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An Examination of Standardized Language, Mathematics, and Reading Achievement Testing Results when Compared for Middle School Aged Student Leaders and Non-Student Leaders

Susan Schaming

AN EXAMINATION OF STANDARDIZED LANGUGE, MATHEMATICS, AND READING ACHIEVEMENT TESTING RESULTS WHEN COMPARED FOR MIDDLE SCHOOL AGED STUDENT LEADERS AND NON-STUDENT LEADERS

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Susan Patricia Schaming

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Abstract

The evolution of the middle school concept, according to Forte and Schurr (2003), with its own identity and its subsequent implementation, has proven to be an ideal or preferred model for educating students. Knowles and Brown (2000) assert the importance of middle level teachers' ability to nurture their students' academic, emotional, personal, and social development during the often "chaotic" years of transescence and early adolescence.

This study examined and explored sixty-four randomly selected seventh grade middle school students' earned scores on their annual standardized achievement testing, particularly the Terra Nova II Multiple Assessments subtests in the areas of Language, Mathematics, and Reading. The investigator wanted to determine if demonstrating and applying leadership abilities, competencies, qualities, skills, and traits positively influenced the seventh grade middle school students' earned achievement? Additionally, regardless of the seventh grade middle school students' intelligence quotient (IQ), did their demonstrating leadership abilities, competencies, qualities, skills, and traits positively influence their earned scores on the annual standardized achievement testing, particularly the Terra Nova II Multiple Assessments subtests in the areas of Language, Mathematics, and Reading?

The statistical analyses included an analysis of variance (ANOVA), specifically a *T* test; in addition, an *F* test was subsequently calculated to determine any significant interactions.

The findings of this study were explored and discussed from Freed and Parsons (1997) view of the "left-right brain continuum," as two of the three main effect hypotheses were rejected. As a result, the findings yielded a significant difference in student leaders and non-student leaders' earned achievement test scores on the subtests of Language and Reading on the Terra Nova II Multiple Assessments. This investigator suggests that the "left-right brain continuum" theory is a potential, valid, and research-supported variable in this study, as it elucidates students' learning styles. Moreover, it is widely stated and commonly known that learning styles ultimately effect students' achievement and earned scores on both standardized testing and authentic assessments.

Finally, the results of this study can assist professional guidance counselors, as well as school district administrators and faculty who are considering implementation and germination of such student leadership programs in their middle school curriculum.

Table of Contents

List of Tables

CHAPTER ONE

INTRODUCTION

Educators agree, contend Forte and Schurr (2003), that student-centered education is the most effective approach to meeting the educational, social, emotional, and psychological needs of young adolescents. Their research further specifies that grouping young adolescents together in a supportive environment provides the best climate for learning and growing. Currently, after nearly twenty years, it appears the evolution of the middle school concept, with its own identity and its subsequent implementation, has proven to be an ideal or preferred model for educating students and nurturing their development during their middle school years of transescence and early adolescence.

This first chapter provides a concise summary of the research on middle school development, curriculum implementation, and students' leadership application. The six hypotheses—*three main effect and three interaction*—are discussed, as well as this investigator's aims and predictions. An overview of the theoretical framework for the study is provided, yet further detailed in Chapter Two, Review of the Literature. In addition, the chapter presents significance for the study, as it may reveal important information to teachers, guidance counselors, principals, and school district administrators who are anticipating the development of student leadership training programs in their schools. Moreover, the study may provide additional rationale for germinating and implementing such programs in the middle school. Finally, the operational definitions for this study are outlined.

The Middle School Philosophy

As middle school began to replace junior high schools, Knowles and Brown (2000), as well as other educators, noted a paradigm shift that reflected the vibrancy of young adolescents. Because these early years of adolescence are a time of transition from the dependence of the elementary school setting with the self-contained classroom to the growing independence of the departmentalization offered in high school, the middle school concept required its own curriculum. Arnold and Stevenson (1998) note that the middle school curriculum includes a full exploratory program, in contrast to the former junior high school model. For this reason, Hackmann and Valentine (1988) describe the middle level educators as ones who promote mini-classes, exploratory course options, service clubs, special interest activities, independent study projects, and community experiences not only to encourage academic achievement, but also to include personal growth and life skills. In essence, the middle school concept values potential student involvement in all areas of the schooling process, and places a high priority on self-direction, self-description, and self-assessment contend Forte and Schurr (2003). Middle school teachers and students alike are empowered to make decisions and wield choices.

Knowles and Brown (2000) describe transescence and adolescence as tough times of transition, as the focus or task for students is self-examination and discovery, crafting one's individual personality. Despite being seemingly chaotic and confusing, Knowles and Brown emphasize that adolescence reflects both transition and independence. As a result, middle level educators understand the need for positive adult-student relationships, which recognize faculty members as student advocates and

students as members of a homeroom-based advisor program (Hackman and Valentine, 1998).

Inherent for an effective middle school organizational structure, according to *This We Believe: A position paper of the National Middle School Association* (1995), are classroom teachers who have mastered strategies that promote a positive classroom climate and active student participation in activities to enhance the students' growth and development. Specifically, middle school students require opportunities that focus on affective education as a regular part of their daily schedule. In addition, the effective middle school organizational structure affords the quest for life skills, forward thinking, a devotion to excellence in classroom instruction and student motivation, broad-based learning, as well as creative thinking opportunities for the students. Moreover, Forte and Schurr (2003) endorse the belief that a middle school, which meets the emotional, psychological, academic, and social needs of its students, is aimed for optimal academic achievement and its students' overall success.

The National Middle School Association's 1995 update of *This We Believe* affirms that developmentally responsive middle school are those that have all-embracing guidance and support services, as well as programs that foster health, wellness, safety, and security for the students. This researcher believes that when such nurturing programs are included in the middle school's daily schedule, students are more likely to assert their independence through appropriate, meaningful endeavors. Furthermore, opportunities for students to excel and exhibit their competencies in both academics and extra curricular activities promote student growth and development, whilst at the same time fostering supportive student and faculty relationships.

A common middle school faculty structure is "teaming." Thompson and VanderJagt (2001) explain that teaming requires the same group of teachers to share the same group of students for an uninterrupted block of instructional time. Principally, teaming is considered a hallmark of any middle school structure; nevertheless, an alternative to ponder when creating teams of teachers in the middle school is the creation of "smaller partner teams" consisting of two to three teachers and forty to sixty students. Relative to this investigator's study is the notion that the already-known advantages of teaming are magnified with "small partner teams." For example, Arnold and Stevenson (1998) claim that occurrences of student self-government are notably more frequent in middle schools with "smaller partner teams" of faculty. In addition, students appear to take the initiative and accept responsibilities more easily in these groupings. As a result, this investigator hypothesizes that the middle school students are more likely to exhibit and apply leadership abilities, competencies, qualities, skills, and traits in the "smaller partner" teams as well.

Nonetheless, judging the success of a middle level school cannot be done solely on the basis of how well students perform on standardized achievement testing and in high school. Success in further education is unquestionably important, argues Lipka (1998); hitherto, she emphasizes that a good middle school experience including a superfluity of student activities is its own reward. Certainly, school effectiveness at any level ought to be measured in terms of how well students deal with life tasks. Predominantly at the middle school level, some of these tasks might include: negotiating transescence and adolescence with a minimum of stress, acquiring a lifelong love of learning, developing interpersonal skills, and establishing values as a guide for

living purport the National Middle School Association's (NMSA) 1995 position paper, *This We Believe*. Finally, asserting one's independence and competence in a meaningful way, whilst as Gossen (1997) states, "harnessing one's potential toward a goal," is a middle school student's chief task.

It is noted and observed by this investigator that when middle schools offer the students the opportunities to exercise their independence in appropriate and meaningful ways such as leadership roles, it helps to lessen the uncertainty, fear, and anxiety that typically accompany adolescent identity development. Conversely, when adolescents are unable to establish positive feelings about themselves, create healthy relationships with peers and faculty, and channel their energy for independence in constructive ways, Mills, Dunham, and Alpert (1988) notice that they are more likely to drop out of school and forfeit academic achievement. Hence, this investigator believes a cause and effect relationship might exist when middle school students exhibit high levels of academic achievement, and when they are observed applying those same leadership abilities, competencies, qualities, skills, and traits to their academic endeavors. In other words, when middle school students access their leadership abilities, competencies, qualities, skills, and traits, then subsequently transfer and apply those same abilities, competencies, qualities, skills, and traits to their academics and study habits, the middle school students may benefit with higher academic attainment, particularly on standardized achievement testing in the areas of Language, Mathematics, and Reading (Schmoker, 2001).

Overview of Theoretical Perspective

For the purposes of this study, the investigator reports her observations from a large middle school with over 1200 students located in New Jersey. First, she observed that the seventh grade middle school students, who were actively involved in student government, peer mediation, athletics, logica and cognetics clubs, or any other extra curricular activities where they had opportunities to apply leadership abilities, competencies, qualities, skills, and traits, typically possessed a 3.25 or higher quality point average. Furthermore, she observed that this group of seventh grade middle school students', who are hereafter referred to as "student leaders," interpersonal relationships with peers and faculty were typically perceived as positive, engaging, and productive. Next, this investigator compared the "student leader" group of seventh grade middle school students to another group of seventh grade middle school students who also possessed a 3.25 or higher quality point average, yet were neither observed applying nor exhibiting leadership abilities, competencies, qualities, skills, and traits in their interpersonal relationships with their peers and faculty. The second group of seventh grade middle school students are hereafter referred to as "non-student leaders." The non-student leaders' relationships with peers and faculty were not observed to be as engaging, positive, and productive as compared to the student leaders' interactions based upon Raphael (1996) and Covey 's (2000) descriptors of highly effective teens and student leaders. Raphael and Covey's depictions of student leaders are included in the listing of operational definitions in Chapter One.

In addition to Knowles and Brown's (2000) research, Glasser (2000) endorses and emphasizes this investigator's notion that a positive cause and effect relationship

exists between middle school students' high academic achievement and their simultaneous application or exhibition of leadership abilities, competencies, qualities, skills, and traits in their interpersonal relationships with peers and faculty. Additionally, Glasser reports that the middle school students who exhibit leadership abilities, competencies, qualities, skills, and traits not only earn high scores on standardized achievement and proficiency tests, but also on college entrance exams. For example, in a typical Glasser Quality School (GQS), the students' earned standardized achievement test scores are reported to be significantly high—*above the 80th percentile is a commonly earned score in Glasser Quality Schools*.

This investigator was interested in examining if what gave the impression to be a cause and effect relationship between the seventh grade middle school students' academic achievement and their earned scores on the Terra Nova II Multiple Assessments in Language, Mathematics, and Reading was in fact a result of their application of leadership abilities, competencies, qualities, skills, traits, and tendencies. Specifically, she examined and explored if demonstrating and applying leadership abilities, competencies, qualities, skills, and traits positively influenced the seventh grade middle school students' earned scores on the subtests of Language, Mathematics, and Reading on the Terra Nova II Multiple Assessments. Additionally, regardless of the seventh grade middle school students' intelligence quotient (IQ), did demonstrating leadership abilities, competencies, qualities, skills, and traits positively influence the seventh grade middle school students' earned scores on the annual standardized achievement testing in the areas of Language, Mathematics, and Reading?

Statement of the Problem

This study examined the Terra Nova II Multiple Assessments (TN2—MA) annual standardized achievement test scores earned by a randomly selected group of seventh grade students from a middle school in New Jersey. Specifically, the seventh grade middle school students' earned scores from the subtests of Language, Mathematics, and Reading were examined to determine if there was a significant difference in the seventh grade middle school students' earned scores in Language, Mathematics, and Reading between the high-achieving seventh grade middle school students who applied leadership abilities, competencies, qualities, skills, and traits, in their interactions with peers and faculty, compared to the high achieving seventh grade middle school students who appeared to neither apply nor exhibit leadership abilities, competencies, qualities, skills, and traits in their interactions with peers and faculty.

Research Questions

Specifically, this investigator examined and explored if demonstrating and applying leadership abilities, competencies, qualities, skills, and traits positively influenced the seventh grade middle school students' earned scores on their annual standardized achievement testing, particularly the Terra Nova II Multiple Assessments subtests in the areas of Language, Mathematics, and Reading? Additionally, regardless of the seventh grade middle school students' intelligence quotient (IQ), did demonstrating leadership abilities, competencies, qualities, skills, and traits positively influence the seventh grade middle school students' earned scores on the annual standardized achievement testing, particularly the Terra Nova II Multiple Assessments subtests in the areas of Language, Mathematics, and Reading?

Rationale

The current body of literature, Glasser (2000) most prominently, endorses that a relationship indeed exists between middle school students' academic achievement and middle schools providing opportunities for students to reveal their leadership abilities, competencies, qualities, skills, and traits. Burleson and Kunkel (1996) purport that an adolescent's development of leadership abilities, competencies, and skills is nurtured by their successful academic achievement. Distinctively, this study investigated if there was a significant difference between the high achieving seventh grade middle school students' earned scores in Language, Mathematics, and Reading on the Terra Nova II Multiple Assessments annual standardized testing, who appeared to apply and exhibit leadership abilities, competencies, qualities, skills and traits in their relationships with peers and faculty, according to Raphael's (1996) and Covey 's (2000) descriptors of highly effective teens and student leaders, versus the high achieving middle school students' earned scores in Language, Mathematics, and Reading on the Terra Nova II Multiple Assessments annual standardized testing, who appeared to neither apply nor exhibit leadership abilities, competencies, qualities, skills and traits in their relationships with peers and faculty according to Raphael's (1996) and Covey 's (2000) descriptors of highly effective teens and student leaders?

Significance for the Study

This study may reveal important information to teachers, guidance counselors, principals, and school district administrators who are anticipating the development of middle school student leadership training programs in their schools. In view of the fact that this study determined participation in leadership programs and activities, or that

middle school students' application of leadership abilities, competencies, qualities, and skills did not influence middle school students' earned scores on Language, Mathematics, and Reading standardized testing, this study's results notwithstanding, may offer rationale for considering, germinating, or implementing such programs in middle school curricular planning.

Hypotheses

Specifically for the purposes of this study, the investigator examined the seventh grade middle school students' earned performance scores on the Terra Nova II Multiple Assessments standardized test in the areas of Language, Mathematics, and Reading. Additionally, the Terra Nova II *InView* Cognitive Skills Index (TN2—*IV* CSI) score determined the seventh grade middle school students' intelligent quotient score.

The hypotheses for this study were as follows:

1. There is *no significant difference* between high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle school non-student leaders in their earned *Language* achievement test scores on the Terra Nova II Multiple Assessments.
2. There is *no significant difference* between high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle school non-student leaders in their earned *Mathematics achievement* test scores on the Terra Nova II Multiple Assessments.
3. There is *no significant difference* between high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle

school non-student leaders in their earned *Reading* achievement test scores on the Terra Nova II Multiple Assessments.

4. There is *no significant interaction* of I.Q. with high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle school non-student leaders on their earned *Language* achievement test scores on the Terra Nova II Multiple Assessments.
5. There is *no significant interaction* of I.Q. with high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle school non-student leaders on their earned *Mathematics* achievement scores on the Terra Nova II Multiple Assessments.
6. There is *no significant interaction* of I.Q. with high-achieving seventh grade middle school student leaders and high-achieving seventh grade middle school non-student leaders on their earned *Reading* achievement scores on the Terra Nova II Multiple Assessments.

Definitions

For the purposes of this study the following definitions were operational:

Achievement—a seventh grade middle school student's earned score in the content areas of Language, Mathematics, and Reading as measured by the Terra Nova II.

Intelligence Quotient (IQ)—measured as an extrapolated score from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI). For the purpose of this study, and given the nature of IQ ranges for high achieving students, a low IQ range was below 109, an average range was 110-124 and the high range was 125 and above.

High-Achieving Non-Student Leader—defined as a seventh grade middle school aged student (twelve to fourteen years of age) earning a 3.25 quality point average or higher on their final report card, who is *not* observed exhibiting and/or applying leadership abilities, competencies, qualities, skills, and traits.

High-Achieving Student Leader—defined as a seventh grade middle school aged student (twelve to fourteen years of age) earning a 3.25 quality point average or higher on their final report card, who is observed exhibiting and/or applying leadership abilities, competencies, qualities, skills, and traits.

Language—defined on the basis of the earned score on the subtests of the Terra Nova II Multiple Assessments that measure sentence structure, writing strategies, and editing skills.

Mathematics—defined on the basis of the earned score on the subtests of the Terra Nova II Multiple Assessments that measure number and numeral relations, computation and estimation, measurement, geometry and spatial sense, data, statistics and probability, patterns, functions and algebra, and problem solving and reasoning.

Non-Student Leader—a seventh grade middle school aged student (twelve to fourteen years of age) who does not exhibit or apply the abilities, competencies, qualities, skills, and traits identified as a leader. For the purposes of this study, according to Raphael's (1996) and Covey 's (2000) descriptors of highly effective teens and student leaders, middle school students who exhibit leadership are observed as having a range of interests, as being focused, deliberate, empowered, and intrinsically motivated. They are quite adept with organizational abilities when accomplishing both academic and non-academic tasks. They are facile problem solvers. These students not only appear to

possess confidence, they access their self-confidence and competence when facing a challenging task; they persevere and manage frustration appropriately.

Reading—defined on the basis of the earned score on the subtests of the Terra Nova II Multiple Assessments that measure basic understanding, analyzing text, evaluating and extending meanings, and identifying Reading strategies.

Student Leader—a seventh grade middle school aged student (twelve to fourteen years of age) who exhibits or applies the abilities, competencies, qualities, skills, and traits identified as a leader. For the purposes of this study, according to Raphael's (1996) and Covey 's (2000) descriptors of highly effective teens and student leaders, middle school students who exhibit leadership are observed as having a range of interests, as being focused, deliberate, empowered, and intrinsically motivated. They are quite adept with organizational abilities when accomplishing both academic and non-academic tasks. They are facile problem solvers. These students not only appear to possess confidence, they access their self-confidence and competence when facing a challenging task; they persevere and manage frustration appropriately.

Terra Nova II *In View* (TN2—*IV*) —defined by the five subtests that measure cognitive ability. All five subtests are combined to create a total score. Specifically, s*equences, analogies, and quantitative reasoning* are combined to yield a total nonverbal intelligence quotient score; *verbal reasoning-words and verbal reasoning-context* are combined to create a total verbal intelligence quotient score.

Terra Nova II Multiple Assessments (TN2—MA)—defined as a "comprehensive modular assessment series" that measures academic achievement in Language,

Mathematics, Reading, Science, and Social Studies. For this particular study, the seventh grade middle school students' earned achievement scores from the Language, Mathematics, and Reading subscales were used.

Summary of Chapter One

In this chapter the investigator presented the statement of the problem. The intention to examine and determine if the seventh grade middle school students' earned scores on the Terra Nova II Multiple Assessments (*particularly the Language, Mathematics, and Reading subscales*) were affected when these high-achieving seventh grade middle school students are observed exhibiting and/or applying leadership abilities, competencies, qualities, skills, and traits. Furthermore, this investigator proposed to determine if this same group of high-achieving seventh grade middle school students' earned scores on the Terra Nova II —*InView*, particularly on the sequences, verbal reasoning words and context, quantitative reasoning, and analogies subscales are effected when these high-achieving seventh grade middle school students were observed exhibiting and/or applying leadership abilities, competencies, qualities, skills, and traits.

Because the current body of literature, Glasser (2000) most prominently, endorses that a relationship indeed exists between middle school students' academic achievement and middle school providing opportunities for students to reveal their leadership abilities, competencies, qualities, skills, and traits, it is believed that useful information regarding a potential connection between middle school student achievement and leadership application will be revealed. Teachers, guidance counselors, principals, and school district administrators who are anticipating the development of student leadership training programs in their schools should be able to refer to this study's results to provide additional rationale for germinating and

implementing such programs. In addition, they may consider imbedding leadership training in the middle and high school curriculum.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

In chapter two, this investigator presents a review of the relevant literature that provides additional rationale for conducting this study. The following topics are explored: standardized testing and academic achievement, development of middle school student leaders, middle school climate and culture, middle school student-teacher interactions, as well as the benefits and creation of student leadership programs.

Specifically, when measuring students' academic achievement in the quest for "assessment sanity" as Popham (2003) describes it, what kind of data should be spurned versus what should be respected is discussed. In addition, a closer look at how educators use data to improve and differentiate instruction is included. Next, the notion of nurturing middle school student leaders is examined. Additionally, does offering middle school students leadership opportunities promote higher academic achievement? Finally, what do effective, comprehensive, and successful middle school student leadership programs offer? When observing middle school students' interactions, what are the distinctive strategies and activities that foster middle school student leaders?

Standardized Testing, Data Assessment, and Academic Achievement

Society relies on testing to ensure safety, to spend money wisely, and to take care of our health. Likewise, educational assessments, according to Gandal and McGiffert (2003), which are rigorous and meaningful, help assure the academic health of all students. Just as in medicine complaints are waged due to cost or inconvenience,

it is similar in education in so far as standardized testing expenditures and inherent costs are frequently challenged.

Securing coherent and complete information, whether in medicine or education, helps to make an accurate diagnosis; typically, the diagnosis is then followed by planning accordingly for treatment and improvement. In terms of education, teachers and students alike may benefit from President Bush's (2000) education improvement initiative, the "No Child Left Behind Act" (NCLB). This comprehensive improvement initiative will require an academic achievement "check-up" for all students enrolled in grades 3-8, and once again before all students are graduated from high school. Skeptically, Gandal and McGiffert (2003) emphasize that quantity without quality in the assessments to be designed will add little value to President Bush's NCLB aims. Hopefully, the new tests that must comply with the NCLB federal law will add significant merit to nationwide school improvement efforts, students' academic achievement scores, and teacher preparation and education. In summary, "useful educational assessments must make clear what they measure, and they must measure what we value most," state Gandal and McGiffert.

Once schools secure the data that identifies and confirms the needs, weaknesses, and areas for improvement, Bernhardt (2000) contends that school administrators will secure a better picture of how to improve learning for all students. Specifically, school administrators will gather, intersect, and organize the four different categories of data—*demographic, student learning, perceptions, and school processes*—more effectively.

Popham (2003) notes that instructionally beneficial data can only come

from instructionally useful tests. He defines five attributes of an instructionally useful test that are applicable to large-scale and teacher-made assessments: *significance, teachability, describability, reportability, and nonintrusiveness*. The data that is derived from an instructionally useful test will enable teachers to instruct students in the best possible way—*which is the reason why students are tested in the first place*. Moreover, tests that do not produce instructionally useful data incline educators to demand more data that is instructionally beneficial.

Unfortunately, according to Popham (2003), today's nationally standardized tests miss the mark dramatically with respect to three of the attributes of instructionally useful assessments. First, Popham questions the describability, because nationally standardized achievement tests have been constructed according to a traditional measurement approach aimed at providing a comparative picture of students' relative performances.

Next, the teachability of many standardized achievement tests is scrutinized because nationally standardized tests contain many instructionally insensitive items that are linked to students' socioeconomic stature or inherited academic aptitudes, purports Popham (2003). Last, the reportability on nationally standardized achievement tests almost always is at levels of generality unsuitable for teachers' day-to-day instructional decision making. Popham believes that the data provided does not make it easy for teachers to improve and elevate their own instructional effectiveness.

In summary, Popham (2003) states, "Nationally standardized achievement tests have a role in education, yet it is much more modest than the publishers of these tests would have us believe." Furthermore, he urges educators to

disregard data from standardized achievement tests that are not instructionally useful, whilst pursuing the installation of instructionally beneficial tests, so that the data from those assessments will yield better-taught students (Commission on Instructionally Supportive Assessment, 2001).

Schools today are working on two distinct kinds of improvement initiatives. First, examining what is happening in the classrooms to emphasize effective instructional practices. Second, is what McTighe and Thomas (2003) call the improvement process "systemic," that is, creating results-oriented schools that use the analysis of achievement tests and data to develop improvement plans for instructional and curricular design purposes.

Both at individual schools and district-wide, improvement approaches and initiatives can be integrated; Wiggins and McTighe (1999) refer to it as "backward design for forward action." In other words, educators and administrators must first think carefully about the desired results, then work backwards to design meaningful assessments and lesson plans. A major benefit of "backward design" notes Wiggins and McTighe, is that it will enhance school improvement planning, and ensure that curricular decisions are driven by data.

Schools that use data to make decisions are following some of the best advice from the business world and the education field, contend Teddlie and Reynolds (2000). They believe that focusing on student achievement makes good sense. Because schools are in the business of helping students learn, the data used to guide educational decisions should relate directly to the students' achievement and faculty's' improved lesson planning.

Schmoker (2001), whilst discussing the Oak Park School District in Detroit, MI, makes it clear that effective schools use data well. He states, "If there is anything we can learn from districts such as Oak Park, it is that successful organizations do not just collect data, they revere it. They are not satisfied with the data until the data has life and meaning for every teacher, every pertinent party" (p.55). He emphatically asserts that successful school districts use data to create and to ensure an objective, commonly held reality. Furthermore, the proper and effective use of data allows for organized, simplified discussions that merge to create focused priorities and productive action.

Although this dynamic appears to be simple, Marzano (2003) reports that middle schools and districts frequently error in at least two ways in their efforts to be data-driven when addressing achievement, curriculum, instruction, and student performance. The first mistake, according to Marzano (2000), is using measures that are not sensitive and commensurate to the actual learning occurring in classrooms. Particularly, this refers to "indirect" learning data provided by off-the-shelf standardized tests. The second mistake, Marzano claims is less obvious, yet the stakes are greater. It occurs when a district or school does not have a specific plan or system for interpreting the data to improve instruction and student performance.

Changing a current practice in schools does take an effort. It is incremental in nature (Fullan, 1982). To ensure a high probability for success, school administrators must recognize that effective change requires time, resources, and energy. All too often though, more time, resources, and energy than the staff and faculty are willing to spend are necessary, which creates a formula for failure.

Parsons (2003) also acknowledges that implementation of a plan for data usage occurs over time. If schools recognize this, they can safeguard against discarding new instructional practices prematurely. For example, Parsons endorses a rubric for implementation with three levels: getting acquainted, partial implementation, and full implementation. Throughout the three-step process the focus remains on the efficacy of the specific instructional methods, rather than on the individual teachers' performance. This paradigm shift is helpful, as teachers may feel less scrutinized and are more apt to participate cooperatively and collaboratively in the process.

In addition to the teachers' acceptance and implementation of new methods to improve student learning, a school should provide parents with opportunities to learn how they can reinforce the teachers' instructional methods. Using student demonstrations, parents see what high levels of learning look like. Parsons (2002) believes that with data-driven information in the foreground, a district will exhibit slow, but steady changes in student achievement. In turn, this assists the community in ensuring that no children are left behind.

In contrast to Parsons (2003) and Popham (2003), the quizzes, tests, writing assessments, and other assessments that teachers administer on a regular basis in their classrooms are what Guskey (2000a), (2000b), (1998), and (1997) contends are best suited to guide improvements in student learning. Guskey believes that teachers trust the results from these non-standardized assessments because of their direct relation to the classroom instructional goals. Plus, the results are immediate and easy to analyze at the individual student level. Nonetheless, to use classroom assessments to make improvements, there must be a paradigm shift in teachers' views of assessments and

their interpretation of the results. Essentially, teachers must see their assessments as an integral part of the instructional process.

In spite of the importance of assessments in education today, few teachers receive specialized or formal training in assessment design or analysis (Stiggins, 1999). In order to use assessments to improve instruction and student learning, teachers need to change their approach to assessments in three important ways claims Guskey (2003). First, classroom assessments that surprise students do not serve as meaningful sources of information. Instead, Bloom, Madaus, and Hastings (1981) suggest assessments that reflect the concepts and skills emphasized in class and are ideally aligned with state or district standards facilitate learning and achievement.

Next, the best classroom assessments serve as meaningful sources of information for teachers, insists Guskey (2003), by helping instructors identify what they taught well and what needs additional work. For example, by paying special attention to the trouble spots—*those items or criteria missed by large numbers of students in the class*—teachers have the data to modify their instructional approach and refine lesson planning. Resultant, is hopefully higher student achievement levels on future assessments.

Finally, to accept Guskey's (2003) notion that assessments provide information for both students and teachers, assessments then cannot denote the end of learning. Rather, assessments must be followed by high-quality, corrective instruction that is designed to remedy whatever learning errors or gaps the assessment identified. Therefore, following assessments with instructional alternatives that present concepts in

new ways to engage students in different and more appropriate learning experiences is required (Guskey, 1997).

In order to adjust and perfect classroom assessments, DuFour (1998) encourages district administrators to provide faculty and staff with professional development programs related to assessment practices. Research-based recommendations drawn from the best practices for continuously improving middle school students' performance is required to transform a middle school into a results-oriented learning community with student leaders and high academic achievement (Bumpers-Huffman, 1998, Kiefer-Hipp, 1998, and Reeves, 1998).

Middle schools that favor improvement, results, and noticeable changes in student achievement, according to Schmoker (1996), have three common characteristics. First, the concept of middle school faculty teaming is effectively used; few, if any teachers are isolated. Next, the leaders communicate a clear, preferred vision with measurable goals to all the stakeholders. Last, a selective and judicious process for using data when academic and curricular changes are under consideration is employed to ensure that no children are left behind.

Fostering Middle School Student Leaders in the Classroom

The perception and ideal of leaving no children behind extends well beyond middle schools and school districts using data to improve students' academic achievement. Author and educator Herb Kohl (1998) emphasizes the importance of providing a rich, challenging, and well-crafted education for all children. On the contrary, unless elementary, middle, and high schools begin to inspire hope, efforts to teach students to read, write, and calculate will not make a profound difference.

Succinctly, Kohl believes that an educator's task is to engage the students' imagination, as well as to convince them they are people of worth; thus, student empowerment, and potentially student leadership, begins to be nurtured and fostered in the middle school.

Beyond the teacher's affirmation and support, Kohl (1998) believes that a curious community where invention, creativity, and imagination are encouraged is what distinguishes a positive middle school culture that nurtures student leaders from other middle schools. Working toward this optimistic and nurturing school climate means that dedicated teachers, administrators, and staff are making conscious efforts to enhance and enrich the middle school culture.

Purkey and Novak (1996) present a framework to distill the elements that contribute to a positive and an invitational school climate: *places, policies, programs, processes, and people.*

First, policies and rules are without a doubt necessary; however, sometimes they exist because of tradition and ritual rather than because they promote or encourage an effective school. When administrators and middle school teachers establish policies that encourage and permit versus restrict or direct, they help to promote an invitational middle school. Ideally, as Covey (1989) describes, a win/win result is desired. This is difficult to achieve, but it is a worthy and desirable goal.

Next, in addition to the rigorous academic courses, which typically lead to positive results in district and state assessments, the invitational school curriculum includes telecommunication courses, cooperative programs with community organizations and businesses, and varied special electives. When a plethora of programs and activities are available, it provides options and alternatives for middle

school students to explore their interests. Furthermore, participation in extra curricular activities, as well as assuming leadership roles, encourages and helps students to develop life skills. Noticeably, the choices for participation in extra-curricular activities are increasing in today's middle schools, as are the leadership opportunities. Hansen and Childs (1998) remind us that the challenge is to continually labor to achieve the goal of making middle schools places where students want to be. Joy, a sense of thrill and satisfaction, should accompany work, affirms Childs (1998).

In contrast to the Interstate School Leaders Licensure Consortium (ISLLC) (2000) guidelines and recommendations, many middle schools' decision-making protocol is unilateral or arbitrary. The ISLLC has strongly promoted the idea of shared decision-making by all members of the school community, which is characterized by participation, cooperation, and collaboration. Even students are encouraged to take responsibility, to be involved, and speak with their voices, which promotes the canons of middle school student leadership and personal growth.

Similarly, Glasser (1997) encourages his "choice theory"—processes that teach people that they control their own behavior. He relates his "choice theory" to an individual's need to belong, have power, have fun, and have freedom. When middle level educators understand this theory, Glasser contends they are better suited to meet the challenges of teaching in a middle school.

Finally, Goodlad (1994) believes that the most important element in a school with a positive climate is the people. They are the one resource guaranteed to make a difference. Investing in people—*students, faculty, and staff*—results in effective changes for a middle school improvement plan that yields positive results.

The idea of educational responsibility in the middle school, as described by Schneider (1996) is both a concept and a strategy designed to strengthen student empowerment, responsibility, and leadership. Hence, the strategies that influence and comprise educational responsibility are grounded in, but not limited to, the works of Glasser (1990); the Johnson brothers (1991); Curwin and Mendler (1998); and Charney (1991). Simply stated by Schneider, "From the ashes of our old Skinnerian model of instruction, a new kind of classroom community has arisen" (p.22).

The new kind of classroom community that Schneider (1996) describes includes Goldman's (1998) belief for school reform. Goldman contends that initiating a process for involving students in transforming schools will empower them as they participate in real decision-making that affects their education. He believes his inclination for student participation garners further study and consideration with all school reform initiatives.

Nurturing students who likely will become lifelong learners, self-directed seekers, and leaders requires educators to offer the students opportunities to practice making choices and reflecting on outcomes purports Gossen (1992). In addition, the individual educators who instill positive feelings—*competence, belongingness, potency, and usefulness*—from their choicefully planned lessons and activities foster leadership and responsibility in middle school students. Sagor (1992) contends that neither pep talks nor positive self-image school-wide assemblies cultivate student leaders; rather, structured activities are what empower middle school students.

Sagor (1996) further asserts that infusing classrooms and curriculums with resiliency building and leadership experiences can have a profound impact on

developing middle school students' self-image. Auspiciously, classroom techniques that nurture leadership qualities and foster resilience in middle school students are most likely already part of quality middle school teachers' repertoires.

Giving students a sense of ownership in their classroom, believes Zachlod (1996), is precisely what leads to the open and cooperative learning environment that promotes empowerment and student leadership. Additionally, children become confident, active participants in their own learning. Very much like the constructivist paradigm, which has become increasingly popular in university teacher preparation, educational leadership, and counselor education programs note Serfass (personal communication, May 2003) and MacGibeny (personal communication, November 2003). The middle school classroom becomes a place where students test their ideas, develop moral autonomy, find answers to questions, and learn about what interests them. Summarily, when students participate in the decision-making processes with regard to how a classroom operates, they learn about personal responsibility and leadership.

A critical aspect of education and developing student leaders is focused on what happens in the classroom between teachers and students. Evans (1995) claims that the encouragement model, which is quite contrary to traditional classroom management, is designed to help middle schools create a democratic climate for both students and teachers. This model reflects the belief that educators must use well-developed human relations skills to manage democratic, cooperative classrooms where all students contribute.

Toward this end of encouraging middle school students and nurturing middle school student leaders, Carlson (1992) stresses six practices: making relationships a priority; carrying on respectful dialogue; practicing encouragement and affirmation daily; having fun on a regular basis; and resolving conflict. Carlson is not alone in viewing encouragement as vital to learning. Psychologist Alfred Adler (1964) believed that an educator's most important task was to see that no child is discouraged, defeated, or beleaguered at school.

Furthermore, in Glasser Quality Schools, Glasser (1990) affirms that the teachers using his encouragement model report that their middle school-aged students' increased sense of belonging and feelings of empowerment have greatly improved the students' academic performance. Improvement is noted on standardized achievement testing as well as teacher-made assessments, writing pieces, student portfolio submissions, projects, and authentic assessments in Glasser Quality Schools.

Nurturing Student Leadership: Creating the School Climate

Although it may be hard to define and difficult to put a finger on, a school culture is extremely powerful. As people work together, solve problems, and confront challenges, this highly enduring web of influence binds the school together, according to Peterson and Deal (1998), and make it special place for middle school students to learn.

Clement (1992) emphasizes the personal qualities that contribute toward a positive school climate and the critical role of relationships among students, faculty, and staff in schools. She contends that integrity, commitment, and tenacity forge and define meaningful relationships in schools. Working toward an improved school climate

means that dedicated individuals are striving to enrich the culture in schools. This ephemeral aspect of schools—their culture—is one of the most significant features of any educational enterprise.

Darling-Hammond (1997) describes the desirable school culture—*a climate of support and encouragement, of warmth and acceptance*—as a place where students and teachers like to be and enjoy attending each day. Building student-teacher relationships, offering a sense of security and belongingness, similar to that in Glasser Quality Schools, is precisely how Lightfoot (1983) describes as an ideal, invitational, and positive middle school.

As noted in *The Mood of American Youth*, students who think positively about their schools believe that "their schools provide courses relevant to their future and offer opportunity for open discussion" (Horatio Alger Association of Distinguished Americans, 1997, p.14). Conversely, middle school students who think negatively about their schools "report a lack of interesting and relevant classes and little personalized instruction" (p.22). In addition, it seems that when faculty do not apportion time to build relationships with their students, the middle school students' are hesitant and resistant to become involved in extra curricular activities.

Sharing conversation with students shows respect for them and interest in their opinions and thoughts. Bush (1998) believes middle school students are "adults" in some ways; therefore, she stresses the importance of helping middle school students to develop the skills necessary to become involved members of the school community and society. Furthermore, Gardner (1991), Goodman (1996), and Sizer (1984) all concur that middle school students need authenticity, and that their schoolwork and related

activities need some relevance to their lives outside of school in order to have any meaningful impact.

When teachers, administrators, and support staff model lifelong learning, Bush (1998) finds that middle school students begin to understand the purpose of education. She emphasizes that an all-encompassing goal of middle school education is to help the students develop into adults, who are inquisitive and responsible for their learning. She aspires to nurture students who are willing to work with others to learn more and advance themselves in life. Overall, Bush stresses that creating an inviting middle school community brings hope to a school environment where students can develop their academic talents and their ability to solve social conflicts amicably. Furthermore, Lederhouse (1998) believes it is a middle school educator's responsibility to reflect hope in their daily instructional interactions with students.

The Benefits and Creation of Student Leadership Programs

Considerable evidence—Glasser (1990), Goldman (1998), Gossen (1992), Lightfoot (1983), Sagor (1996), VonDrehle (1981), and Zachlod (1996)—indicate that student leaders play a critical role in today's middle schools. Effective, comprehensive student leadership programs appear to have common characteristics that effect change in schools and communities, as well as enriching student lives. In addition to having a positive effect on students' success in school and later life, involvement in student activity programs influences how students think about themselves, claims Leatt (1988).

Leadership training should be focused around three central themes, suggests Young (1977): the skills of leadership and followership, organizational structure and styles, as well as group process skills. Included in the skills of leadership are roles and

responsibility; basic communication; evaluation; planning meetings; and leading discussions. Next, a tricky part of helping students understand organizational structure and leadership in the middle school is the relationship of middle school student leaders to the administration and faculty. Last, interpersonal skills, problem solving, and communication are included in the group process skills.

Joekel (1985) has reported several important research findings involving student activities. When he and other researchers compared students' major achievements in activities and their earned high grades in school, they found that the "only factor that could be used to predict success in later life was achievement and participation in extracurricular activities." Moreover, a study of the Scholastic Aptitude Test (SAT) found that "the best predictors of creativity in mature life were a person's performance during youth in independent, self-sustained ventures."

Leadership training, a common course that is offered in many middle schools has direct benefits, claims Stiles (1986). She reports that through leadership programs, students developed greater self-confidence and leadership abilities; they also assumed greater responsibilities in subsequent years, comparable to Joekel's (1985) research findings.

Student councils and leadership programs should provide a meaningful learning experience for the students according to Keith (1992). A 1983 publication of the New York State Education Department comments that student activities programs are to expand on what is taught in the classroom and to augment formal instruction.

Both in print and practice, according to Goldman (1998), Gossen (1992), Joekel (1985), Keith (1992), Sagor (1996), Stiles (1986), VonDrehle (1981), and Zachlod

(1996), the evidence verifies the critical role student leadership opportunities play in today's middle schools. Dynamic and effective student leadership programs feature strong support from the school's administration, a vision that leads to action and meaningful results, and participative decision-making strategies, claims Leatt (1988).

Summary of Chapter Two

Student assessment and achievement along with teacher accountability, according to Whetton, Twist, and Sainsbury (2000), have become the watchwords of education in the United States today. Clement (1992), Glasser (2000), Joekel (1985), Kohl (1998), as well as Peterson and Deal (1998), endorse that a relationship indeed exists between middle school students' academic achievement and those middle schools that provide encouragement, nurturance, and opportunities for students to reveal their leadership abilities, and participation in extra curricular programs. In addition, Burleson and Kunkel (1996) also purport and concur with Glasser that an adolescent's development of leadership competencies is nurtured by their academic achievement.

By creating positive, inviting learning communities and using school-wide programs, teaching strategies, and methods of classroom management as vehicles for student-teacher relationships, self-directed seekers and middle school student leaders are bound to emerge. The poignant challenge raised by Franklin Roosevelt (1940) more than fifty years ago states, "We cannot always build the future for our youth, but we can build our youth for the future," remains apropos today.

Raphael (1996) notes that providing students the opportunities to collaborate and problem solve are precursors to becoming student leaders. Through interactions with their peers and teachers, middle school students create a basis for academic achievement, collaboration, compassion, integrity and leadership.

CHAPTER THREE

METHODOLOGY

Chapter three provides a description of the research methodology and design. The random selection process and designation of student leader or non-student leader is described. Next, the instruments are discussed along with the instruments' psychometric information—*norming, reliability, and validity*. Last, an explanation of the statistical methods employed is furnished.

Students

This researcher randomly selected the students' achievement test scores from the seventh grade at a middle school in New Jersey, where she is a guidance counselor. The investigator had access to the seventh grade individual and group lists of the Terra Nova II Multiple Assessments test scores, as well as the Terra Nova II *InView* Cognitive Skills Index individual and group list test scores as part of her professional guidance office records. For the purposes of this study, the investigator secured written permission to use these seventh grade middle school students' standardized achievement test scores and cognitive skills index scores for the sole purpose of conducting her dissertation research. (See Appendix A) Furthermore, to ensure and preserve strict confidentiality, all of the seventh grade middle school students' earned scores were assigned a random number.

Random Selection Processes

To select the seventh grade middle school students' scores for the purposes of this study, the high-achieving seventh grade middle school students' identified as applying and exhibiting leadership abilities, competencies, qualities, skills, and traits,

test scores were randomly assigned a number by the investigator. Next, a smaller group consisting of thirty-two seventh grade middle school students' test scores was randomly selected from the assigned numbers via a computer-generated table of random numbers. Accordingly, this investigator randomly assigned the high-achieving seventh grade middle school students' identified as neither applying nor exhibiting leadership abilities, competencies, qualities, skills, and traits, test scores a random number. Finally, the second group of thirty-two seventh grade middle school students' test scores was randomly selected from the assigned numbers via a computer-generated table of random numbers. Parenthetically, for the purposes of this study, gender was not being taken into account; consequently, the aggregate data was examined without considering the seventh grade middle school students' gender.

Student Leader Descriptors

For the purposes of this study, the basis for identifying a student as a "student leader" or a "student identified as applying and exhibiting leadership abilities, competencies, qualities, skills, and traits," was derived from a compilation of Covey's (2000), Blanchard, Carlos, and Randolph's (1996), Leatt's (1988), as well as Schurr and Forte's (2002) writings. Characteristically, the students who exhibit leadership are observed as maintaining a range of interests, as being focused, deliberate, empowered, and intrinsically motivated. They are quite adept with organizational abilities when accomplishing both academic and non-academic tasks. They are facile problem solvers. These students not only appear to possess confidence; rather, they access their self-confidence and competence when tackling a challenging task; relatedly, they persevere and manage frustration appropriately. Furthermore, these students typically participate

in school activities such as the Student Council, Renaissance Service Club, Team and Intramural Sports, Cognetics Brain Teasers and Problem Solving Group, Students Against Destructive Decisions Club, Peer Mediation Program, and/or the Future Teachers of America Club.

Instrumentation

The following information describing the Terra Nova II Multiple Assessments (TN2—MA) and the Terra Nova II *InView* (TN2—*IV*) has been obtained from the Buros Institute's *Fourteenth Mental Measurement Yearbook* (2001).

The Terra Nova II Multiple Assessments is a comprehensive, modular assessment series offering multiple measures of both English— and Spanish— Language student achievement. Like other achievement batteries, the TN2—MA is designed to assess individual student learning and academic achievement using a combination of selected response items with constructed response items that allow students to produce short and extended responses. Both item formats are presented in contexts related to situations in and out of the classroom environment.

The three subject areas of the Multiple Assessments examined in this study were: Language—*subtest of the TN2—MA that measures sentence structure, writing strategies, and editing skills;* Mathematics—*subtest of the TN2—MA that measures number and numeral relations, computation and estimation, measurement, geometry and spatial sense, data, statistics and probability, patterns, functions and algebra, and problem solving and reasoning;* and Reading—*subtest of the TN2—MA that measures basic understanding, analyzing text, evaluating and extending meanings, and identifying Reading strategies.*

The Terra Nova II—*InView* (TN2—*IV*) consists of five subtests that measure cognitive ability. The five subtests are: Sequences, Analogies, Quantitative Reasoning, Verbal Reasoning—*Words*, and Verbal Reasoning—*Context*. All five subtests are combined to create a total performance score.

Sequence items involve recognition of spatial relationships, ordered patterns, progressions, and combinations of parts to form a whole. The analogies subtest measures students' abilities to identify diverse relationships between pairs and infer parallel relationships. Quantitative reasoning measures the facility for thinking with numbers. The students are required to identify arithmetic patterns, rather than demonstrate learned computation skills. Solving verbal problems by reasoning deductively is what the verbal reasoning—*words* subtest measures. Lastly, verbal reasoning—*context* measures students' abilities to solve verbal problems by drawing logical conclusions.

Norming

Norming of the Terra Nova II Multiple Assessments (TN2—MA) and the Terra Nova II InView (TN2 —*IV*) was completed providing a relatively current set of national norms. The standardization was large and generally representative. Schools participating in the standardization completed a demographic survey and the results of the survey were compared to national demographic data. The norm group tended to have somewhat fewer minorities than the general population, yet it had more students on free and reduced-price lunch, as well as more students from single-parent families. Full complements of norms are available including local and national percentile ranks,

normal curve equivalents, stanines, and grade equivalents. In addition, developmental scale scores ranging from 0 to 999 span all grade levels tested.

Reliability and Validity

Coefficient alpha was used to estimate the reliability of the Terra Nova II Multiple Assessments (TN2—MA), which were as consistently high as those of other batteries. Furthermore, reliability coefficients for the subtests and composite scores on the TN2—MA were reported consistently high—*in the .80s and .90s*. Finally, when the interrater reliability studies were conducted on the constructed response items, the mean score points awarded by two raters were very close; consequently, the correlations were especially high, indicating high rater agreement. To ensure that interrater agreement and accuracy remain elevated, monitoring techniques are in place.

A thorough process was used to create the test and ensure its content validity. For example, tests, basals, and numerous other publications, as well as standards developed by the states and the professional associations, were used in the development of the series. Frequent and thorough trials, reviews, and revisions were completed by a wide variety of classroom teachers and experts in their respective subject fields.

Other data obtained included usability studies and sensitivity/bias reviews to ensure that the test materials were clear and appropriate, and did not reflect possible bias in Language, subject matter, or group membership. Not surprisingly, the Multiple Assessments battery has a greater number of items reflecting higher level thinking skills. Another feature that enhances the content validity of these tests is the thematic integration of subsets of items on the tests. This thematic integration makes the tests

resemble materials to which students are exposed to in the classroom and in their everyday lives.

Frankly, this investigator describes the Terra Nova II Multiple Assessments as an innovative, well-developed set of standardized achievement testing batteries. The norming and score reporting methods are well developed. The content and construct validity evidence support the test and its appropriate use in elementary and middle school. The reliability evidence is robust as well. Nonetheless, as with all achievement tests, it is necessary that the users determine the extent to which the content of the Terra Nova II Multiple Assessments matches the curriculum in their respective schools.

Procedures

The investigator had access to the seventh grade individual and group lists of the Terra Nova II Multiple Assessments test scores, as well as the Terra Nova II *InView* Cognitive Skills Index individual and group list test scores as part of her professional guidance office records. This researcher randomly assigned a number to the seventh grade students' earned achievement test scores from a middle school in New Jersey, where she is a guidance counselor. Distinctively, this researcher secured written permission from the New Jersey middle school, where she is employed, to examine and analyze these scores for the sole purpose of this study, as well as to report anonymously *(without naming particular students and their respective scores)* her findings (See Appendix A).

The Terra Nova II Multiple Assessments (TN2—MA) and Terra Nova II *InView* (TN2—*IV*) were administered to all seventh grade students in a New Jersey middle school during the spring semester of 2002. The standardized achievement test results

from the March 2002 administration were examined and analyzed by this investigator for the purpose of this study only.

As previously described the investigator randomly assigned the students' respective earned achievement test scores a number. Then, a computer-generated table of random numbers randomly selected the two specific sets of thirty-two students—*high achieving student leaders and high achieving non-student leaders*. In this particular investigation, the basis for identifying the students as "leaders" or "students who demonstrate leadership abilities, competencies, qualities, skills, and traits," was aforementioned in the "students" section of chapter 3. Summarily, students who exhibit leadership are observed as maintaining a range of interests, as being focused, deliberate, empowered, and intrinsically motivated. They are quite adept with organizational abilities when accomplishing both academic and non-academic tasks. They are facile problem solvers. These students not only appear to possess confidence; rather, they access their self-confidence and competence when tackling a challenging task; relatedly, they persevere and manage frustration appropriately.

Hypotheses and Statistical Analyses

This investigator gained access to the seventh grade middle school students' earned achievement test scores to conduct an analysis of variance (ANOVA) and a specific *t* test to determine if there were any significant differences in the following three hypotheses:

1. There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Reading* achievement scores on the Terra Nova II Multiple Assessments.

2. There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Language* achievement scores on the Terra Nova II Multiple Assessments.

3. There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Mathematics* achievement scores on the Terra Nova II Multiple Assessments.

Next, this investigator calculated an *F* test to determine if any significant interactions existed in the following three hypotheses:

4. There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Reading* achievement scores on the Terra Nova II Multiple Assessments.

5. There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Language* achievement scores on the Terra Nova II Multiple Assessments.

6. There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Mathematics* achievement scores on the Terra Nova II Multiple Assessments.

A Tookey test (Strauss, 1999) was intended for the post hoc analysis if any significant interactions existed for the fourth, fifth, and sixth hypotheses. Incidentally, this investigator selected the Tookey Test (Strauss) for the post hoc analysis, because Strauss claims that it is the most appropriate post hoc analysis to use when an investigator has two different samples.

Summary of Chapter Three

In chapter three the research methodology was presented. The seventh grade middle school students' earned scores in Language, Mathematics, and Reading on the Terra Nova II Multiple Assessments (TN2—MA) administered in March 2002 at a Southern New Jersey middle school were examined.

For the purposes of this study, the seventh grade middle school students' earned test scores were assigned a number randomly by the investigator. Next, a smaller group of thirty-two seventh grade middle school students,' identified as "student leaders," earned test scores were selected randomly from the assigned numbers via a computer-generated table of random numbers. Accordingly, the same process was repeated to assign and select test scores of the seventh grade middle school students who were *not* identified as "student leaders." The aggregate data was examined without considering gender.

The instruments, the Terra Nova II Multiple Assessments and Terra Nova II *InView* Cognitive Skills Index, are innovative and well-developed achievement and intelligence test batteries, maintain Buros (2001). Furthermore, Buros contends that the reliability evidence is fervent; whilst the content and construct validity substantiation defend the assessments' apposite use in schools.

An analysis of variance (ANOVA), specifically a *t* test, was conducted to determine if any significant differences existed between the two groups of seventh grade middle school students' earned achievement test scores. Then, the investigator computed an *F* test to determine if any significant interactions of intelligence quotient (I.Q.) existed between the two groups of seventh grade middle school students' earned

achievement test scores. Finally, a Tookey test (Strauss, 1999) was intended for the post hoc analysis had any significant interactions been noted.

CHAPTER FOUR

RESULTS

Introduction

The most effective approach to meeting the academic, social, emotional, and psychological needs of middle school students, maintain Forte and Schurr (2003), is a student-centered education. Their research further points out that grouping these young adolescents together in a supportive environment provides the best climate for learning. In the interest of meeting the "whole student," Arnold and Stevenson (1998) note that the middle school curriculum includes a full exploratory program. For this reason, Hackmann and Valentine (1988) describe middle level educators as the ones who promote mini-classes, exploratory course options, service clubs, special interest activities, independent study projects, and community experiences not only to encourage academic achievement, but also to include personal growth, leadership, and life skills. In essence, the middle school concept values potential student involvement in all areas of the schooling process. Self-direction, self-description, and self-assessment, contend Forte and Schurr (2003), are high priorities in middle school curriculums.

The overall goal of this study was to examine the Terra Nova II Multiple Assessments (TN2—MA) annual standardized achievement test scores earned by a randomly selected group of high achieving seventh grade students from a middle school in New Jersey. Specifically, the students' earned scores from the TN2—MA subtest areas of Language, Mathematics, and Reading were examined to determine if there were significant differences in the students' earned scores in Language, Mathematics,

and Reading between the high achieving seventh grade middle school students who appear to apply leadership abilities, competencies, qualities, skills, and traits in their interactions with peers and faculty, compared to the high achieving seventh grade middle school students who appeared to neither apply nor exhibit leadership abilities, competencies, qualities, skills, and traits in their interactions with peers and faculty.

Chapter four discusses the statistical analyses and findings of this study. First, the statistical analysis approach used with the data is described. Next, each hypothesis is restated with its subsequent results and the particular analyses used in this study. Last, a summary of the study's results and significant findings are reported.

Findings

Statistical Analyses

An analysis of variance (ANOVA), specifically a *t*-test, was calculated to determine if any significant differences existed between the two groups of seventh grade middle school students' earned achievement test scores on the subtests of Language, Mathematics, and Reading. Then, the investigator computed an ANOVA, using the *F*-ratio to determine if any significant interactions of intelligence quotient (I.Q.) existed between the two groups of seventh grade middle school students' earned achievement test scores on the subtests of Language, Mathematics, and Reading. A Tookey test (Strauss, 1999), as mentioned in Chapter three, was intended for the post-hoc analyses; on the contrary, no significant interactions requiring a post-hoc analysis were established.

Specifically for the purposes of this study, the investigator examined the seventh grade middle school students' earned performance scores on the Terra Nova II Multiple

Assessments standardized test in the areas of Language, Mathematics, and Reading. Additionally, the students' earned performance scores from the Terra Nova II *InView* Cognitive Skills Index (TN2—*IV* CSI) determined the students' intelligent quotient score and subsequent designation as high, average, or low IQ.

Hypothesis One: Language Achievement

> There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Language* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of seventh grade middle school student leaders whose Terra Nova II Multiple Assessment *Language* test scores were randomly selected for this study was 32; their earned mean score on the *Language* subtest of the Terra Nova II Multiple Assessments was 77.40 with a standard deviation of 14.90. Subsequently, the total number of seventh grade middle school non-student leaders whose Terra Nova II Multiple Assessment *Language* test scores were randomly selected for this study was 32; their earned mean score on the *Language* subtest of the Terra Nova II Multiple Assessments was 83.75 with a standard deviation of 8.58. The *t*- ratio was calculated to be 2.057, which reflects a significant difference at the .05 alpha level as shown in Table 1. The findings indicate that the non-student leaders scored significantly better on the *Language* subtest of the Terra Nova II Multiple Assessments; therefore, the first hypothesis is rejected.

Table 1

Group Mean Language Test Performance Scores, Standard Deviations, and T Ratios

Group	N	Mean	S D	df	*t* Ratio
Student Leaders	32	77.400	14.90	62	2.057*
Non-Student Leaders	32	83.750	8.58		

*Significant at the 0.5 alpha level; the hypothesis is rejected, as the non-student leaders scored significantly higher.

Hypothesis Two: Mathematics Achievement

There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Mathematics* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of student leaders whose Terra Nova II Multiple Assessment *Mathematics* test scores were randomly selected for this study was 32; their earned mean score on the *Mathematics* subtest of the Terra Nova II Multiple Assessments was 82.84 with a standard deviation of 8.63. Subsequently, the number of non-student leaders whose Terra Nova II Multiple Assessment *Mathematics* test scores were randomly selected for this study was 32; their earned mean score on the *Mathematics* subtest of the Terra Nova II Multiple Assessments was 83.47 with a standard deviation of 9.17. Furthermore, the t ratio was calculated to be 0.279, which is not a significant difference at the .05 alpha level as shown in Table 2. Although the data suggests that the non-student leaders earned a higher group mean score on the *Mathematics* subtest of the Terra Nova II Multiple Assessments, the second hypothesis is accepted because the 0.63 difference in the mean scores is not statistically significant.

Table 2

Group Mean Mathematics Test Performance Scores, Standard Deviations, and T Ratios

Group	N	Mean	S D	df	*t* Ratio
Student Leaders	32	82.84	8.63	62	0.279*
Non-Student Leaders	32	83.47	9.17		

*Not significant at the 0.5 alpha level; the hypothesis is accepted

Hypothesis Three: Reading Achievement

There is *no significant difference* between high-achieving student leaders and high-achieving non-student leaders in their earned *Reading* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of student leaders whose Terra Nova II Multiple Assessment *Reading* test scores were randomly selected for this study was 32; their earned mean score on the *Reading* subtest of the Terra Nova II Multiple Assessments was 72.88 with a standard deviation of 16.60. Subsequently, the total number of non-student leaders whose Terra Nova II Multiple Assessment *Reading* test scores were randomly selected for this study was 32; their earned mean score on the *Reading* subtest of the Terra Nova II Multiple Assessments was 80.062 with a standard deviation of 9.88. Furthermore, the *t* ratio was calculated to be 2.360, which reflects a significant difference at the .05 alpha level as shown in Table 3. Thus, the results indicate that the non-student leaders scored significantly better on the *Reading* subtest of the Terra Nova II Multiple Assessments; consequently, the third hypothesis is rejected.

Table 3

Group Mean Reading Test Performance Scores, Standard Deviations, and T Ratios

Group	N	Mean	S D	df	*t* Ratio
Student Leaders	32	72.88	16.60	62	2.360*
Non-Student Leaders	32	80.062	9.88		

*Significant at the 0.5 alpha level; the hypothesis is rejected, as the non-student leaders scored significantly higher.

Hypotheses Four

There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Language* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of student leaders whose Terra Nova II Multiple Assessment *Language* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Language* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

For the purpose of this study, and given the nature of IQ ranges for high achieving students, a low IQ range was an earned score below 109 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); an average IQ range was an earned score between 110-124 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); and the high IQ range was an earned score of 125 and above from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of student leaders in the high IQ group was 11; their earned mean score on the *Language* subtest of the Terra Nova II Multiple Assessments was 74.81, with a standard deviation of 14.63. The total number of student leaders in the average IQ group was 16; their earned mean score on the Language subtest of the Terra Nova II Multiple Assessments was 84.70, with a standard deviation of 14.26. The total number of student leaders in the low IQ group was 5; their earned mean score on the

Language subtest of the Terra Nova II Multiple Assessments was 75.05, with a standard deviation of 9.12.

Subsequently, the total number of non-student leaders whose Terra Nova II Multiple Assessment *Language* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Language* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of non-student leaders in the high IQ group was 11; their earned mean score on the Language subtest of the Terra Nova II Multiple Assessments was 78.55, with a standard deviation of 18.72. The total number of non-student leaders in the average IQ group was 16; their earned mean score on the Language subtest of the Terra Nova II Multiple Assessments was 86.11, with a standard deviation of 6.42. The total number of non-student leaders in the low IQ group was 5; their earned mean score on the Language subtest of the Terra Nova II Multiple Assessments was 87.00, with a standard deviation of 13.55 as noted in Table 4. The F ratio was calculated to be 2.12 for degrees of freedom 5/58; this is not significant at the .05 alpha level; subsequently, the fourth hypothesis is accepted. Table 5 illustrates the F ratio for interaction analyses of IQ and Language achievement.

Table 4

High, Average, and Low Intelligence Quotient Subgroup Mean Language Test Performance Scores and Standard Deviations

Group	High IQ Leader	Average IQ Leader	Low IQ Leader	High IQ Non-Leader	Average IQ Non-Leader	Low IQ Non-Leader
Mean	74.81	84.70	75.05	78.55	86.11	87.00
SD	14.63	14.26	9.12	18.72	6.42	13.55
Number	11	16	5	11	16	5

Table 5

F-ratio for Interaction Analyses of IQ and Language Achievement

Source	SS	df	MS	*F* Ratio
Between	75.88	5	70.88	2.12
Within	93.43	58	33.43	
Total	169.33			

Hypotheses Five

There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Mathematics* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of student leaders whose Terra Nova II Multiple Assessment *Mathematics* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Mathematics* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

For the purpose of this study, and given the nature of IQ ranges for high achieving students, a low IQ range was an earned score below 109 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); an average IQ range was an earned score between 110-124 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); and the high IQ range was an earned score of 125 and above from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of student leaders in the high IQ group was 11; their earned mean score on the *Mathematics* subtest of the Terra Nova II Multiple Assessments was 85.91, with a standard deviation of 8.44. The total number of student leaders in the average IQ group was 16; their earned mean score on the *Mathematics* subtest of the Terra Nova II Multiple Assessments was 86.06, with a standard deviation of 8.61. The total number of student leaders in the low IQ group was 5; their earned mean score on

the *Mathematics* subtest of the Terra Nova II Multiple Assessments was 78.33, with a standard deviation of 3.38.

Subsequently, the total number of non-student leaders whose Terra Nova II Multiple Assessment *Mathematics* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Mathematics* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of non-student leaders in the high IQ group was 11; their earned mean score on the Mathematics subtest of the Terra Nova II Multiple Assessments was 81.18, with a standard deviation of 8.66. The total number of non-student leaders in the average IQ group was 16; their earned mean score on the Mathematics subtest of the Terra Nova II Multiple Assessments was 84.33, with a standard deviation of 8.56. The total number of non-student leaders in the low IQ group was 5; their earned mean score on the Mathematics subtest of the Terra Nova II Multiple Assessments was 86.67, with a standard deviation of 9.40 as noted in Table 6. The F ratio was calculated to be 0.74 for degrees of freedom 5/58; this is not significant at the .05 alpha level; subsequently, the hypothesis is accepted. Table 7 illustrates the F-ratio for interaction analyses of IQ and Mathematics achievement.

Table 6

High, Average, and Low Intelligence Quotient Subgroup Mean Mathematics Test Performance Scores and Standard Deviations

Group	High IQ Leader	Average IQ Leader	Low IQ Leader	High IQ Non-Leader	Average IQ Non-Leader	Low IQ Non-Leader
Mean	85.91	86.06	78.33	81.18	84.33	86.67
SD	8.44	8.61	3.38	8.66	8.56	9.40
Number	11	16	5	11	16	5

Table 7

F-ratio for Interaction Analyses of IQ and Mathematics Achievement

Source	SS	df	MS	*F* Ratio
Between	86.71	5	81.71	0.74
Within	170.42	58	110.42	
Total	257.13			

Hypotheses Six

There is *no significant interaction* of I.Q. with high-achieving student leaders and high-achieving non-student leaders on their earned *Reading* achievement test scores on the Terra Nova II Multiple Assessments.

The total number of student leaders whose Terra Nova II Multiple Assessment *Reading* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Reading* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

For the purpose of this study, and given the nature of IQ ranges for high achieving students, a low IQ range was an earned score below 109 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); an average IQ range was an earned score between 110-124 from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI); and the high IQ range was an earned score of 125 and above from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of student leaders in the high IQ group was 11; their earned mean score on the Reading subtest of the Terra Nova II Multiple Assessments was 70.30, with a standard deviation of 17.26. The total number of student leaders in the average IQ group was 16; their earned mean score on the Reading subtest of the Terra Nova II Multiple Assessments was 76.30, with a standard deviation of 14.15. The total number of student leaders in the low IQ group was 5; their earned mean score on the

Reading subtest of the Terra Nova II Multiple Assessments was 75.70, with a standard deviation of 9.20.

Subsequently, the total number of non-student leaders whose Terra Nova II Multiple Assessment *Reading* test scores were randomly selected for this study was 32. This group of student leaders' Terra Nova II Multiple Assessment *Reading* test scores was subsequently separated into three subgroups based on each student leaders' Intelligent Quotient (IQ). The student leaders' IQs were measured from the Terra Nova II *In View* (TN2—*IV)* Cognitive Skills Index (CSI).

The total number of non-student leaders in the high IQ group was 11; their earned mean score on the Reading subtest of the Terra Nova II Multiple Assessments was 80.20, with a standard deviation of 11.40. The total number of non-student leaders in the average IQ group was 16; their earned mean score on the Reading subtest of the Terra Nova II Multiple Assessments was 82.72, with a standard deviation of 9.15. The total number of non-student leaders in the low IQ group was 5; their earned mean score on the Reading subtest of the Terra Nova II Multiple Assessments was 82.70, with a standard deviation of 9.01 as noted in Table 8. The F ratio was calculated to be 1.83 for degrees of freedom 5/58; this is not significant at the .05 alpha level; thus, the hypothesis is accepted. Table 9 illustrates the F-ratio for interaction analyses of IQ and Mathematics achievement.

Table 8

High, Average, and Low Intelligence Quotient Subgroup Mean Reading Test Performance Scores and Standard Deviations

Group	High IQ Leader	Average IQ Leader	Low IQ Leader	High IQ Non-Leader	Average IQ Non-Leader	Low IQ Non-Leader
Mean	70.30	76.30	75.70	80.20	82.72	82.70
SD	17.26	14.15	9.20	11.40	9.15	9.01
Number	11	16	5	11	16	5

Table 9

F-ratio for Interaction Analyses of IQ and Reading Achievement

Source	SS	df	MS	*F* Ratio
Between	71.48	5	66.48	1.83
Within	96.33	58	36.33	
Total	167.81			

Summary of Chapter Four

This study examined the standardized language, mathematics, and reading achievement test results when compared for middle school aged student leaders and non-student leaders. In chapter four the results of the analyses of the six hypotheses was presented. The results of this study support only one of the main effect hypotheses. Distinctively, it was determined that the non-student leaders possess significantly higher achievement test scores on the Language and Reading subtests of the Terra Nova II Multiple Assessments; therefore, the hypotheses were rejected. Conversely, there was no significant difference on the Mathematics subtest of the Terra Nova II Multiple Assessments between the student leaders' earned scores and the non-student leaders' earned scores; thus, the hypothesis was accepted.

In comparison, the high, average, and low IQ levels did not have an effect on the student leaders' and non-student leaders' earned achievement test scores in the Language, Mathematics, and Reading subtests of the Terra Nova II Multiple Assessments. Resultant, there was no significant interaction effects of IQ and achievement on any of the Terra Nova II Multiple Assessments subtests; therefore, the three interaction hypotheses were accepted.

CHAPTER 5

CONCLUSIONS, DISCUSSION, IMPLICATIONS, and RECOMMENDATIONS

This chapter presents the conclusions of the study. In addition, there is a discussion of the possible reasons for the results and a presentation of the implications for professional use of the results. The final section lists some possible future studies based on the results achieved in this study.

Conclusions

There is a paucity of diverse, critical literature on the specific topic related to application of leadership abilities, competencies, qualities, skills, and traits, and their effect on middle school students' academic achievement. Nonetheless, the published literature on student achievement and leadership application generally indicates, contend Forte and Schurr (2003), that student-centered education with robust a robust student activities program is the most effective approach to meeting the educational, social, emotional, and psychological needs of young adolescents.

Furthermore, this investigator observes and believes that when middle schools offer students the opportunities to exercise their independence in appropriate and meaningful ways such as leadership roles, it helps to lessen the uncertainty, fear, and anxiety that typically accompany adolescent identity development, as well as the typical transition struggles of middle school aged adolescents. Conversely, when adolescents are unable to establish positive feelings about themselves, create healthy relationships with peers and faculty, and channel their energy for independence in constructive ways, Mills, Dunham, and Alpert (1988) notice that they are more likely to drop out of school and forfeit academic achievement.

Despite rejecting two of the three main effect hypotheses, this investigator contends that a cause and effect relationship, notwithstanding, exists when middle school students exhibit high levels of academic achievement, and when the middle school students are observed applying those same leadership abilities, competencies, qualities, skills, and traits to their academic endeavors.

The results of this study yielded some confounding results related to the main effect hypotheses. For example, on the Terra Nova II Multiple Assessments subtests of *Language* and *Reading*, the non-student leaders' earned scores and mean scores were higher than the student leaders. The *t*- ratio for the student leaders and non-student leaders earned scores in language achievement was calculated to be 2.057, which reflects a significant difference at the .05 alpha level. The *t*- ratio for the student leaders' and non-student leaders' earned scores in reading achievement was calculated to be 2.360, which reflects a significant difference at the .05 alpha level. Hence, the notion of hypotheses 1 and 3 that no significant differences exist between high-achieving student leaders' and high-achieving non-student leaders' *Language* and *Reading* achievement test earned scores on the Terra Nova II Multiple Assessments was rejected.

Conversely, when examining the student leaders' and non-student leaders' earned scores on the Terra Nova II Multiple Assessments subtest of Mathematics, the *t*-ratio for the student leaders and non-student leaders' earned scores in Mathematics achievement was calculated to be 0,279, which does not reflect a significant difference at the .05 alpha level. The investigator duly notes that although the non-student leaders' earned scores and mean scores were slightly higher than the student leaders' on

the Mathematics subtest of the Terra Nova II Multiple Assessments, the difference was not significant at the .05 alpha level; hence, the impression purported in hypothesis 2 that no significant difference exists between high-achieving student leaders' and high-achieving non-student leaders' *Mathematics* achievement test earned scores on the Terra Nova II Multiple Assessments was accepted.

The analyses of the three interaction hypotheses yielded results that support those hypotheses. Specifically, in the area of Language achievement for student leaders and non-student leaders in the high, average, and low IQ ranges, the student leaders' and non-student leaders' earned scores on the Terra Nova II Multiple Assessments Language subtest did not reflect a significant difference. The F ratio was calculated to be 2.12 for degrees of freedom 5/58; this is not considered significant at the .05 alpha level; subsequently, the hypothesis is accepted. Located within Chapter 4 on page 56, Table 5 illustrates the F-ratio for the interaction analyses of IQ and Language achievement. Next, in the area of Mathematics achievement for student leaders and non-student leaders in the high, average, and low IQ ranges, the student leaders' and non-student leaders' earned scores on the Terra Nova II Multiple Assessments Mathematics subtest did not reflect a significant difference. The F ratio was calculated to be 0.74 for degrees of freedom 5/58; this is not considered significant at the .05 alpha level; subsequently, the hypothesis is accepted. Located within Chapter 4 on page 59, Table 7 illustrates the F-ratio for the interaction analyses of IQ and Mathematics achievement.

Finally, in the area of Reading achievement for student leaders and non-student leaders in the high, average, and low IQ ranges, the student leaders' and non-student leaders' earned scores on the Terra Nova II Multiple Assessments Reading subtest did

not reflect a significant difference. The *F* ratio was calculated to be 1.83 for degrees of freedom 5/58; this is not considered significant at the .05 alpha level; subsequently, the hypothesis is accepted. Located within Chapter 4 on page 63, Table 9 illustrates the *F*-ratio for the interaction analyses of IQ and Reading achievement.

The primary conclusion for the study is that non-student leaders in the middle school have significantly higher scores on the verbal sections of a standardized achievement test than do student leaders.

Discussion of the Results

In this section, this investigator will propose reasons why the results for this study were achieved. The results of this study provide interesting insight into the nature of middle school students' leadership application of abilities, competencies, qualities, skills, and traits and its effect upon their earned scores for academic achievement on standardized testing. It was proposed that the first three hypotheses were the main hypotheses, and the fourth, fifth, and sixth hypotheses were nested within the first three.

The findings are interesting to examine due to the fact that significant differences were noted for two of the three main effect hypotheses. Distinctively, the non-student leaders earned scores were higher than the student leaders on the Language and Reading subtests of the Terra Nova II Multiple Assessments. Fittingly, the investigator annotates that the student leaders' earned mean scores on the Language and Reading subtests on the Terra Nova II Multiple Assessments, 77.40 and 72.88 respectively, are considered proficient and above average according to customary, standardized testing rubrics. In spite of this investigator not having a succinct, study-

driven explication for the findings, the following are possible latent and underlying considerations to account for this study's remarkable results.

First, this investigator purports that Freed and Parsons (1997) view of the "left-right brain continuum" is a potential, valid, and research-supported variable in this study. Freed and Parsons' (1997) left-right brain continuum examines and elucidates students' learning styles. Subsequently, learning styles ultimately effect students' achievement and earned scores on both standardized testing and authentic assessments. The left-right brain continuum may have contributed to this study's findings because student leaders, in particular, may be more left-brained—*exacting, orderly, logical, analytical, very reliable and responsible*—compared to their non-student leader peers.

Convincingly, Freed and Parsons (1997) claim that left-brained students excel at solving problems that involve sequential logic such as Mathematics. To contemplate the concept that student leaders may be more left-brained than whole or right-brained, offers some insight into why there was no significant difference between the student leaders and non-student leaders' earned scores on the Mathematics subtest of the Terra Nova II Multiple Assessments.

Taking a closer look at the Mathematics subtest of the Terra Nova II Multiple Assessments reveals the specific topics and concepts that the subtest measures. They are: number and numeral relations, computation and estimation, measurement, geometry and spatial sense, data, statistics and probability, patterns, functions and algebra, and problem solving and reasoning. Not surprising, the particular subject matter that the subtest quantifies bears a resemblance to the strengths and assets of the

left-brained learner. Hitherto, the notion that student leaders may be more left-brained than their non-student leader counterparts and peers is answerable.

Furthermore, left-brained students struggle with simultaneous and parallel tasks, linguistics, and whole language reading strategies contends Vitale (1994). Left-brained students, according to Williams (1983), are adept at linear and sequential processing. Recognizing the parts that make up the whole is a common characteristic of the left-brained learners, in sharp contrast to the right-brained learners who specialize in separating out the parts that make up the whole—*synthesizing*.

Interestingly, the comprehensive Kindergarten through 8th Grade Reading curriculum is a whole-language program for the entire school district in New Jersey where the investigator secured the Terra Nova II Multiple Assessments scoring data (Middle School Reading and Writing Curriculum Supervisor, personal communication, February 2004). As previously cited, Vitale (1994) purports that a whole-language Reading program is more suited for whole-brained and right-brained learners. Explicitly, Freed and Parsons (1997) state, "It can be said, that under *ideal conditions*, a right brained child has a definite edge in Reading comprehension, because he visualizes so much better" (p. 115).

Commensurate with the left-right brain continuum theory, it appears that the Reading and Language subtests of the Terra Nova II Multiple Assessments include tasks and skills that require more right-brain processing versus left-brain processing, as described by Spears and Braund (1996). Knowingly, the Reading and Language subtests measure basic comprehension and understanding, analyzing text, evaluating and extending meanings, sentence structure, writing strategies, editing skills, and

identifying Reading strategies. Because there was a significant difference between the student leaders and non-student leaders' earned scores on the Reading and Language subtests of the Terra Nova II Multiple Assessments, this investigator speculates that some student leaders may be more left-brained than whole or right-brained. Should this speculation be accurate, the notion that some student leaders may be more left-brained than their non-student leader counterparts, it could be a probable explication for the significantly different findings in the students' earned scores in Reading and Language.

Implications for the Profession

This study was designed to examine whether or not middle school students' application of leadership abilities, competencies, qualities, skills, and traits enhanced or elevated their earned scores on the Terra Nova II Multiple Assessments in the areas of Language, Mathematics, and Reading. As discussed in Chapter 4, this study yielded significant differences in the student leaders' and non-student leaders' earned scores on the subtests of Language and Reading. On the other hand, this study ascertained that no significant differences were detected in the student leaders' and non-student leaders' earned scores on the subtest of Mathematics. Furthermore, this study indicated there were no interactions of IQ for student leaders and non-student leaders regardless of their high, average, or low IQ status on the Terra Nova II Multiple Assessments subtests of Language, Mathematics, and Reading.

In spite of rejecting the two hypotheses that no significant difference exists in the earned achievement test scores of student leaders and non-student leaders on the Terra Nova II Multiple Assessments subtests of Language and Reading, this study, nevertheless, may reveal important information and offer unsullied insight to teachers,

guidance counselors, principals, and school district administrators, because providing student leadership training programs in schools is observed by this researcher to be a worthwhile endeavor.

Furthermore, in view of the fact that it was determined that participation in leadership programs and activities, or that middle school students' application of leadership abilities, competencies, qualities, and skills yielded no significant statistical difference in their Mathematics achievement on the Terra Nova II Multiple Assessments, this investigator refers to Von Drehle (1981) who contends that student activities play a key role in the education of students in Middle and High Schools. He further claims that participation in student activities and leadership roles fulfill the dual role of promoting such activities and training students in the skills and processes of leadership. Summarily, along with Leatt (1987) and Von Drehle, this researcher asserts that providing middle school students with activities and programs to develop and practice leadership is a worthwhile endeavor in creating school climates that address the excellence in education.

Recommendations

Based on the results of this study, the following recommendations for future research are suggested.

1. This study should be replicated using actual student grade point averages rather than standardized test scores. This would give a better understanding of whether or not there is an effect on achievement in the classroom.

2. In addition to considering the students' grade point averages to measure their academic achievement, future studies should include an emphasis on the affective domains of student achievement.
3. There has been much speculation about the effect of gender and school achievement; for this reason, it is recommended that this study be replicated to determine if there is an interaction effect of achievement with gender.
4. Future studies should also focus on an alternative age group, such as high school students, in order to gain a more precise understanding of the relationship between leadership application and language, math, and reading achievement.
5. The small sample size restricted the statistical analyses; therefore, more powerful analyses, accounting for potential confounds—*such as special education accommodations*—could not be completed using multivariate methods or stratified analyses. It would be helpful in a future study to tease apart the regular and special education students in the sample.
6. The sample is comprised of Caucasian students; as a result, the findings are not generalizable to non-Caucasian populations. A more diverse, multi-cultural sampling population ought to be considered for future studies.
7. The Terra Nova II *InView* Cognitive Skills Index (TN2—*IV* CSI) score determined the students' intelligent quotient score. Although the TN2—*IV* demonstrates good reliability and validity, a future study might apply a more widely used measurement, such as the Wechsler Intelligence Scale for Children—Revised (WISC—R).

Summary of Chapter 5 and Dissertation Conclusion

This chapter presented a summary of the study's findings and subsequent conclusions. The findings yield that no significant difference exists between student leaders and non-student leaders' Mathematics achievement on the Terra Nova II Multiple Assessments. Conversely, the non-student leaders' Language and Reading achievement was significantly better than the student leaders. Furthermore, this study indicated there were no interactions of IQ for student leaders and non-student leaders regardless of their high, average, or low IQ status on the Terra Nova II Multiple Assessments subtests of Language, Mathematics, and Reading.

Next, the investigator's explication for the results is discussed. Summarily, commensurate with the left-right brain continuum theory, it appears that the Language and Reading subtests of the Terra Nova II Multiple Assessments include tasks and skills which require more right-brain processing versus left-brain processing, as described by Spears and Braund (1996). Therefore, this investigator speculates that some of the high-achieving seventh grade middle school student leaders may be more left-brained than whole or right-brained. The proposition that some of the seventh grade middle school student leaders could possibly be left brained versus right or whole-brained, may be a probable explication for the significantly different findings with the high achieving seventh grade middle school student leaders compared to the high achieving seventh grade middle school non-student leaders' earned scores in Language and Reading on the Terra Nova II Multiple Assessments.

The implications for professional use of the results are presented next. In spite of rejecting the two main effect hypotheses that no significant differences existed in the

earned test scores of the seventh grade middle school student leaders and non-student leaders on the Terra Nova II Multiple Assessments subtests of Language and Reading, this study, nevertheless, may reveal important information, because Von Drehle (1981) contends that student activities play a key role in the education of students in middle and high schools. Consequently, middle school teachers, guidance counselors, principals, and school district administrators who are considering the development of student leadership training programs in their schools may find the study beneficial. Von Drehle further claims that participation in student activities trains students in the skills and processes of leadership. Summarily, Leatt (1987) and Von Drehle assert that student-led activities and programs facilitate a school-learning climate that addresses the issues and concerns of excellence in education.

The final section lists some possible future studies based on the results realized in this study. Issues such as gender, multiculturalism, diversity, middle school assessment measures, and alternative instruments were included in the recommendations for further investigation.

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Appendix A

Letter Granting the Investigator Permission

to access the

Annual Standardized Testing Results