional analyses examined the mean scores on the myreadinglab posttest for all groups. The results are included in Table 10.

Table 10

Mean myreadinglab Posttest Scores for All Groups

	Mastery Groups				Non-Mastery Groups			
	Group PT (n = 19)		Group T (n = 20)		Group P (n = 18)		Group N (n = 16)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
myreadinglab Posttest	54.89	10.92	53.05	9.64	56.33	11.47	61.75	14.96

A side-by-side comparison shows not only how the mastery learning groups performed on the myreadinglab posttest, but also how each individual group or class section performed as well. The mastery learning groups (Group PT and Group T) had lower mean scores on the myreadinglab posttest than the non-mastery learning groups.

CHAPTER FIVE: DISCUSSION

Chapter Five includes a discussion of the major findings of the quantitative analyses, implications for developmental reading education, limitations of the study, and suggestions for further research.

Summary

This study attempted to discern whether mastery learning is an effective instructional tool in developmental reading classes. Three primary research questions guided this study:

1. What is the difference in the academic achievement of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?
2. What is the difference in the reading attitudes of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?
3. What is the difference in the reading skills of community college developmental reading students when taught by traditional instructional methods versus mastery learning instructional methods?

Quantitative data collection methods were used to ascertain if mastery learning instruction is a viable alternative instructional method for developmental reading students. The sample included 73 students enrolled in four sections of a developmental reading class. One instructor taught two sections using mastery learning instruction.

Another instructor taught two sections using non-mastery learning instruction. A Solomon four-group research design was used in the study. This research design was ideal as it helped control variance by testing for potential confounding variables (Sarafino, 2005). Not only is the effect of the treatment assessed, but also the effect of the pretests and the interaction between the two factors is also assessed. The site was a public, urban community college located in the southeast region of the United States.

Conclusions

A few broad conclusions can be drawn from this study concerning mastery learning instruction as it pertains to the following: academic achievement, reading attitude, and reading skill. These conclusions are summarized in the sections that follow.

Academic Achievement

In this study, the researcher examined the differences in the academic achievement of community college developmental reading students when taught by mastery learning instruction versus non-mastery learning instruction. The analysis included an examination of both student performance on unit exam scores and the final grades that students earned in the RED 090 class. Students in the mastery learning classes had: (a) similar mean exam scores, (b) similar mean final grades and, (c) no D or F grades. Retest opportunities resulted in improved academic achievement for the mastery learning subjects.

Similar to the findings of Aviles (1998), students in the mastery learning groups had higher mean scores than students in the non-mastery learning group on three of the five unit exams when retests were considered. This second chance opportunity made the difference between passing and failing the class for the 11 students that took advantage of

the retest opportunities. During the first retest cycle, six students in the mastery learning condition took advantage of the opportunity to retest and to improve their grade. However, by the second retest cycle, no students failed the Unit 2 Exam and subsequently did not require a retest opportunity. One possible reason is that students had grown familiar with the style of tests that were being administered in the class. Another possibility is that students that were unprepared for the first test took the necessary steps to be better prepared for the Unit 2 Exam. A third reason might have been avoidance. It is probable that the students that participated in the corrective activities that followed the Unit 1 Exam were better prepared to ensure that they passed the Unit 2 Exam. Adequate preparation and study may have allowed these students to pass the test and avoid corrective activities that might have been viewed as additional work.

The data also indicated that students in the mastery learning conditions had the lowest mean scores on the Unit 1 and Unit 4 Exams, respectively. One possible reason for the low performance on the Unit 1 Exam is the "novelty effect" and the order of succession. Since this exam is the first exam of the semester, students might lack adequate preparation and readiness for the exam. It seems that by the Unit 2 Exam, the "novelty effect" had worn off and students became more accustomed to the testing environment and were better prepared. In addition, the content of the Unit 4 Exam typically poses a problem for developmental reading students. Unit 4 involves critical thinking and inference. These skills require students to move beyond the literal level of reading to a more sophisticated level of reading. Unit 4 involved "reading between the lines" and interacting with text at the inferential level. Both groups had the lowest mean scores on the Unit 4 Exam. The non-mastery learning groups had slightly higher mean

scores on the Unit 4 Exam than the mastery learning groups. However, neither group had a stellar performance on this particular exam.

Reading Attitude

This study also examined the differences in the reading attitudes of community college developmental reading students when taught by mastery learning instruction versus non-mastery learning instruction. The analysis included an examination of student performance on a pre and post administration of a reading attitude survey. The results indicated that there were no significant differences in the reading attitudes of mastery learning and non-mastery learning students. All groups had similar mean scores on both the pre and post administration reading attitude survey. The findings indicated that the reading attitudes of the students that participated in this study were relatively low and that it remained the same over the treatment period. This finding was similar to the research conducted by Ferguson and Bitner (1984), when they compared the reading attitudes of developmental reading students with non-developmental, college-level freshman English students. Likewise, Ferguson and Bitner (1984) concluded that developmental reading students had poor reading attitudes and would try to avoid participation in reading activities.

Many developmental students will openly share that they do not like to read. The finding that the developmental readers in this study did not have good reading attitudes is no surprise to the researcher. The fact that the students were in different treatment conditions did not change the fact that they were all developmental reading students, who were required to take at least one extra class in order to be eligible to take college-level reading or English classes. However, the researcher was hopeful that more time spent

working on remedying deficits would have resulted in a positive change in reading attitude. Consequently, no positive change was observed in either group and students in the mastery learning group may actually have been annoyed that they were required to complete more work in a subject area that they were not excited about in the first place. Once again, these students might have viewed the enrichment and corrective activities as additional work and this might have impacted the reading attitude of these students.

Reading Skill

Likewise, this study also examined the differences in the reading skills of community college developmental reading students when taught by mastery learning instruction versus non-mastery learning instruction. The analysis included an examination of student performance on a pre and post administration of the myreadinglab reading skills assessment. The results indicated that there were no significant differences in the reading skills of mastery learning and non-mastery learning students. The findings indicated that the reading skills of the students that participated in this study were relatively low, as mentioned previously, however, the myreadinglab pretest mean scores were statistically significantly different than the myreadinglab posttest mean scores for these same students.

The finding that the developmental readers in this study did not have good reading skills is no surprise to the researcher. The fact that the students were placed in developmental reading classes is a good indication that their reading skills are deficient. However, the results did indicate that the mean scores on the myreadinglab posttest were higher than the mean scores on the myreadinglab pretest for both groups. The increase in

mean scores is an indication that both students in the mastery learning and the non-mastery learning condition made positive gains in their reading skills during the study.

Implications

Given the results of this study, developmental reading educators should consider the following implications about mastery learning. First and foremost, there is little conclusive research that examines mastery learning instruction in community college developmental reading classes. While this single study cannot provide enough evidence to make the claim that all developmental reading classes should employ mastery learning as an instructional method, it does suggest that developmental reading students can benefit academically from mastery learning.

However, this potential benefit does come with a cost. Just as Littlejohn (1973) discovered while examining mastery learning in undergraduate educational psychology courses, mastery learning itself is very time-consuming. When planning for mastery learning instruction, one needs to take into account the importance of extra planning for the corrective and enrichment activities that follow the initial teaching and testing cycle. The enrichment and corrective procedures allow the students to either work independently to enrich their skills or receive corrective instruction that reteaches skills and allows for retesting opportunities, respectively. This component of mastery learning instruction requires time and an instructor needs to take this factor into account when planning instruction for the semester.

In addition, developmental reading educators need to consider the inherent nature of many developmental reading students before employing mastery learning instruction. Many of these students bring years of reading deficits to the classroom. Some of these

students do not enjoy reading, lack reading motivation and resent placement in a developmental reading class. Most likely, these students will not be willing participants in reading activities that are not required or graded. Therefore, developmental reading students might resist mastery learning and view it as more work in a subject area that they do not enjoy.

Another implication that should be considered is the multi-dimensional nature of reading as a subject area. Reading experts cannot agree on the best method to teach reading, but each reading educator has a strong sense about how they believe reading should be taught. Even Bloom (1968) suggested that reading is not a subject that is best suited for mastery learning. However, in order for reading to be taught in a mastery learning environment, a skills-based approach is most likely the best method. The implementation of a skill-based approach might pose as a philosophical conflict for those individuals that do not endorse a skills-based approach to reading instruction. Developmental reading educators must make careful consideration before deciding to employ mastery learning in their classrooms.

Also, another aspect to consider is the interrelatedness of the three domains of reading: affect, behavior, and cognition. These three domains are interrelated as affect and cognition can be inferred from behavior (Mizokawa & Hansen-Krening, 2000). However, to affect change in an individual's affect, behavior or cognition, time is essential. The length of a 16-week semester might not be sufficient to see real change in these three domains.

A final implication to consider is the recent trends and developments that influence the state of developmental education. Currently, policy makers and other

stakeholders are looking closely at the curriculum and instructional practices of developmental educators. Fueled by budget cuts associated with the economic recession, many agencies are moving towards modular or lab-based instruction to replace the traditional instructor-led classroom. These cost-cutting measures call for developmental students to literally "teach themselves" in self-paced environments. Consequently, this movement affects an instructor's ability to implement the group-based, teacher-paced model of mastery learning, but not the individualized, self-paced model. It seems that this trend aligns very well with Keller's Personalized System of Instruction (PSI).

Limitations

This study had a few limitations that could not be avoided. First, the confounding of instructor with the instructional method was a limitation. It was impossible to separate the effects of the instructor from the method of instruction. While every effort was made to ensure that both instructors taught the same content in a similar fashion, differences in presentation style and teaching techniques are inherent when different instructors are teaching the content.

A second limitation was the use of a convenience sample. The registration procedures at the host institution made random assignment virtually impossible. Students were allowed to register for any section that suited their schedule and met their needs. However, only students who earned a score of 57-79 on the ACCUPLACER Reading Comprehension Test were eligible to register for RED 090, an upper developmental reading course, at this institution. Therefore, students that registered for the class sections that were taught by the two instructors involved in this study comprised the convenience sample used in the study.

In addition, a third limitation of the study involved the time constraints of the 16-week semester during which the study was conducted. A big component of mastery learning involves allowing students extra time to achieve mastery. This facet becomes a challenge when the time period is fixed and students require more time than the semester allows.

A fourth limitation was the use of instructor created exams instead of standardized instruments. Typically, standardized instruments have met a standard of rigor that includes the following criteria: history of use, widely accepted use, statistical analysis, norming procedures, and established reliability and validity standards. Instructor created exams do not undergo the same rigorous process before being administered. Typically, instructor created exams are developed and administered without any formal review process. The formal review processes that standardized instruments undergo make these instruments more valid and reliable.

Future Research

First and foremost, more research needs to be conducted that examine mastery learning instruction in developmental reading classes. This study will add to the limited literature base that now exists, but it did not yield strong enough results to make the case to all developmental reading educators that mastery learning is a viable instructional method to utilize in their classrooms. Additional studies need to be conducted to add the depth and breadth necessary to expand the literature base. Only additional research will inform developmental reading educators about the strengths and weaknesses that mastery learning instruction has to offer.

Future studies could replicate this study and include a qualitative analysis to gain more insight on student and instructor perceptions. Both students and instructors play huge roles in a mastery learning classroom in order for the instruction to be successful. It would be quite informative to tap into the perceptions and experiences of both students and instructors as they participate in a mastery learning environment. Interviews could be conducted with both students and instructors to determine their thoughts, feelings, and attitudes about mastery learning instruction.

An additional area to investigate might include examining if mastery learning impacts student motivation in a developmental reading class. Many developmental reading students lack motivation and their level of motivation declines as they have negative academic experiences. The opportunity to receive reteaching and retesting in order to achieve success might impact student motivation.

Also, another study for future research would be to examine if gender or race impacts student performance in a mastery learning environment; specifically, in a developmental reading class within which the majority of the students are minority students. It would be informative to learn if males or females respond more positively or negatively to mastery learning or whether a particular racial or ethnic group responds more positively or negatively to mastery learning instruction.

Additionally, another potential area of interest might be to examine the impact of the inclusion of culturally relevant reading materials in a mastery learning environment. Much of the research indicates that students enjoy reading most when they can relate to the reading material and that students tend to read more if the material is culturally relevant. It would be informative to learn how developmental reading students in a

mastery learning environment would respond to culturally relevant materials. Since this population traditionally has little interest and low motivation to read, it would be particularly interesting to explore if exposure to other types of reading materials influences the reading behavior, reading motivation, and reading attitudes of these students.

Finally, another suggestion would be to examine the implementation of an individualized mastery learning instruction program. This study and many others have focused primarily on group-based mastery learning instruction because that is typically how classrooms are organized. However, self-paced learning, programmed instruction, and modular based instruction in lab settings are becoming more common. More studies that use Keller's Personalized System of Instruction or a variation should be conducted to see if these programs might be more effective instructional methods for developmental reading students.

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APPENDIX A: CONSENT FORM

Informed Consent for
Urban Community College Student's Reading Achievement and Attitude

Project Title and Purpose:
You are being invited to participate in a research study entitled, "Different Approach, Different Results: A Study of Mastery Learning Instruction in a Developmental Reading Class At An Urban Community College". The purpose of this project is to compare student achievement and reading attitudes of urban community college students who are enrolled in developmental reading classes with either mastery learning instruction or traditional instruction. *Mastery Learning* is an instructional philosophy whose roots can be traced back to the 1920s. It is a group-based, teacher-paced model within which whole group instruction is supported by enrichment and corrective instruction to meet the needs of the students. Retesting opportunities are also a component of mastery learning instruction.

Investigator:
The primary investigator in this study is Patricia Hill-Miller, a doctoral student at The University of North Carolina at Charlotte (UNCC) and Reading Instructor at Central Piedmont Community College. The responsible faculty member at UNCC is Dr. Robert J. Rickelman.

Description of Participation:
You are being asked to participate in this study because you are enrolled in a reading course at Central Piedmont Community College (CPCC). During this semester, you will be asked to complete a myreadinglab pre-test and post-test. You will also be asked to complete an online reading attitude inventory that consists of 50 questions. Accuplacer Placement Test scores will be obtained from your educational record. In your classes, you will receive either mastery learning instruction or traditional instruction. Both the mastery learning sections and the traditional sections, will receive the same syllabus, learn the same content, and abide by the same grading scale. However, the students in the mastery learning sections will receive retest, corrective, and enrichment opportunities.

Length of Participation:
Your participation in this project will take approximately 16 weeks, the time needed to complete spring semester 2011.

Risks and Benefits of Participation:
There are no foreseeable risks or discomforts in participating in this study. Benefits to the subject include participating in a study and adding significant knowledge to the research literature concerning reading. Benefits to society include (a) improvement of literacy programs, and (b) breaking down barriers to higher education. You will not be paid for participation in this research project.

Volunteer Statement:
You are a volunteer. The decision to participate in this study is completely up to you. If you decide to be in the study, you may stop at any time. You will not be treated any differently if you decide not to participate in the study or if you stop after you have started. All data will be reported collectively, as a whole group, and not individually. If you choose not to participate in the study, no information will be reported.

Confidentiality:
All data collected by the investigators will not contain any information that will link the data back to you or your participation in this study. The following steps will be taken to ensure this anonymity: (a) students' names and community college attended will not be reported, and (b) written reports will describe statistical results of the entire class, not individual responses.

Fair Treatment and Respect:
UNC Charlotte wants to make sure that you are treated in a fair and respectful manner. Contact the university's Research Compliance Office (704-687-3309) if you have questions about how you are treated as a study participant. If you have any questions about the actual project or study, please contact Patricia Hill-Miller at 704-330-6977 or patty.hill@cpcc.edu or Dr. Robert Rickelman at 704-687-8890.

Approval Date:
This form was approved for use January, 2011 for use for one year.

Participant Consent:
I have read the information in this consent form. I have had the chance to ask questions about this study and about my participation in the study. My questions have been answered to my satisfaction. I am at least 18 years of age, and I agree to participate in this research project

Participation: YES _____

NO_____

Participant
Signature_____
Date

Investigator
Signature_____
Date

APPENDIX B: READING ATTITUDE SURVEY

Reading Attitude Survey

Directions: In this questionnaire, many of the statements will be about two types of reading. When the term "**traditional reading materials**" is used this refers to traditional printed materials such as **books, magazines and newspapers**. When the term, "**digital reading materials**" is used this refers to online materials such as **internet websites, blogs, ebooks, online newspapers or magazines and emails**. Please read the following statements and click on the most appropriate response. Your answers will not affect your grade in any way.

The scale for the reading attitude instrument will be:
SD – Strongly Disagree
D – Disagree
N – Neutral
A – Agree
SA – Strongly Agree

Affective

1. I feel uncomfortable reading in front of people.
2. I enjoy reading.
3. I get excited about traditional reading materials.
4. I get excited about digital reading materials.
5. I like to read traditional reading materials.
6. I like to read digital reading materials.
7. When I read the traditional reading materials, I feel anxious.
8. When I read digital reading materials, I feel anxious.
9. When I read the traditional reading materials, I feel relaxed.
10. When I read the digital reading materials, I feel relaxed.
11. While reading traditional reading materials, I am absorbed in what I am reading.
12. While reading digital reading materials, I am absorbed in what I am reading.
13. I enjoy discussing traditional reading materials that I have read with others.
14. I enjoy discussing digital reading materials that I have read with others.

Cognitive

15. I believe reading gives me confidence.
16. I believe reading is an important part of my life.
17. I believe reading is a good way to spend my spare time.
18. I believe reading is an effective way to learn new things.
19. I believe reading is difficult.
20. I think I read too slowly.

Behavior

21. I often look for reading materials related to something that interests me.
22. I usually check out a book when I go to the library.
23. I usually purchase ebooks.
24. I usually read while I am on vacation.

25. I intend to read for pleasure.
26. I intend to read to learn.
27. I intend to read traditional reading materials as often as possible.
28. I intend to read digital reading materials as often as possible.
29. I like to read when I have free time.
30. I like to read to escape from problems.
31. I find time to read.
32. I only read when I have to complete an assignment.
33. I read unassigned material.
34. I spend _____ hours a week reading (this can include books, emails, ebooks, blogs, websites, magazines, newspapers, manuals, etc.)
    a. 0 to 3 hours per week
    b. 4 to 7 hours per week
    c. 8 to 11 hours per week
    d. 12 to 15 hours per week
    e. 16 hours or more per week

Childhood Reading Experiences
When you were a child…

35. did a parent or guardian encourage you to read?
36. did a parent or guardian read to you?
37. did you see a parent or guardian reading traditional reading materials?
38. did you see a parent or guardian reading digital reading materials?
39. did your parent or guardian expect you to be a good reader?
40. did you have discussions with a parent or guardian about the books that you read?
41. did a parent or guardian influence your attitude positively about reading?
42. did a parent or guardian influence your attitude negatively about reading?

Demographic Information

43. What is your age?
44. What is your gender?
    a. Female
    b. Male

45. Please indicate your race.
    a. White/Caucasian
    b. Black/African-American
    c. Latino/Hispanic
    d. Asian/Asian-American
    e. American Indian/Alaska Native
    f. Multiethnic
    g. Other, please specify

46. How many credit hours are you taking this semester?
    a. 11 hours or less
    b. 12 hours or more

47. Please indicate the class section that you are enrolled.
48. Please enter your student ID # .

APPENDIX C: UNIT 4 SAMPLE MATERIALS

Unit 4 Sample Exam Questions

RED 090
Unit 4, Test A

Answer the following multiple-choice questions based on the information you learned. Please use the scantron sheet for your answers **(20 points).**

1. The literal level of the reading process
   a. is the "highest" level.
   b. presents the facts.
   c. deals with motives, feelings, and judgments.

2. In the reading process, the level of inference requires the reader to
   a. "read between the lines" to understand the meaning.
   b. merely memorize factual information.
   c. pronounce each word clearly in his or her mind.

3. All of the following imply meaning rather than directly state it ***except***
   a. advertisements.
   b. jokes.
   c. almanacs.

4. Connotations are
   a. emotionalism surrounding a word.
   b. specific meanings of words.
   c. synonyms for denotations.

5. For the most part, idioms are
   a. words that are fresh and unique.
   b. phrases that have been used for many years.
   c. used only by cults and gangs.

6. The difference between a simile and a metaphor is that a
   a. metaphor is indirectly stated.
   b. simile uses "like" or "as" in the comparison.
   c. simile is figurative language.

7. Of the following, which would ***not*** be categorized as figurative language?
   a. Metaphors
   b. Irony
   c. Connotations

RED 090
Unit 4, Test B

Answer the following multiple-choice questions based on the information you learned. Please use the scantron sheet for your answers **(20 points).**

1. The inferential level of the reading process
   a. allows you to point to the words on the page to answer questions.
   b. presents the facts.
   c. is often called reading between the lines.

2. In the reading process, the literal level
   a. requires the reader to "read between the lines" to understand.
   b. presents factual information.
   c. requires the reader to pronounce each word clearly in his or her mind.

3. All of the following imply meaning rather than directly state it ***except***
   a. cartoons.
   b. jokes.
   c. almanacs.

4. Denotations are
   a. emotionalism surrounding a word.
   b. specific meanings of words.
   c. synonyms for denotations.

5. For the most part, idioms are
   a. words that are fresh and unique.
   b. phrases that have been used for many years.
   c. used only by cults and gangs.

6. The difference between a simile and a metaphor is that a
   a. metaphor is indirectly stated.
   b. simile uses "like" or "as" in the comparison.
   c. simile is figurative language.

7. Of the following, which would ***not*** be categorized as figurative language?
   a. Metaphors
   b. Irony
   c. connotations

8. Which of the following situations is ironic?
   a. My teacher lived in Alaska for ten years before she came to CPCC.
   b. The soft drink machine near my office has been empty for five days.
   c. The copy machine at the Xerox office has been out of order for two weeks.

Unit 4 Enrichment Group Assignment-Figurative Language Project

- Search the Internet, literature texts or any publications for poetry,
  prose or song lyrics that contain figurative language. Make sure that your poem or song is appropriate for class discussion.
- Once you have selected your song or poem, write up an analysis of the piece.
  See below for a sample outline.
- Your analysis should by typed and at least 1-2 pages in length. A copy of the poem or song should be turned in with your analysis.
- Oral presentation- Be prepared to share your analysis with the class on the
  day that projects are due. Please let me know if you are planning to bring in
  a CD or cassette, so that I can make plans to have a player in the classroom that day.
- Sample outline: The analysis should include the following:
  - Title: Title, author and genre of the piece. What does the title have
  - to do with the poem? Think about how the title relates to the rest of the piece.
  - Paraphrase the poem: Put the poem into your own words. What does it mean on a literal level?
  - Identify the types of figurative language being used in the piece and provide specific examples from the piece as support.
  - Also, include in your discussion how the author makes use of the figurative language to enhance the piece.

Unit 4 Corrective Group Assignment

- Attend in class-review sessions during the week following the Unit 4 Exam.
- Attend at least one tutoring session at the Academic Learning Center during this week.
- Complete myreadinglab assignments: Critical Thinking and Inference.
- Take the Unit 4 Retest at the Central Campus Testing Center within 1 week after retest cycle.