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The Evaluation of an Academy's Summer School Program

Mercedes Ricon Abelleira

THE EVALUATION OF AN ACADEMY'S SUMMER SCHOOL PROGRAM

DISSERTATION

Presented in Partial Fulfillment of the Requirements for

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Exceptional Student Education and Leadership in

the Adrian Dominican School of Education of

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by

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Area of Specialization: Learning Disabilities

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This work is dedicated to the angels in my life, my mother Mercedes Ricon, my sister
Monica Ricon, and my brother David Ricon.
Esta obra tambien esta dedicada a mis angeles en el cielo, mi abuela Aurea Torres Lage y mi
tio Jose Manuel Abelleira Torres.

Their love, support, guidance, and care give my life meaning.

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ABSTRACT

The Evaluation of an Academy's Summer School Program is a study that quantitatively investigates the efficacy of its brain based educational program for students with Learning Disabilities (LD), Attention Deficit Disorder (ADD), and Attention Deficit Hyperactivity Disorder (ADHD) using a pre-and post-test quasi-experimental design. All participants ($N=40$) reside in the suburban multicultural southeast Florida community and experience learning and social difficulties that often interfere with their learning abilities. It was hypothesized that individualized brain-based mastery learning instruction would yield improved test scores in core academic achievement and social and life skills areas. The results of this study, based on the pre-and post- scores of the *Woodcock-Johnson-Third Revision Achievement Test Forms A and B* (WJ-III) administered by an independent licensed psychologist showed that the secondary level participants produced statistically significant academic improvement in reading fluency. Teachers completed the *Social Skills Rating System-Teacher (SSRS)* to assess students' social and life skills and performed their duties without knowledge of who was participating in the study. The study results showed that all participants attained statistically significant gain score improvement in their development of social and life skills. Subsequent statistical analyses indicated that 99.76 % of the participants produced positive core academic achievement gains in reading, writing, and mathematics and 93.33% of the participants showed positive growth in social and life skills. The positive results of this study in such a short duration of time demonstrates the effectiveness and benefit of providing a highly specialized and individualized brain based mastery learning program to elementary and secondary students with LD, ADD, and ADHD.

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CHAPTER I

Problem Statement

Introduction

All students possess an inherent desire and ability to learn and to succeed. Students will more efficiently and effectively acquire and apply knowledge when provided with an opportunity to learn at their own pace within a facilitative educational environment (Levine, 2003a). A facilitative educational environment provides students with well-patterned and highly organized scholastic activities (Levine; Kovalik, 1997). The scholastic activities are delivered by professional educators who possess instructional expertise and deliver instruction in a proactive and positively reinforcing manner. This study evaluated student success during a summer program at a small private school located in Miami-Dade County, Florida, herein referred to as “the Academy”. The Academy is committed to providing a nurturing, consistently patterned, and highly organized learning environment that develops and supports student confidence and self-esteem. The Academy’s educational programs are predicated upon an array of researched and respected educational paradigms and strategies. The program is built on the principle that students will attain their successes and progress toward their goals through highly individualized and complex circuitous, neurological, and developmental routes (Moats, 2004). Accordingly, students optimally progress in their experiences of knowledge acquisition when provided with the requisite amount of support necessary for them to receive, process, and apply the information they have been exposed to within their classes (Swanson, 1999a; Moats, 2004). Fundamental to the Academy’s summer school program is the belief and opinion that all students are inherently curious and active learners.

Whether gifted, exhibiting attention deficits, or possessing unique learning styles, each student enrolled in the summer school program receives the individual attention, positive reinforcement, and accommodations necessary to attain success.

Statement of the Problem

The challenge confronting parents and educators, and ultimately students involves finding the most effective methods to educate students with diagnosed learning disabilities (LD), attention deficit disorder (ADD) and/or attention deficit hyperactivity disorder (ADHD). Many parents are looking for programs that best address the needs of their children with these disabilities. Yet, most typical programs in public education for students with LD, ADD, and ADHD offer an inclusion model approach which does not always improve the learning process of the individual student or address his or her particular style of learning in this larger setting. The inclusion model supports a learning environment wherein students with LD and ADD/ADHD receive instruction in the general education classroom from a general education teacher and a special education instructor who is generally in the classroom for a limited period of time (Heward, 2003).

The effectiveness of educating students with disabilities in the general education classroom is an ongoing debate amongst educators, parents, and students (McConnell & Odom, 1999; Pavri & Monda-Amaya, 2000). This continued discussion supports the need for more recent research in the area of inclusion. The research of Cartledge and Johnson (1996) questions the effects of inclusive classrooms on the social development of students with disabilities. The Orton Dyslexia Society (1994) published a survey of 1,500 National Center of Learning Disabilities (NCLD) members which showed that 98% of parents of students with LD did not believe regular education teachers had attained

sufficient proper training on how to educate students with LD in an inclusion classroom. In this same study, 50% of the teachers surveyed agreed with the parents by acknowledging that they had not received proper training. The research of Klinger, Vaughn, Schumm, and Shay (1998), states that students with LD do not prefer inclusion classrooms to receive their educational programs. Additionally, Nowicki (2003) determined that students with LD in inclusion classrooms face greater social jeopardy than the other students in the classroom. In their research, Favazza, Phillipsen, and Kumar (2000) indicated that children with learning disabilities are not socially accepted in the inclusion classroom. Their research indicates that students without disabilities do not accept students with disabilities unless the students with disabilities are exposed to social educational programs promoting social integration and acceptance. Shanker (1995) suggests that placing students with LD in an inclusive educational setting is a trend promoted by financial reasons and not for reasons of yielding social acceptance.

The U.S. Department of Education (1999) revealed that 73% of students with disabilities receive their educational programs in an inclusive general education classroom. Huey (2000) suggests that the individual needs of students with disabilities are not being met in the inclusive model of education provided in most public schools in the U.S. Additionally, Manset, and Semmel (1997) determined that inclusive programs are less effective than pull out programs for some students with LD. In 1998, an analysis of the education provided to students with LD in the Miami-Dade County Public School System (Miami, Florida) determined that teachers provide undifferentiated and uniform/generic lessons to the whole class with minimal instructional accommodations or modifications (Klinger et al., 1998). In view of these findings, it is reasonable to

consider that parents with students diagnosed with LD, ADD, and ADHD would endeavor to identify a private learning environment providing the specialized learning opportunities to meet the individualized needs of students at the Academy.

Further, the continuity of an educational program serving students with learning disabilities becomes a significant concern with the approach of the summer hiatus. Black (2005) indicates that nationwide on average, five million K-12 students enroll in summer school programs. In 2004, Philadelphia alone enrolled approximately ninety thousand summer school students. The vast proportion of summer school students attended programs for remediation or enrichment in reading and mathematics. Roughly one-third of the enrollees sought summer school enrichment in art and technology (Black).

Additionally, Cooper (2003) posits that long summer vacations break the rhythm of instruction, lead to forgetfulness, and foster the need for a considerable amount of academic review when students return to school in the fall. He found that students' aggregate achievement scores decline by approximately one month, on average, over the summer hiatus. However, in mathematics computation, he notes that the decline in students' achievement is more than double that rate, at closer to 2.6 months. Parents who are dissatisfied with typical education programs seek brain based methods where learning is consistently connected to their children's real life experiences. These parents seek a program with sensory-based approaches to enhance the memory and learning of students with LD, ADD/ADHD and use multi-sensory approaches ordinarily absent from an inclusive setting. Such is the need, that the state of Texas formally implemented instructional strategies for students with dyslexia that utilized multi-sensory, meaning based instruction (Texas Education Agency, 1998). However, this does not meet the

needs of all students with disabilities, nor does it resolve the issue for students with disabilities in other states.

The development of formal individualized learning plans, such as those offered at the Academy, are sought to provide academic, social, and life skills education. These programs predicated upon objective assessment measures and presented to the students in small, well-patterned, and highly structured school environments are considered by a host of parents and educators as the most facilitative approach to inspire learning.

Accordingly, it is the purpose of this study to objectively demonstrate the efficacy of an individualized brain based, mastery learning summer school program with a population of students diagnosed with learning disabilities and/or ADD/ADHD.

The Academy Program

The Academy has been educating students since 1970. Reflecting the emergence of Howard Gardner's (1997) brain based research studies, the design and implementation of the Academy's summer school educational paradigm employs brain based methods as the basis for its mastery learning model. As part of its mission, the Academy strives to meet the needs of the many students who require and benefit from special care, academic support, and nurturing. At the Academy staff beliefs hold that all students can learn and succeed if they are provided the opportunities to grow in an environment of educational expertise and knowledgeable support. To provide for individually paced and strategic instruction, the Academy's summer program curriculum is consistently reviewed and refined by the respective department heads, instructors, and administrators. The formula for success at the Academy is to build student confidence and self esteem through a program that espouses and provides for brain based educational methods and techniques.

Within the brain based model, provisions for a quiet, accommodating, reinforcing, and nurturing educational environment facilitates every student's ability to learn. This summer school evaluation detailed and quantitatively assessed the key measurable components that have facilitated students' academic achievement at the Academy for thirty-seven years.

The Academy's mission is to educate students from three to eighteen years of age. The students demonstrate average or above average intellectual ability, and possess unique learning styles and differences for which individualization is supportive to their success. These students are without severe physical disabilities or special health problems, and have not been classified as emotionally disturbed or mentally retarded. The Academy serves students who possess learning disabilities or attention deficits as well as students with superior intellectual abilities who might feel unchallenged and dissatisfied in a general education classroom setting. At the Academy, barriers to learning are removed by the implementation of multi-method and multi-modal individualized differentiated instruction.

Students with specific learning disabilities (LD) were defined in 1975 by PL 94-142 as students who have a disorder in one or more of the basic psychological processes involved in understanding or in using language that is spoken or written. The disability may be evident in students by their display of difficulties in their abilities to listen, think, speak, read, write, spell, or to execute mathematical calculations. The term LD may include such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. This term does not include students who have learning problems which are primarily the result of visual, hearing, or motor

handicaps, of mental retardation, of emotional disturbance, or environmental, cultural, or economic disadvantage. The Individuals with Disabilities Education Act (IDEA) 2004 establishes how to identify and label students with disabilities. Currently, there exist two classification systems permitted by IDEA 2004 for identifying students with learning disabilities: the discrepancy model and the Response to Treatment Intervention (RTI) model. The most common model, and the one selected by the state of Florida to implement, is the discrepancy model. The discrepancy model, defined in PL 94-142 (1975), is based on a battery of tests administered by a highly qualified professional, usually a psychologist. To be labeled with a learning disability, the tests must demonstrate a significant difference of 15 points or more between the student's intellectual quotient (IQ) and achievement in reading or math.

The more traditional discrepancy model has recently undergone questions relating to theoretical and procedural problems (Vaughn & Fuchs, 2003). In contrast, RTI combines low-inference and practical assessment procedures that may be used with both group and individual educational plans (Christ, Burns, & Yesseldyke, 2005). RTI is a multi-tier educational prevention system involving scientifically validated research (Fuchs, Fuchs, Compton, Bryant, Hamlett, & Seethalaler, 2007). RTI is composed of continuing student analysis and assessment, universal and rigorous interventions, and ongoing monitoring of student progress and further assessment (Fairbanks, Sugai, Guardino, & Lathrop, 2007). RTI is not only a method for determining disability classification and labeling permitted by IDEA 2004, but also an instructional method implemented daily in the classroom from which all students may benefit.

The research of Mayes, Calhoun, and Crowell (2000) explains that attention and learning disabilities (LD) are interconnected and often coexist. In their study, they found that of 119 students with LD, 86 students (72%) had ADHD and 33 students (28%) did not. The Diagnostic and Statistical Manual Fourth Revision- Text Revision (DSM-IV TR) categorizes all students with attention deficits under the Attention Deficit Hyperactivity Disorder umbrella (American Psychiatric Association, 2000). This manual estimates that three to five percent of school aged children have this condition. This diagnostic tool identifies ADHD as consistent patterns of inattention and/or hyperactivity and impulsivity that are more frequent and more severe than is typically observed in same age individuals with comparable levels of development. However, these patterns of inattention and hyperactivity must impair the social and academic functions of the individual student in order to receive a label. Kohn (1998) found that boys diagnosed with ADHD outnumber girls four to one.

Levine (1994) explains that attention processes regulate thinking and daily activity. Unusual attention processes, whether heightened or more limited, would therefore affect the developing education and learning of the student. As this is the case for many students, Levine (1994) encourages the use of the term “learning differences” instead of the terms of LD, ADD, or ADHD. Levine (2003a) explains that the characteristics of learning differences and attention differences are positive. He recommends, and the Academy espouses, that the focus be on the whole child, and not their differences. Levine (2003b) worries about the current educational system that requires that all students be good at all things and therefore makes going to school an unpleasant situation for many. He recommends that schools focus on individual students’

neuro-developmental strengths and learning styles to lead to an upward spiral of success for all.

The Academy's educational method is differentiated, incorporating individualized instruction via a brain based mastery level learning paradigm. The educational programs are eclectic as they employ all available learning resources and are humanistic as they emphasize personal success. The Academy attempts to change the disposition of students from "failure-avoidance" to one of "success-striving", thus producing a change both in attitude and life style. This is accomplished through attention to the student's interaction with other students and his or her response to the environment. These observations are then integrated into the total education plan for each student.

The Academy respects the fact that students gradually approach their academic goals through circuitous routes (Caine & Caine, 1994; Kovalik, 1997). Accordingly, in a highly structured, supportive, and individualized educational environment, the Academy's students begin to demonstrate their progression toward measurable successes. Each student demonstrates additional scholastic gains if he or she has been provided the necessary identified supports to process the information they have received (Caine & Caine, 1994). Recent research into how individuals learn states that this process is unique for each student (Caine & Caine, 2006). As stated by Jean Piaget (1970), children are not passive empty vessels to be filled with knowledge, but active builders of knowledge. They are young scientists who are consistently creating and testing their own theories of the world. Believing that one's observation of how a child's mind develops might lead to the discovery of how we acquire knowledge; Piaget (1970) further states that children have a real understanding only of that which they invent themselves. The brain research

of Burton (2007) explains that recent studies confirm Piaget's theories. He confirms Piaget's constructivist theories on how babies gradually construct knowledge from life experiences. Burton notes that learning takes place when the brain anticipates an occurrence, and instead encounters a novel unexpected event. Thus learning occurs when the brain's attention is triggered as past life experiences do not correlate with new found facts.

Because an individualized curriculum is designed for each student at the Academy, the student's unique learning style and pace of learning are understood and respected. The curriculum and individualized learning objectives ensure that each individual student's needs, abilities, and interests are reflected and incorporated into his or her learning plan. The individualized methodology affords the student an opportunity to acquire skills and knowledge in a structured sequential pattern; this pattern promotes greater efficiency by requiring mastery of a skill prior to moving forward to a higher skill level (Polloway, Patton, & Seina, 2001). The individualized learning plan methodology provides each student with a meaningful degree of involvement in his or her own learning. It also provides students the requisite time to process and master necessary skills (Stevens & Rosenshine, 1981). The Academy is not merely filling an "empty vessel"; but rather, the program is encouraging each student to become dynamically involved in his or her own learning process (Piaget, 1970).

While the instructional methodology at the Academy is based upon contemporary educational research concepts, the structure of the curriculum is traditional. Pedagogically, the program draws from The Core Knowledge Curriculum (Hirsch, 1999) and the Sunshine State Standards (Florida, 2005) as the basis of its content curriculum.

The Core Knowledge Curriculum is a national prospectus that emphasizes academic excellence and literacy in the elementary and secondary schools. According to Hirsch (1988, 1999) characteristics of this curriculum include solid, sequenced, specific, and shared foundations of knowledge. The Core Knowledge Foundation (2007) establishes that its curriculum is: solid, as it consists of a body of knowledge that shapes the foundation of any curriculum; is sequenced, as it allows student understanding to build on previously mastered skills; specific, in that it succinctly identifies important ideas that should be learned; and shared, wherein it covers an extensive range of knowledge represented in the national culture of the United States. The Core Knowledge Curriculum is organized by grade level into sequences that are incorporated into students' skill development through mastery learning. Using individualized instruction, as students demonstrate mastery of a rudimentary skill, they are advanced to a more complex skill (Bloom, 1971). The student's progression is determined through a post-test assessment measure wherein eighty percent mastery must be demonstrated. Thus, the mastery learning methodology permits each student to be challenged while progressing at his or her own pace with necessary accommodations and modifications.

During the high school years, the Academy's students continue to appreciate the benefit of a challenging individualized brain based mastery learning model. High school students are exposed to all of the traditional core academic subjects as well as an array of elective options through traditional instruction, individualized mastery goals, and online instructional programs. The high school curriculum adheres to the learning objectives outlined in the Sunshine State Standards and to the graduation requirements of the State of Florida Department of Education. The continued acquisition of the social and life skills

that were introduced in the earlier grades is also stressed now emphasizing, advanced social competencies and leadership skills.

Student achievement is fostered through small class sizes and recognition of individual learning styles. Classes are taught using whole group and individual instruction while vigorous personalized goals are established. Therefore, students are allowed and encouraged to achieve their personal best, and are not made to conform to nonspecific group objectives. In classes such as mathematics, reading, and language arts, students work at their appropriate level and at their own pace. The mastery program ensures that students achieve at least an eighty percent on any assessment unit prior to progressing to the next level or skill, allowing students to understand and master all concepts. This requirement means that students do not progress to new levels with gaps in understanding from previous, requisite lessons. Instead, students are provided with the time and support to succeed and advance accordingly.

The individualized program maintains the structure and patterning that the students have come to value from the lower and middle schools. While the curriculum varies between classrooms and grade levels, students can depend on the fact that the manner in which they learn remains consistent, providing them with a secure learning environment. Within this patterning, however, students explore highly engaging and relevant topics such as the Harlem Renaissance to honor Black History Month, or the effects of global warming, and other aspects of ecology for science fairs. At the Academy, structure coupled with innovative teaching and engaging subject matter allows the students to flourish as they strive toward success.

The goal of the program is to provide academic college preparation. It centers on an essential core curriculum that includes language arts, reading, science, social studies, mathematics, foreign languages and the fine arts. The Academy stresses a unified curriculum, selecting an annual focus to thematically blend the classes. This focus provides an integrating thread that connects each of the classes, encouraging students to recognize the associations between various fields of study. While challenging, the high school curriculum is presented in a manner that every young adult can succeed and will always find the support he or she needs. The Academy's objective is to prepare students for further education and to help them achieve success toward their future goals.

Whether considered gifted, exhibiting attention deficits, or possessing unique learning styles, all students can learn from personal interactions, direct tangible experiences, and the application of logical thinking about their experiences. Through an array of learning practices, including the integrated arts program, students learn to carefully observe and actively engage in creative thinking and craftsmanship. In addition, the performing arts program inspires the self-expression of the student through theater, music, and dance. Thus, the entire student is broadened. The arts, together with experiences in physical education and technology, stimulate the brain and help expand the student's social, physical, and cognitive potential. Seeing the world through the eyes of a musician, artist, or athlete often has the effect of creating a new vision for the student.

Academic achievement itself does not necessarily equate to achieving a productive quality of life. The Academy recognizes that social and emotional success is also vital to the growth of the complete individual. As such, the Academy's Lifelong Guidelines and Lifeskills (Kovalik, 1997) curriculum, a social and life skills program, is an essential

component of the school's instructional method and is fundamental to the academic and emotional growth of the complete student. Integrity, caring, and friendship are among the many life skills that are reinforced daily. Students desire and seek praise. Often, however, the student's past school experiences have produced the opposite effect. At the Academy, the student's positive attributes are emphasized and reinforced. Educating students to render quality life choices and providing them with the necessary skills to remedy their differences in adaptive ways is central to the Academy's mission. Further, brain based research supports the need for the inclusion of a social and life skills program (Lemonick, 2007). To this end, the Academy supports the proposition that social and emotional growth is vital for life success.

The Academy's small teacher-student ratio provides for individualized instruction. Distinct academic departments enable the student to become responsive to a variety of individuals. Individualized instruction is geared to and appropriate for the individual student's unique and specific needs (Polloway et al., 2001). Individualized instruction is accomplished through teaching one-on-one or in small groups (Polloway et al.). Research demonstrates that smaller learning environments, with small teacher-student ratios, are favored in school settings as it allows for improved student achievement and attitudes, as well as enhanced student behavior (Fowler, 1995; Mosteller, 1995; Raywid, 1995). All academic classes at the Academy are individualized to the students' needs. The Academy's focus is the total student; therefore, the staff is consistently aware of the student's social, emotional, and physical development in addition to his or her academic progress. Individualization assures that the student grasps essential skills in his or her particular way of learning. Small group instruction reinforces

the need for cooperative learning and development of skills for collaboration and mutual support. Stevens and Rosenshine (1981) explain that individualization is a component of all effective instruction as it allows each student to succeed, to achieve a large proportion of correct responses, and encourages the student to become confident with his or her capability as a student.

It is the goal of the Academy to provide students with the learning and organizational skills to achieve success through an atmosphere of support and acceptance. The Academy helps students develop confidence and a strong self-image while challenging students to achieve their optimum potential. The Academy develops leadership skills and responsibility, while reinforcing a strong moral sense and personal values. The aim of the Academy, in conjunction with family and community, is to build exemplary citizens. The school is determined to maintain the high standards and sound educational practices that have been its goal and direction, and it is committed to continue the warm, nurturing and knowledgeable care that has been its hallmark.

Curriculum at the Academy

Reading is the first priority of the Academy. Student placement, class assignments, and individualized educational plans are dependent, to varying degrees, upon a student's reading proficiency. A typical reading class session allows students to achieve success every step of the way. Students participate in learning experiences through a program of controlled language and reinforcement. The learning experiences target specific areas to meet the student's individual learning needs. An important part of the reading program stresses the use of the library. Reading is closely integrated with language arts instruction to combine critical reading skills with practical applications. In

this manner, achievement in reading progresses hand-in-hand with writing, literature, and grammar skills. The Academy's curriculum emphasizes the importance of the classics, particularly in the study of literature.

Writing classes foster a student's natural development of language and the tools of English, grammar, composition. While the program for each student is individualized, a curricular framework guides the instructional program. In addition, the student is consistently prompted toward awareness of the world around him or her and accordingly, the teacher draws upon and integrates other learning disciplines to formulate assignments and lessons. The curriculum stresses the acquisition of such skills as spelling, vocabulary, writing and personal expression, handwriting, and the use of technology in cross-curricular activities.

The goal in mathematics is to instill a working knowledge of basic mathematical skills and to produce confident problem-solving students who trust themselves and their mathematical abilities. While the program emphasizes individual goals, the student is measured against the acquisition of skills that are typical for his or her age and grade. A wide variety of concrete materials are used to meet each student's particular needs. Techniques include direct instruction and audio, visual, and tactile stimulation. Fortifying the more traditional mathematical goals are textbooks, workbooks, manipulative materials, group lessons, visually enriching computer programs, and audiotapes. A unique aspect of the program is the technology lab where computer programs are utilized both for reinforcement and acceleration of math skills.

The summer program promotes activities that develop in the student an understanding and interest in his or her own culture and community. While the afternoon

activities program is individualized, student-centered, well rounded, and flexible, the class sizes are larger than in the academic component of the summer program. The comprehensive growth of every student demands enriching experiences in every area of development – intellectual, personal, emotional, cognitive and physical. The Academy balances the student’s successes in the classroom with experiences in art, performing arts, technology and physical education. The afternoon activities specifically target Gardner’s (1983) multiple intelligences representing each student’s unique cognitive strength. Further, the inherent social experiences in the larger activities group setting lend themselves well to reinforcing the Lifelong Guidelines and Lifeskills (Kovalik, 1997) curriculum. The goal is to integrate the student into a larger group through the afternoon activities and to have him or her confidently, independently, and successfully perform in that setting. However, each student’s program remains predicated upon the student’s individual needs.

While reinforcing core academic skills, the performing arts curriculum is uniquely designed to incorporate the comprehensive skills, creative concepts, and activities that promote the social and emotional development of the student. The curriculum, which includes theater, music and dance, emphasizes self-expression, and addresses the student’s cognitive and social skills growth in a creative setting. Every student has an opportunity to participate in the summer performing arts production. Furthermore, opportunities for the development and the continuation of physical coordination, the use of the voice and body for self-expression, and learning to use all of the body parts in unison toward a common goal, all add a further dimension to the student’s education.

Visual arts are also a vital part of the program. Training the hand and eye helps students develop special understanding and allows them to relate to the world around them through a different medium. Through aesthetics, critical inquiry, cultural awareness, historical perspective, and studio production skills, students learn the differences and similarities that make individuals uniquely human. The visual arts curriculum reinforces the learning objectives of reading, writing, and mathematics. The result is personal development, appreciation of the arts, and an awareness of self. A variety of art projects provide opportunities for students to develop their creative talents, their aesthetic sensitivity, and their pursuit of excellence through artistic self-expression. Students are encouraged to experience painting, drawing, graphic arts, collages, and other creative projects. Art history is also integrated into the studio work, making the students aware of great artists of the past. When students discover their creative abilities, they often produce work that is beyond their years and demonstrates great artistic ability.

Early childhood through young adulthood is a time to celebrate the possibilities of the body as well as the mind. For that reason, the Academy believes and indeed provides structured physical activity on a daily basis. At the Academy, the emphasis in physical education is upon group participation, developing not only the body but the qualities of sportsmanship, cooperation, and playing by the rules. These qualities are not only important on the athletic field, but additionally, they comprise a significant basis for one's success in life (Ohanian, 1988a; 1988b). In physical education, structured activities are designed to meet the educational needs of each student and continue to develop their social and lifeskills.

The program recognizes that computers have an increasingly integral role in education. As a result, computers are in every classroom and in the computer lab. Computers are an inherent part of the entire scholastic program. New software targeting the school's individualized differentiated methodology is in place and enhances the students' reading, writing and mathematics skills. A special technology lab incorporates state-of-the-art computers into the daily instructional program, while other departments use computers on a continuous basis in the regular classroom. Computers are invaluable tools for remediation, but also have the power to enrich the learning of the more advanced students.

The Academy encourages the utilization of various research based instructional strategies that facilitate the design of the student's educational plan. These include, but are not limited to: memory enhancement strategies, verbal rehearsal, the pegword strategy, categorization, graphic organizers, modeling, agendas, group investigation, independent study, portfolios, and problem-based learning.

Lifelong Guidelines and Lifeskills Program

The social and life skills curriculum is at the core of the Academy's academic program and are predicated upon Susan Kovalik's Lifelong Guidelines and Lifeskills (1997). The purpose of this program is to provide adaptive mental guidelines for teachers and students in a learning environment. These guidelines help students to evaluate their performance as well as to guide them toward an understanding of which social behaviors will enhance their success. Additionally, these guidelines represent the Academy's expectations for how the students should perform, behave, and what behaviors should be expected from others. The Lifelong Guidelines are: trustworthiness, truthfulness, active

listening, no put-downs, and personal best. The Lifeskills are: integrity, initiative, flexibility, perseverance, organization, sense of humor, effort, common sense, problem-solving, responsibility, patience, friendship, curiosity, cooperation, caring, courage, and pride.

Kovalik (1997) recommends teacher modeling as the best method of instructing students in the Lifelong Guidelines and Lifeskills program. Therefore at the Academy, the teachers make note of demonstrating these behaviors during teacher-to-student and teacher-to-teacher interactions. Kovalik explains that an additional method to incorporate the program into the classroom is by acknowledging student and teacher use of the behaviors. This allows the students to understand what the Lifelong Guidelines and Lifeskills look like. Additionally, it allows them to examine what skills are important to attain success. At the Academy, teachers are trained to regularly implement this praise in the classroom. For example, a teacher might say, “Monica and David were using the Lifeskill of organization so well that they have successfully completed their project. Hence, Monica and David have arrived at a better outcome through their implementation of a well thought-out orderly plan.” Kovalik recommends that students brainstorm the skills and behaviors required prior to beginning an assignment. The teacher can then expand upon what those behaviors may look and sound like. At the conclusion of the assignment, students are provided with an opportunity to review which behaviors were successful and those behaviors which were not. This dialogue may be found daily in every classroom within the Academy.

Instruction on the Lifelong Guidelines and Lifeskills (Kovalik, 1997) are observed in all of the Academy’s subjects. For example, in reading, the teacher might

assign the student to write an essay on the Lifeskills personified by the main character in a story. In mathematics, patience is developed through teacher-directed instruction in organizing, planning, and sequencing division problems. Formal lessons on Lifelong Guidelines and Lifeskills development occur during the Academy's two daily home room periods. The AM homeroom period is from 8:30 to 8:45. This is a time when teachers typically read inspirational poems or short stories about positive outcomes when using the Lifelong Guidelines and Lifeskills. The PM homeroom is from 2:15 to 2:45. This period is dedicated to teacher-directed games and fun activities with social and life skills at their core. The activities are designed to help the students develop and enhance the Lifelong Guidelines and Lifeskills (Kovalik, 1997) so as to reinforce a balanced life perspective.

The Academy's Lifelong Guidelines and Lifeskills (Kovalik, 1997) program promotes a positive and proactive approach to educating its students. For example, the Academy focuses on what is expected of the student rather than on the infraction of the student. Further, the Academy does not have typical rules posted on bulletin boards. For example, "no talking" and "no fighting" signs are not located in the school as this focuses on negative behaviors. Rather, the Lifelong Guidelines and Lifeskills are prominently posted on bulletin boards in every class room. The Lifelong Guidelines and Lifeskills define the adaptive behaviors expected of the students by the Academy's community. Each guideline is addressed on a rotation basis throughout the summer school program.

When a student falls out of compliance with a Lifelong Guideline or Lifeskill (Kovalik, 1997), a structured proactive learning exercise is completed by the student with the support of their instructor. The exercise includes a written or oral reflection

addressing the following ideas: What behavior did the student engage in to prompt the reflection? What internal need was the student attempting to fulfill? How did the student's action impact others? What Lifelong Guidelines or Lifeskills should have been considered prior to the student's non-compliance? What Lifelong Guideline or Lifeskills should the student demonstrate if a similar situation came about?

Counseling

Parents and student at the Academy are provided with supportive guidance and professional counseling services. The "solution-seeking" design of the counseling department reflects the Academy's philosophy and platform of prevention, early problem detection, and expedient intervention. The Academy's counseling services include but are not limited to: supportive individual guidance and counseling to students; supportive parent consultations; professional referral outsourcing; social and life skills training; professional facilitation of student relations among people (RAP) groups; and in-service professional training.

Admissions Procedures

In order to be considered for enrollment in the Academy's educational program, students must meet established school admission requirements. Parents are required to submit a recent (not older than two years and eleven months) psycho-educational testing report with the application for admission. This report is administered by an independent licensed psychologist.

In addition, the psycho-educational testing, provided to the admissions department, includes: the referral source and the reason for the evaluation; in conjunction with the initial interview with the psychologist and the available family members

regarding the impact of the disability on the academic, social, and emotional state of the child. The administration of a series of objective assessment instruments in the psycho-educational evaluation may include: the Wechsler Intelligence Scale for Children-Fourth Revision (WISC-IV), the Woodcock Johnson-III Cognitive Abilities Achievement Test (WJ-III), the Illinois Test of Psycholinguistic Abilities (ITPA), the Peabody Picture Vocabulary Test Battery (PPVT), the Goodenough Draw-a-Person Projective and the teacher/parent completion of the Social Skills Rating System (SSRS).

The findings are presented in the results section of the psycho-educational report followed by the examiner's discussion of the results. Particularly important is the evaluator's formal determination regarding a student's testing results as meeting the legal diagnosis for Learning Disability or Attention Deficit Hyperactivity Disorder in order to qualify for protections, assistance, and accommodations under IDEA (2004). The summary and conclusions extrapolated from the assessment include the norm referenced diagnostics of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders- Fourth Revision Text Revision (DSM-IV TR). The final portion of the psycho-educational evaluation report is the recommendation section. Of particular importance is the evaluator's clear presentation of professional recommendations including psychiatric and/or neurological evaluations indicating the need for one or more of the following: adjunct medicinal treatment, occupational, speech and language therapies, subject specific tutorials, the identification of particular in-school accommodations as well as instructional strategies; the need for instruction in study skills, writing, and reading development, supportive counseling or psychotherapy with a licensed mental health professional, behavioral therapy with a certified behavioral

specialist, social pragmatics classes and recommended readings (bibliotherapy) that include informational web sites. The completed psycho-educational evaluation process is completed prior to each student's admission.

After the completion of the psych-educational evaluation process, the prospective student is then invited for a one day visit to the school. The student is assigned a student mentor of the same grade level and follows the mentor's academic program. The student is observed via visits by the school psychologist (visual presence in the classroom) and discreetly via the television monitor in the director's office. Following lunch, the student is invited to visit with the school director and psychologist for a personal interview. The feedback is important as it is expected that the student be an active participant in the admission process. The faculty, having observed the visiting student's performance, provides feedback to the Academy's director and the school's psychologist. This, together with the other accumulated information from the admissions process, serves as the basis for the program that is formulated for each student. In turn, the acquired data governs the placement and sets the initial academic goals for the student.

Once admitted, a student is placed in the corresponding instructional level. This is the level at which a student can perform with direct support from the instructor. Pre- and post-unit assessments are administered and continue throughout the term to determine each student's progress. Ongoing informal assessments establish the objective basis, where indicated, for the modification of a student's academic plan. An ongoing assessment process minimizes unnecessary remediation for those skills already mastered; this process promotes further individualization and accelerated learning. The post-test measures the degree of success that the student has exhibited for specific materials, and a

new program is developed based on these results. This system provides for efficiency and mastery and aids in the retention of material.

A Day in the Life of a Summer School Student at the Academy

Reflecting the Academy's mission, consistency and continuity are hallmark objectives supporting the student's academic experience. Accordingly, every summer school day is patterned in a manner that is welcoming, highly structured, and educationally diversified.

Each summer school day commences with a designated faculty member and/or administrator cordially welcoming the student to school between 7:45 and 8:05 a.m. On their first day of attendance at summer school, each student is accompanied to their assigned home room by a faculty member. Thereafter, at the time of arrival to school the student reports to homeroom. During the twenty minute homeroom period while the teacher shares a reading emphasizing a Lifelong Guideline or Lifeskill (Kovalik, 1997), each student is prompted to review the visual organizer located on every classroom's white board. As the students read and review the guide prompts to check that their uniform is in order, their folders are in place in their trapper/folder, and that class work documents and work materials are organized in a neat and orderly manner, the instructor orally reviews each item and proceeds to assist each student to prepare for his or her day. Thus, it is within the homeroom period that each student commences his or her day with a consistent and continuous emphasis on organization and program structure. Homeroom dismissal occurs at 8:25 a.m.

During the morning schedule of sixty minute classes, the summer school student attends reading, writing, and mathematics. Every classroom is designed to facilitate and

accommodate scholastic flexibility. The academic environment is comfortably illuminated with room temperature adjusted by the instructor to accommodate the needs of the students. The desks are arranged in the shape of a “U”. The desks and chairs are of a size that is comfortable for the students. Using the classroom visual organizer, each student is orally prompted to document completed homework in his or her agenda. During the summer school program, students are provided with an opportunity to begin their home work assignments within a designated period of time in class. Consistency, structure, and continuity in each class are further demonstrated via the schedule of individualized instruction provided to the students. The initial ten minute period of the class is designed to present the topic of study for the day. Following the instructor’s direct instruction of the topic, the students are prompted to note the topic that has been written on the board into his or her notebook.

In reading class, a daily oral reading (DOR) exercise is introduced and reviewed by the instructor. The daily reading exercise provides the students with an opportunity to first silently read from a required text and then subsequently discuss with their class and instructor, their individually assigned materials. The instructor works individually with each student on their daily assignment, while the other class members are working on their reading tasks. During the individualized session with the teacher, the student is asked to read a selected passage aloud. Reading aloud with the instructor provides a supportive and guided method to objectively assess the student’s level of achieved phonemic awareness, reading fluency and comprehension. During the one-to-one teacher-student interaction, positive reinforcement, verbal prompts to redirect attention, and verbal “fixes” when indicated are collectively employed to facilitate the student’s

progress. Fixes are the skills that have been identified as requiring additional instruction and a need for further clarification. The final five minutes of the class are dedicated to summarizing the day's lesson and responding to questions. In addition, pre- and post-chapter assessments are administered by the instructor to objectively assess each individual's attainment of a mastery level of 80%. Mastery level attainment indicates that the student has acquired a working knowledge sufficient and necessary to proceed to the next level of academic challenge.

In language arts and in mathematics, the continuity of pattern and class room sequence remains the same as in reading. Individual accommodations, such as additional instructor review of newly introduced material and quick target probes of past skills learned, facilitates student understanding and retention. In language arts, the student is presented with a daily oral language (DOL) exercise. The DOL is a grade-level-equivalent class exercise wherein the instructor presents on the board a written passage with grammatical and vocabulary mistakes. When called upon, the student may orally identify a correction or may approach the board to make the correction in writing. The student is concomitantly familiarized with the employment of Modern Language Association notations used by instructors and authors. Following completion of the DOL, the instructor individually works with each student on his or her designated language arts learning plan. While individually instructing a student, the instructor also responds to other students' inquiries. Any additional questions are answered at the end of the class period. Pre- and post- test unit evaluations are employed to objectively assess when the student has achieved mastery at the 80% level. When mastery is achieved, the student progresses to the next unit of knowledge acquisition.

In mathematics, the students are initially introduced to their grade level equivalent lesson through a daily math review (DMR) exercise. The students in the class are prompted to collectively solve a portion of the presented math problem or to solve the entire problem. The multi-method and multi-sensory accommodations available to the mathematics students include the traditional clock model, calculator, or abacus counting device, all significantly support student confidence and enthusiasm, particularly when introduced to new mathematics concepts. Following the completion of the DMR, each student receives one-to-one teacher-student instruction. The lessons and tasks are again individually determined via the student's psycho-educational evaluation and the initial mathematics assessment. Pre- and post- chapter assessments evaluate each student's progress toward mastery at the 80% level.

At 11:30 a.m., following the morning session of summer school, the students return to their home room. The students and their home room instructor enjoy a thirty-minute lunch period. The afternoon program session begins at twelve o'clock. The scholastic activities in the afternoon session include visual arts, performing arts, physical education (PE), and technology. A concerted effort has been made to integrate the afternoon program with the educational experiences in students' morning sessions. For example, in the celebration of the Fourth of July holiday, the student received instruction in the design of Fourth of July materials such as flags and other Independence Day symbols. In art class, the students created their own flags; this activity incorporated both math and reading. In performing arts, the student received instruction on the songs and costumes representative of the first Fourth of July. In technology, students learned to develop the research necessary to complete all the afternoon activities.

Purpose of the Study

The purpose of this study is to evaluate the effectiveness of an Academy's brain based summer school program for students with LD and ADD/ADHD using their pre- and post-test scores in reading, writing, mathematics skills and growth in social and life skills development. Further, it is hoped that the results of this study will contribute to the educational and social science research, espousing the efficacy of brain based mastery learning in students diagnosed with LD, ADD, and ADHD.

Evaluation Questions

This program evaluation investigated the measurable outcomes of the Academy's summer school program, addressing specific *in vivo* research questions. Does the unique educational design and accompanying individualized instructional strategies produce statistically significant achievement gains within six weeks in reading, writing, and mathematics? Does the Academy's social and life skills program produce measurable gains in participants' levels of adaptive social and behavioral functioning? This study's findings will be used to improve the instructional program for students with LD and ADD/ADHD.

Significance of the Study

This study supports the efficacy of the program design, its individualized mastery learning brain based curriculum, and instructional strategies implemented in the summer school program by comparing pre- and post-test scores for students with LD and ADD/ADHD. Obtained data and statistically analyzed results from the Woodcock Johnson III (WJ-III) Achievement Test (Mather & Woodcock, 2001) and the Social Skills Rating Systems [SSRS] (Gresham & Elliott, 1989) will provide the quantitative

rationale for proactively advancing the work of the educational program at the Academy. In addition, it is hoped that this successful program will be adopted by private learning centers in other geographic locations that are also interested in successfully educating students with LD and ADD/ADHD successfully.

Null Hypotheses

The established null hypotheses for this study include:

1) There will be no statistically significant differences in the reading achievement of students attending the Academy's summer school program based on the pre- and post-test scores on the WJ-III.

2) There will be no statistically significant differences in the writing achievement of students attending the Academy's summer school program based on the pre- and post-test scores on the WJ-III.

3) There will be no statistically significant differences in the mathematics achievement of students attending the Academy's summer school program based on the pre- and post-test scores on the WJ-III.

4) There will be no statistically significant differences in the social and life skills of students attending the Academy's summer school program as based on the pre- and post- test scores on the SSRS.

Definition of Terms

Attention Deficit Disorder (ADD / ADHD) is a condition in which an individual exhibits developmentally inappropriate inattention, impulsivity or hyperactivity (Heward, 2003).

Brain based learning strategies are brain compatible learning strategies that are "task-specific" techniques. The techniques utilize a cognitive orientation to learning, providing

students with methods for using their own abilities and knowledge to acquire, organize, and integrate new information. The student's successful demonstration of acquired academic skills leads to greater independent learning as these strategies are generalizable to other learning situations whenever a specific task is required. (Archer & Gleason, 1995).

Cognitive Learning Theory is a theory that posits the idea that new information is presented and integrated with prior knowledge. Elaborations are developed and the relationship is made evident between new and prior knowledge. Learning takes place when the new information becomes part of the knowledge network (Grow, 1996).

Differentiated Instruction is an instructional method matched to the unique needs of the learners (Carolane & Guinn, 2007). It is a teaching method that provides individual students with essential assistance that includes sequencing tasks from simple to difficult (Swanson, 1999).

Dyslexia is a language based disorder characterized by difficulty in decoding and inadequate phonological processing. These difficulties often impair the individual's ability to read (Heward, 2003).

Learning Styles are the employed methods in which individuals begin to concentrate, process, internalize, and retain new and difficult information (Dunn & Dunn, 1992; Dunn, Dunn & Perrin, 1994).

Lifeskills are skills supporting the Lifelong Guidelines of Susan Kovalik (1997) that ultimately support the lifelong goal of personal best. They include: integrity, initiative, flexibility, perseverance, organization, sense of humor, effort, common sense, problem-solving, responsibility, patience, friendship, curiosity, cooperation and caring.

Lifelong Guidelines are used in conjunction with the Lifeskills instruction of Susan Kovalik (1997); these guidelines present expectations for classroom and school wide behaviors. They are trustworthiness, truthfulness, active listening, no put downs, and personal best.

Mastery learning is a structured instructional learning methodology based on a sequence of instructional objectives and involves direct teaching using a cognitive approach. Students are promoted to more complex skills upon demonstrating eighty-percent mastery of the target skill (Bloom, 1971).

Metacognition is a term that reflects the process of contemplating and examining learning and cognitive activity. Hence, metacognition is the ability to think about thinking (Marzano, Brandt, Hughs, Jones, Presseisen, Rankin, & Suhor, 1988). It involves higher order analyses controlling the cognitive process of learning (Meichenbaum, 1985). According to Vacca and Vacca (2002), metacognition includes self-knowledge and task knowledge. Self-knowledge is the understanding students have about themselves as learners. Task knowledge is the understanding students have about the proficiencies, strategies, and resources required for the performance of a cognitive task. A self directed metacognitive question during reading would be, “Are there any words in this text I do not understand?”

Multiple Intelligences are the distinctive ways each person individualizes information during cognitive and personal development. When offering students the same material, each student will have a different experience with it according to his or her individual background of experience (Moran, Kornhaber, & Gardner, 2006).

CHAPTER II

Review of the Literature

Introduction

Based upon the cognitive learning theory, the Academy has developed and implemented a brain based education program for students with LD and ADD/ADHD that recognizes unique learning styles and multiple intelligences. The highly specialized educational format provides the matriculating students with a mastery learning experience through individualized, differentiated instruction. The Academy strives to meet the needs of its students, particularly those who require a well-patterned, highly organized, supportive, and nurturing learning milieu. At the Academy, the administration and instructors share in Bloom and Krathwohl's (1989) and Guskey's (2005) opinions that by recognizing relevant individual differences among students, and by implementing varied instructional methods to better accommodate diverse learning needs, all students can achieve success.

Successful learning is facilitated when each student is provided with the opportunity to evolve both cognitively and socially within the context of a safe and nurturing learning environment wherein educational expertise and knowledgeable support are consistently delivered. The Academy's formula for success operates to strengthen every student's confidence and self esteem using a multi-sensory and multi-modal learning program employing brain based educational models, methods, and techniques. Within a facilitative learning environment that provides applicable and supportive instructional interventions, all students can learn. This study reflects the key

theories and methods used by the Academy to facilitate the student's academic and personal achievement for the past thirty-seven years.

Consistent with Moats' (2004) call for well-researched and robust specialized educational treatment methods, the findings of Lovelace (2005) and Fullan (1991) have noted that the most critical obstacles that our schools currently face is not resistance to innovation, but rather the fragmentation, overload, and incoherence resulting from the unchallenged and uncoordinated acceptance of too many different innovations.

Accordingly, Lovelace established that educational administrators need to limit their investigations to innovations containing well-grounded research. As such, the ongoing development of a formidable research base incorporating innovative investigations that explore the educational needs of students with learning disabilities and unique learning styles will require tested and accepted education models supporting such research.

Program Similarity to a Response to Treatment Intervention-RTI

In response to the need for research-based practices, IDEA 2004 established an innovative model to determine whether a student possesses a learning disability (LD). Called the Response to Treatment Intervention (RTI) model, it identifies students with LD based on their response to intervention strategies employed. Before the referral process for special education placement is made, the student is provided targeted differentiated instructional interventions and is evaluated on his or her response to intervention. The procedures of RTI are different than those used in the discrepancy model. The RTI model provides: 1) Early intervention to the at-risk student; 2) instruction is matched to the academic needs of the students; 3) instruction is adjusted based upon the demonstrated learning needs of the students to assure academic growth;

and 4) student progress is regularly monitored and measured with on-going data-based instructional variations introduced to best serve the student. The RTI model is widely supported by professional educators, as the model is cost effective and treatment interventions based on best practices are more immediate, and available to all of the students when compared to the older discrepancy model (Harry & Klinger, 2007). In view of its growing acceptance among professional educators, the Academy effectively incorporates a modified adaptation of the RTI model into its scholastic program.

However, rather than implementing RTI as an identification and labeling procedure, the Academy's program has incorporated educational strategies, and on-going assessment and evaluations similar to the RTI model to assist, support, and guide our students with LD and ADD/ADHD toward their attainment of academic gains. Harry and Klinger (2007) explain that the RTI model prevents academic failure when students begin to underachieve. They emphasize the importance of the instructor not focusing on student disabilities but rather provide specific interventions to the student's exact instructional needs.

RTI has been studied by educational researchers over the past few years. The research of Fuchs, Fuchs, and Vaughn (2003) reflect a deep appreciation of the RTI model in determining how a student's response to supplemental treatment might be used by schools and the respective districts as a strategic method for identifying students as candidates for special education services. Early identification of reading difficulties in young students was targeted as a result of the increasing awareness that many students with LD regularly demonstrate significant reading challenges. The results of this study posit that RTI should continue to be pursued as a viable option for identifying students

with formal reading and/or learning disabilities. This study establishes that students identified with word attack, word fluency and reading rate challenges would likely benefit from a well-structured and professionally accepted supplemental summer reading program incorporating the core principles of the RTI model. The RTI research synthesis completed by Vaughn, Gersten and Chard (2000) proposes that RTI instruction in small groups with high response rates, immediate feedback, and sequential mastery of skills are the most important characteristics of education. Immersion in such a summer program that includes these components could facilitate statistically significant achievement gains in reading among the enrolled students.

Traditionally, RTI has focused on academic concerns of students with disabilities. However, RTI has recently been applied to the domain of student social behavior. Fairbanks, Sugai, Guardino, and Lathrop (2007) conducted two studies which established RTI as a positive behavioral intervention at school and in the classroom setting. The teachers involved in the study reported that RTI enhanced the atmosphere of the classroom. The student participants of the study indicated that RTI was a positive experience. While the total RTI model is not the foundation of the Academy's program, this study could prove the efficacy of several of RTI's inherent processes and notions supporting educational reform, particularly for educating students with LD and ADD/ADHD.

With a deepening research base and the incorporation of multi-method models such as RTI, the formulation of the Academy's curricular and individual learning plans are predicated upon the awareness and appreciation of each student's optimal style of knowledge acquisition. In the aggregate, brain based learning requires an educator's

overall understanding of the nature of a student's unique cognitive processing style. Such understanding includes the nature and function of brain anatomy and its related cortical functions.

Effective Instruction of Students with Learning Disabilities (LD)

Over the course of the last thirty years, the number of students diagnosed with learning disabilities has increased considerably. Swanson (1999a) estimated that nearly three quarters of a million students were diagnosed with LD in 1976. The United States Department of Education in 2002 reports that roughly one in five people (20 %) are documented as LD. Their report further notes that approximately three million students, age six through twenty-one, possess identifiable symptoms consistent with the presence of a learning related disorder. LD students make up almost half of the students receiving special education today (Swanson, 1999b).

The best teaching strategies and instructional practices to help this population remain largely unimplemented. Students with LD represent a sizeable heterogeneous group of persons. Consistent with brain based research findings, no singular or generic intervention can be recommended to fulfill or be expected to meet the educational needs of all these students (Caine & Caine, 2006; Jensen, 2005). Rather, it is plausible to consider that an eclectic, brain based mastery learning model incorporating a highly individualized differentiated program of instruction might best serve the diverse and unique learning styles of each student.

Ever-evolving educational research targeting the assessment and individualized instruction of students with learning disabilities continue to directly contribute to the vast improvements in program development and the delivery of specialized educational

services. Swanson (1989a, 1996, 1999a) describes students with learning disabilities as “actively inefficient learners.” He continues that students with learning disabilities fail to organize and assimilate processes and strategies vital for academic achievement; they also fail to alter strategies flexibly and set priorities or examine their learning and concentrate on feedback and error modification. As early as 1977, Flavell and Wellman assert that when students with learning disabilities are equipped with specialized meta-cognitive learning strategies, they frequently perform at higher skill levels and learn more effectively. Flavell and Wellman, in addition to Marzano and colleagues, (1988), suggest that a student’s repetitive exposure (practice) to specialized learning strategies will ultimately reduce the required time the student needs to apply a learning strategy, thereby yielding a more efficient and effective learner.

Swanson (1999b) determined that the most effective instructional methods for students with LD include integrated direct instruction with strategy instruction. He identifies direct instruction as instruction that is teacher directed such as lecture, class discussion, and readings from selected texts. He describes strategy instruction as instruction in meta-cognition such as memorization techniques and study skills. A number of the primary instructional strategies espoused by Swanson (1999a, 1999b) that are strategically woven into the Academy’s educational program include: drill-repetition-practice, segmentation, directed inquiry, governance of task difficulty, teacher modeled problems, small-group instruction, and strategy cues. Swanson’s research additionally establishes that students with LD do perform closer to their non-disabled peers when the instructional treatments include such strategies. The meta-analysis of much of the research in LD conducted by Swanson (1999a) includes more

than two hundred seventy two studies and research in the past thirty years. His analyses reflect that the areas of reading comprehension, vocabulary, handwriting, and creativity contained the largest achievement gains when incorporating these strategies. Swanson's (1999a; 1999b) research also note moderate achievement gains in cognitive processing, word recognition, memory, writing, intelligence, attitude and self concept, phonics skills, and global achievement.

Gersten and Baker (1999) also highlighted the impact of teaching metacognitive skills to students with LD. However, they do warn that students with LD experience difficulties generalizing these strategies. In their meta-analysis of reading instruction for students with LD, Gersten, Baker, and Edwards (1999) determined that successful reading interventions teach students to internalize multiple strategies of understanding and self-monitoring of learning. They find that students with LD are more inclined to rapidly discontinue their work when presented with reading passages of increasing difficulty. This study recommends that students should learn to employ self-monitoring strategies such as re-reading portions of the text, utilization of context clues to comprehend implied meaning, summarizing, and prediction of outcomes; it recommends that educators should encourage students to re-read passages several times to improve comprehension (Gersten et al.). Students with LD have difficulty recalling stories previously read and cannot identify significant information in stories. Therefore, the researchers again emphasize the importance of teaching students the metacognitive skills of identifying organizational and text structures (Gersten et al.).

To improve students' writing, Gersten and his colleagues (1999) recommend the incorporation of metacognitive skills. These researchers state that the use of mnemonic

devises, a strategy for recalling critical information, together with the use of think-sheets, are among the most effective strategies to enhance writing skills. Students should be provided with explicit instruction and instructor modeling of the writing phases of planning, writing, and revisions. Teachers should incorporate precise and accurate writing examples for students to reference as models. Gersten and others also emphasize the importance of frequent immediate feedback on student work.

Butler (1998) discusses several instructional principles found to be particularly effective in teaching students with learning disabilities. Butler states that an effective special education program will provide a variety of specialized tasks promoting the students' construction of optimal conceptions of tasks and learning processes. The lessons and related tasks require designs that encourage cognitive development and accordingly, should incorporate meta-cognitive activities. Butler adds that the learning activities must incorporate an appreciation of the student's particular learning style(s) in order to facilitate the student's interest, motivation, and engagement to the activity. Swanson (1996; 1999a) details how learning strategies, when implemented with students with LD, can serve different purposes. He notes that the "law of parsimony" must act as the vehicle directing strategy instruction. Further, learning strategies may effectively operate for students with a particular learning disability (e.g., Dyslexia) but not operate as well for a student with receptive or expressive aphasia. Accordingly, it is important to consider that the implementation of effective learning strategies does not guarantee the extinguishing of information processing differences (Weinstein, 1986).

In his research on adolescents with LD, Swanson (1999a) indicates that students with LD have difficulty in higher order processing and problem solving. Returning to

his meta-analysis of research of fifty eight intervention studies, Swanson (1999a) found that the most effective interventions were those that incorporated cognitive and direct instruction. Based on his decades long research of effective strategies for students with LD, Swanson (1999a) advocates the implementation of the following instructional strategies: 1) breaking things down into small and simple steps; 2) providing probes; 3) providing illustrative presentations; 4) providing independent practice and individually paced instruction; 5) instructing in small groups; 6) teacher modeling; 7) providing individualized instruction; and 8) providing reminders to use certain strategies.

Critical to the educator's effective responses to students with LD are recurring assessment procedure(s) that can accurately determine the nature of the student's learning challenge(s). Further, the assessment must incorporate exact recommendations to remediate the identified areas of academic and/or behavioral challenges, culminating in the development of the student's individual learning plan (Reschly, 1988; Ysseldyke & Christenson, 1988). Individual assessment has been and will continue to be prominent in special education and school psychology. Therefore, increased accountability in education will demand objective measurable assessments that augment diagnostic precision. Increased precision will facilitate a lesson planning team's ability to incorporate well-researched learning strategies specific to an individual student's needs.

The implementation of in-class accommodations, supportive therapies (i.e., occupational therapy, speech and language therapy, brief supportive counseling, etc.) and control for environmental (sensory) factors such as level and type of classroom illumination, extraneous distractions (i.e., ambient sounds, movement about the room,

etc.) are increasingly becoming prominent additions to one's individual learning plan (Christenson & Ysseldyke, 1989; Reschly, 1988; Ysseldyke & Christenson, 1988). Of particular importance in the field of education in general and particularly within special education, is the burgeoning focus upon outcome measures. Quantitative outcome measures will be the driving force not only to define the effectiveness of educational intervention strategies for individual students, but they also reflect the school's efficacy in its remediation of childhood learning challenges.

Regarding the direct student-teacher instructional process, effective instruction requires that a number of factors be considered during the teaching and learning process such as the student's learning style, and the types of intelligences he or she most frequently demonstrates. With a deepening awareness and appreciation of brain based function, methods and strategies, cognitive learning theories can be effectively referenced and incorporated into the development of the student's lesson plan. The process of combining cognitive theory with instructional application thus advances the educator's ability to formulate the precise educational needs and learning plan for the students (Levine 2003a, 2003b, 2004). This is accomplished on an individualized basis through differentiated instruction. Understanding that learning is a unique process to each individual, and each student optimally learns utilizing his or her own style; mastery learning assures that each student is provided with the requisite support necessary to learn a specific academic or instruction-based social skill well. Mastery is attained before moving forward to more complex levels of work. In this manner, students will be able to relate new information to concepts that they have previously

learned. This sequential process promotes success not only in students with LD but with all students.

The Academy recognizes that students acquire knowledge and learn in unique ways. Accordingly, it is essential that students have choices and accommodations for receiving, storing, and retrieving information in a manner that best facilitates their mode of processing and learning. Consequently, educators within the program must structure their teaching methods to address those unique learning styles, and to sequence the information in a manner where it can be related to previously acquired knowledge. For example, differentiated instruction permits the teacher to address and fulfill the specific educational needs of each student within the class via the student's individually developed learning plan.

Caine & Caine (2006) explain that authentic questions, as those provided in brain based education, trigger executive functional skills within the brain to assimilate information. These executive functions help to dissect and digest new information. Executive functions are the skills that include problem solving, planning, decision making, time management, persistence, risk management, judgment, and impulse control (Caine & Caine, 2006). These skills can be developed in a mastery learning brain based environment. However, ADD, according to Brown (2007) seems to be a more complex syndrome than what was thought before, as it affects cognitive management systems and executive functions. These students are more impaired in this area of cognitive functioning than most other people of their same age and developmental level. The U.S. Centers for Disease Control found that 7.8 percent of children in the U.S., ages four to seventeen, are currently diagnosed with ADD or ADHD (2005). Therefore, 7.8 percent

of students require executive functions training and development. However, Brown explains that the important executive function skills may still be developed until the student is in his or her early twenties. This provides schools with ample time to address these skills and foster them in the classroom.

This review of the research literature supports the Academy's brain based mastery learning model as one that operates upon and within the growing body of scientific evidence establishing the importance of recognizing and responding to the style and method of each student's cognitive thinking domain. Once such understanding is objectively obtained, it is then possible to create the design of an effective multi-method, multi-sensory individual brain based mastery learning plan. This individual learning plan, when implemented in a safe, well-patterned, highly organized, and nurturing milieu will optimally impact the student's ability to not only attain significant achievement gains but also directly contribute to the child's growth in scholastic confidence and personal esteem.

Theoretical Framework

The theoretical framework that guides this program evaluation is the cognitive learning theory. Emerging scientific understanding of how the mind works, courtesy of psychology, neuroscience, and linguistics, supports the efficacy of the cognitive learning theory (Gardner, 1983; 1997; 2004). The history of cognitive science demonstrates a cognitive revolution that swept through a number of disciplines fifty years ago and gave rise to this interdisciplinary field. Rejecting the structures of behaviorism, cognitive science spoke of images, ideas, mental operations, and the mind. Like computing devices, individuals are said to take in information, process it in various

ways, and create diverse mental representations; cognitive neuroscience posits that one day, these mental representations will be explicable in purely physiological terms (Gardner, 2004).

The Human Brain

One's appreciation of the brain's dynamic function particularly in learning and specifically addressing persons with learning disabilities first requires a discussion of the brain's constituent components along with their modes of function. According to Fierdorowicz (2005), the human brain is comprised of approximately 100 billion neurons with an additional one trillion supportive cells. Drubach (2000) adds that the brain is responsible for the affective universe within an individual and is responsible for all cognitive processes, including memory, intelligence, and thoughts. It is important to understand the brain and the application of this knowledge within the classroom. It is the source of creativity, our ability to learn information, and our use of that information to control or regulate behavior. It is also responsible for how daily problems and conflicts are resolved.

Kirk (2005) presents an overview of primary localizations of cortical function involving the brain. The corpus callosum facilitates communication between the right and left hemispheres. The limbic system mediates memory, attention, and emotion via the "fright-flight" response. The seat of executive cortical function is located at the site of the anterior cingulate cortex (ACC). The ACC is often considered the "junction-box" wherein emotional controls are activated and mediate the individual's response-reaction processes. Thus, the ACC, in part, facilitates the repertoire of one's adaptive social responses. In the aggregate, the frontal lobes govern many of the constitutional learning

functions such as organization, planning, abstracting and reasoning (Kirk). The right frontal lobe, for example, mediates cognitive inhibition, a vital function involving one's ability to filter out extraneous or ambient distractions. The hypothalamus regulates basal metabolic function, thermoregulation, and assists in mediating emotion (Kirk). Verbal and speech centers are localized in the temporal lobes wherein sound discrimination is mediated. Sometimes referred to as the "emotional brain" the amygdala facilitates the regulation of risk-taking behavior (Kirk, 2005). Accordingly, emotions, fear, pleasure, and sexual attraction are among the complex affect-based functions governed by the amygdala (Kirk).

Often referred to as the "primitive brain", the reticular activating system (RAS) possesses significant implications for persons diagnosed with attention deficit disorder and/or mood related disorders (Heward, 1997). The RAS governs the arousal system. Together with the ACC, the RAS is substantially the mediating body of information reception, processing and screening (Howard). The RAS facilitates one's capacity to focus, concentrate, and attend to incoming information. Persons with "attending" problems may become candidates for prophylactic psychostimulant medication (Kirk, 2005). As such, the primary action site of such medication is the RAS. The medulla governs the life-supporting functions of heart rate, respiration, and blood pressure. The cerebellum mediates muscle control, body posture, coordination, and balance (Howard).

More recently, the cerebellum has been linked to the production and metabolism of brain catecholamine, particularly serotonin and dopamine (Kirk, 2005). Thus, the cerebellum's participation in the production and metabolism of neurotransmitter development carries with it this cortical structure's involvement in cross-structural

learning (Heward, 1997). The occipital lobe mediates visual memory via visual discrimination and visual perception (Howard). The thalamus is the primary relay station transporting messages from all parts of the body perhaps of greatest importance, pain sensation. The parietal lobe innervates somaesthetic and motor discrimination and function (Kirk). The sensory strip integrates and interprets incoming sensory information from all parts of the body. The sensory strip is localized adjacent to the motor strip which regulates voluntary movement. The parietal lobe's operations significantly incorporate both the sensory and motor strips (Howard).

Empirical studies of identical twins have contributed to our growing understanding and appreciation for the brain's localization of function as well as the role of genetic influences upon the brain's in-utero development. In the field of neurology and more specifically within the domain of learning disabilities, these studies permit researchers to investigate the relationships between cortical development and function in persons diagnosed with learning disabilities. For example, Fierdorowicz (2005) notes that there is a sixty-eight percent chance that identical twins will share a learning disability while among fraternal twins, the rate is forty percent. Fierdorowicz also establishes that cortical asymmetry has been identified in students with learning disabilities. The differences have been observed both during brain imaging as well as in post mortem examinations of normal brains versus those persons known to have been diagnosed with learning disabilities. In children with learning disabilities, there appears to be right-hemispheric temporal lobe enlargement in comparison to the left temporal lobe of the left cerebral hemisphere. While such structural differences are observed, the impact of these differences upon the students' learning as yet remains unknown. In view of the growing

body of scientific evidence involving genetic concordance with persons diagnosed with learning disorders, Fierdorowicz (2005) concurs with other researchers that persons with learning disabilities do indeed possess neurologically based differences both in structure as well as within function.

A significant relationship between neurological function and learning is cogently represented in Moore's (1999) interviews with Shaywitz and Shaywitz about their recent research. At the Yale Child Study Center of Learning and Attention, Shaywitz and Shaywitz conclude that "dyslexia is neurobiologically based". In their work with functional magnetic resonance imaging (fMRI), Shaywitz and Shaywitz state that reading disabilities are pervasive over time and are of equal prevalence in boys and girls, although, boys appear to be identified more often. Extending beyond the research of Shaywitz and Shaywitz, the investigations of Richards (1999) employs Magnetic Resonance and Proton Echo-Pla Emission Spectroscopic Imaging to explore functional differences in persons with dyslexia and a comparison control group. Richards' findings posit that there exist statistical differences revealing greater amounts of serum lactate production occurring in students with dyslexia. Richards cautions, however, that the metabolic action of lactate on the human brain and its impact upon learning remain quite unclear.

Drubach (2000) establishes that the brain is the organ responsible for integrating all of the functions that make an individual the unique person that he or she is. Fogarty (1997) reminds educators that a climate for thinking has to be developed within the classroom nurtured by a secure and enriched environment. However, although most researchers agree that heredity plays a major role in determining the potential for brain

growth and cognitive development, there is overwhelming evidence to suggest that an enriched environment stimulates brain activity and subsequent development of higher functioning intellects (Diamond, 1988). Sylwester (1996) explains that because neurons thrive only in an environment that stimulates them to receive, store, and transmit information, the challenge to educators is simple: define, create, and maintain an emotionally and intellectually stimulating environment and curriculum. An enriched environment can stimulate brain growth and neural connections. Education is not complete if an understanding of the brain is not an integral part of the plan.

Empirical research establishes that students with LD possess encoding/decoding difficulties (Bell, McCallum, & Cox, 2003; Bender, 2004; Swanson & Harris, 2003). Aaron, Joshi, and Williams, (1999) as well as Crovetti (1999), propose that students with specific learning disabilities in reading, writing, and mathematics possess significant difficulties integrating lexical and numerical information. The cognitive integration problem in LD children arises as the result of localized cortical failure preventing information retrieval from the remote memory systems. The cortical failure would subsequently result in an LD student's inability to form the requisite schemas or "conceptual bridges" necessary to form semantic memories thus rendering the student unable to assimilate new information. (Allor, Fuchs, & Mathes, 2001; Lovett, Barron, & Benson, 2003). An often-observed result of a retrieval system failure is the student's inability to achieve at age-level expectancy (Hooper, Swartz, Wakely, de Kruif, & Montgomery, 2002).

Currently, brain scan research suggests the presence of mimicking neurological activity. The University of Parma research team (as cited in Nash, 2007) has coined the

term mirror neurons as a primary biological explanation for a broad range of neurological functions. Parma's investigations suggest that neural networks with mirror (parallel) properties may facilitate an explanation regarding the emerging mechanisms of human language from the primordial communication systems of monkeys and apes. Supporting the mirror neuron theory is UCLA neuroscientist Marco Iacoboni (as cited in Nash, 2007). Iacoboni conducted research on 23 volunteers watching a series of videos. The findings indicate that mirror neurons in the areas of the parietal cortex or the inferior parietal lobule fired with greater impetus when the research participants viewed a hand reaching for a teacup placed next to a plate of cookies when compared with the volunteer's observation of a hand reaching for an empty cup surrounded by crumbs and napkins. Thus, Iacoboni established the relationship between movement and meaning.

Given the biological rudiment of the mirror-neuron system, speculation arises among neurologists, neuro-linguistic specialists, and neurobiologists regarding Broca's area- a primary left hemisphere language center, as this region appears to bear a close analogue to the motor mirror region in monkeys. Rizzolatti and USO neuroscientist Michael Arbib (as cited in Nash, 2007) extend the current literature of Broca's area relating this region to the development of both sign-language as well as spoken language and its possible connection to the mirror neuron system. Rizzolatti and Arbib propose that language traces involve roots to hand gestures and facial expressions evolving over time and becoming increasingly complex. Accordingly, it is reasonable to consider that differentiated instructional techniques such as mirroring and modeling that incorporate hand gestures (i.e. thumbs-up communicating a job well-done) and facial expressions (i.e. an instructional lesson teaching happiness versus sadness) are consistent with

contemporary scientific postulates supporting brain based instruction with primary and secondary grade students.

Neural networks with mirror properties may assist in the explanation of how empathy, language, and social behavior develop in children. Christian Keysers' (as cited in Nash, 2007) research team theorized that while human mirror systems are similar though not identical, individuals vary widely in their capacity to resonate with the emotional state of others. Richard Davidson's (as cited in Nash, 2007) brain research supports his hypothesis that one's cognitive efficiency and effectiveness is often compromised under conditions of emotional stress and duress. Davidson analyzed the prefrontal cortex activity via functional magnetic resonance imaging (fMRI) on a sample of professional meditators. The meditators' fMRI's were compared to the results of a sample of undergraduate students lacking meditative skills. The skilled meditators produced significantly greater activation in a brain network linked to empathy, compassion and maternal love (caring) when compared with the cortical activation levels produced in the undergraduate student sample. Additionally, neural connections from the frontal regions activated during formal meditative instruction become stronger with more robust connections between cognitive processing (thinking) and feeling. Consistent with cognitive learning theory (Grow, 1996) and applying Davidson's findings (as cited in Nash, 2007), a student's ability to learn and to integrate new information into their overall knowledge network is enhanced when the student is in a relaxed emotional state and working in a quiet, supportive, and reinforcing instructional environment. Davidson's research further reveals that upon the creation of a relaxed emotional state, appreciable increases in neural activity are observed within an area of the prefrontal cortex which is

the cortical source of activity producing pleasure and happiness. This finding suggests that the positive emotional state is a skill that can be taught, practiced, and ultimately implemented to augment the efficiency and effectiveness of thinking skills in students.

Cognitive Learning Theory

The Academy espouses the application of a cognitive, brain based approach to learning. Applied cognitive theories are in part formulated through an understanding of the brain's mechanism-of-function during the child's evolving learning process. Learning experiences are developed according to the learning style of the student. Each student is actively involved during the learning process. It is important to develop organizational skills, build student abilities to form memory and memory retrieval skills, and help them link new knowledge with previously learned knowledge. Caine and Caine (1994) espouse several strong implications for brain based education and link them to several learning practices. The implications for brain based-based education include: the brain is a multifaceted adaptive system; the search for meaning is instinctive and occurs through patterning; learning involves focused attention, peripheral perception; and, the brain improves by challenge yet is inhibited by threat (Caine & Caine, 1990; 2006). In cognitive learning theories, cognition is defined as "the combined act of perceiving, attending, thinking, remembering, and knowing" (Hresko & Reid, 1988). Learners process information from the environment primarily in a selective fashion (Caine & Caine, 1990; 2006). New information is processed based on previous learning. The extent of meaningfulness and relevance that is extrapolated is based on the unique integrity of the nervous system and the organizational abilities of the individual (Caine & Caine, 1990; 2006). The Academy requires independent psycho-educational evaluations

for every student. The independent evaluation identifies and quantitatively assesses cognitive processes involving both the child's strengths and areas of relative weakness. Findings and interpretations are established in a manner yielding specified recommendations. The recommendations incorporate interventions that can be implemented in the classroom setting. In applying the recommendations, the Academy recognizes a basic tenet of education, that is, emotions drive attention which drives learning and memory (Sylwester, 1995).

As Howard Gardner stated (1983, 1997, 2004), there is more than one way to be smart! No intelligence or ability will blossom until it is given the appropriate environmental setting and models for developing (Jensen, 2000; 2005). According to Gardner (2004), the cognitive learning theory encompasses two active cortical processes: the contents that the brain thinks about, such as concepts, theories and skills; and the formats in which the brain-mind does the thinking, including the various multiple intelligences. The implementation of the cognitive learning theory as modeled at the Academy is similar to the one presented by Grow (1996). Accordingly, new information is presented and connected to prior knowledge. Elaborations are developed between the new information and the prior knowledge. The relationship is made evident. Learning takes place when the new information becomes part of the knowledge network. Grow found that, if elaborated and well-integrated, the new knowledge becomes meaningful and useful; the new knowledge may fit into the knowledge network or modify the network. Once this is achieved, retrieval of specifically learned knowledge takes place. Lastly, the cognitive learning model involves reconstruction and recall (Scherer, 2006). Individuals do not store information

as lengthy, threads of text but instead in vibrant, interlinked systems in which the elements have been broken down into groups linked by multiple associations that may be structured as schemas, scripts, or narratives (Grow, 1996). Implementation of this model by the Academy requires a systematic, organized, and patterned presentation of knowledge that invites precision teaching, testing, reflective revision, and progress (Gardner, 1983; 2004). The cognitive learning model presupposes that one's cortical systems synergistically operate in a complex and highly individualized manner (Caine & Caine, 1990; 2006). Accepting as scientific truth the manner of unique development of each student's brain and accordingly their thinking systems, a discussion of the theory and applied methods surrounding the Academy's brain based education model follows.

Brain Based Education Theory

Over twenty years ago, James W. Keefe (1987), referring to the concept of brain based education, stated that knowledge about learning styles and the way the brain learns was a fundamental tool for providing a deeper and more profound view of a learner. According to Caine & Caine (2006), neural networks enable learning and memory and are shaped by human experiences. To develop and maintain these neural networks, Caine and Caine suggest that experiences in sensory and emotional occurrences create associations with prior knowledge and life experiences, generate questions, and plan and implement action. Brain based education allows for all of these. This knowledge of both learning style and brain based learning should then be used as part of a basic framework in developing effective educational practices and

instruction for all learners. The mission and vision of the Academy are based on providing a brain based educational experience.

Moats (2004) states that special education, as it is typically managed and delivered today, leaves classified students without significant gains or even specialized instruction and usually does little for the larger group of unclassified students who also need research-based treatments. The application of brain based research is necessary in order to bridge the gap that exists between a learner's ability and his or her learning style (Moats). The delivery of instruction should be visualized as an educational prescription specific to the learner's mode of receiving, processing, applying and storing information. This can only be achieved through the application of advanced brain based research implemented into a school's educational paradigm and their practices.

Caine and Caine (1990) helped to establish the foundations of the brain based educational theory by establishing brain based principles that should be incorporated in schools and classrooms. They begin by explaining that educators are responsible for the health of learning by incorporating stress management, exercise, and nutrition into the classroom. Caine and Caine explain that the learning environment must provide constancy and familiarity for the students while at the same time providing for innovation, discovery and change. They continue by emphasizing the importance of teachers providing students with meaningful and personally significant patterns as well as provide a climate in the classroom that demands mutual respect and acceptance. They continue by highlighting that knowledge and understanding takes time to build. Caine and Caine (1990) encourage teachers to give students the ability to engage in activities that allow them to process and reflect upon metacognitive skills used during learning.

The goal of these principles is to provide students with meaningful learning opportunities that reflect the real world. Brain based education occurs when metacognition, questioning, and genuine reflection allow the learner to internalize learning in a way that is meaningful to the brain (Caine & Caine).

Through the incorporation of this brain based curriculum, the Academy aims to produce exemplary citizens. The application of the nine Integrated Thematic Instruction (ITI) Body/Brain Compatible Elements is promoted during the learning process, and inspires the unique style of each student. Kovalik's (1997) curricular concepts promote a brain based educational environment by including the following nine elements: 1) Absence of Threat/Nurturing Reflective Thinking: being free from fears or anxiety about physical or mental safety, experiencing a general sense of well-being and positive emotions with respect to learning experiences. 2) Meaningful Content: selecting topics that interest students and have power to help them understand and influence the world. 3) Choices: providing options as to the what and how of learning, with attention to multiple intelligences, higher level thinking, and personality preferences. 4) Movement to Enhance Learning: using movement to activate and focus the body/brain systems for learning. 5) Adequate Time: having enough time to thoroughly explore, understand, and use ideas, information, and skills. 6) Enriched Environment: providing a healthful, inviting, homey setting with many resources from which the students can learn, with special emphasis on real places, people, and objects. 7) Collaboration: acting on the belief that two heads are better than one to solve problems, explore, and create. 8) Immediate Feedback: providing coaching to promote correct initial learning and sustain motivation toward more learning. 9) Mastery/Application: ensuring a

curriculum focus so that students acquire mental programs stored in long-term memory to use what is learned in real life situations.

The Academy incorporates an educational paradigm predicated upon scientifically supported brain based research. Students, for whom such a learning model could most benefit, attend a program that is formulated upon the creation of a welcoming structured environment. Within an inviting, sensory pleasing and positive classroom, the student's academic and life skills programs are consistently presented in a well-patterned and highly organized manner that is precisely individualized to meet the educational needs of each student.

Constructs of the Academy's Program

In this investigation constructs are identified that represent and define both the Academy's theoretical and applied mechanisms that enable its educational program to uniquely impact the students. Together, these constructs help to implement the Academy's mission and vision and, therefore, require precise definition to reflect the manner in which each construct domain operates. These constructs include: multiple intelligences, learning styles, social and life skills, mastery learning, and differentiated instruction.

Multiple Intelligence

Howard Gardner (1983; 1997; 2004) advanced the theory that our brains work in different ways to gain knowledge. Gardner (1983) originally identified seven types of intelligences. Since then he has added a ninth and he acknowledges that, there may be others. Among the possible additional intelligences is moral intelligence (ethics, humanity, value of life). The nine intelligences now include:

- Linguistic – The ability to read write and communicate with words.
- Logical-Mathematical - The ability to reason and calculate, to think things through in a logical, systematic manner.
- Visual-Spatial - The ability to think in pictures, to visualize a future result.
- Musical - The ability to make or compose music, to sing or to understand and appreciate music.
- Bodily-Kinesthetic – The ability to use the body skillfully to solve problems, create products or present ideas and emotions. This intelligence is displayed in athletics, dance, drama, building and construction.
- Interpersonal (Social) - The ability to work effectively with others, to relate to other people, to display empathy and understanding.
- Intrapersonal - The ability for self-analysis and reflection, introspection, goal-setting and planning.
- Naturalist - The ability to recognize flora and fauna, to make distinctions in the natural world.
- Existential – The ability to contemplate phenomenon or questions beyond sensory data, such as the infinite.

Gardner (1997; 2004) associates rich learning experiences with multiple intelligences. He bases a number of his tenets on Vygotsky's theory on experience. Gardner agrees that experience is the idiosyncratic way each person individualizes information during cognitive and personal development (Moran et al., 2006). Gardner explains that when students are offered the same material, each student will have a different experience with it according to his or her individual background of experience. Therefore, to encourage learning across multiple intelligences, students should be offered rich experiences and activities to engage with material on a familiar level (Moran et al.).

Learning Styles

Learning styles identify a student's optimal learning paradigm. An individual's learning style reflects their mix of intelligences. Learning styles are the way in which students begin to concentrate on, process, internalize, and retain new and difficult information (Dunn & Dunn 1992; Dunn et al., 1994). Likewise, multiple intelligences are the mechanisms through which the brain interprets the material that is provided via an

established and organized instructional format. They indicate a student's preferred learning style, as well as their behavioral and working styles, and their natural strengths. Gardner (2004) suggests that individuals are strong in three ways that indicate not only his or her capabilities, but also the preferred manner in which to learn and develop not only their strengths but also their areas of weakness. Accordingly, students are optimally taught utilizing their preferred (natural) learning methods; they can subsequently be taught how to implement various other differential learning styles.

Lovelace (2005) provides additional evidence for increased achievement and improved attitudes when responsive instruction was implemented for diagnosed learning-style preferences. In his 2006 interview with Scherer, Mel Levine supports learning styles as being a dynamic instructional model. Levine challenges educators to celebrate student differences and their strengths as assets by which the students will find meaning in life. Levine correlates learning styles with a consonance between a student's education and his or her future career (Scherer, 2006).

These findings are also supported by the thirty year longitudinal research of Dunn and Dunn (1992, 1999) on learning styles. Their learning styles model report continues to receive broad acclaim within the disciplines of neuroscience, special education, pediatric neurology, neuropsychology, and cognitive psychology. The findings of Dunn and Dunn's longitudinal research conclude: 1) most individuals can learn. 2) Instructional environments, resources, and approaches must be responsive to diverse learning-style strengths. 3) Everyone has strengths, but different people have very different strengths. 4) Individual instructional preferences exist and can be measured reliably. Burke and Dean (2002) further show that, given responsive

environments, resources, and approaches, students attain statistically higher achievement and attitude-test scores in congruent, rather than incongruent, treatments. Dunn and Dunn, (1992, 1993); Dunn and colleagues (1994); and Fine (2002) demonstrate that students also behave better in learning style responsive environments. Follow up studies note that teachers can acquire skills to use learning styles as a cornerstone of their instruction (Dunn & DelBello, 1999); and students can learn to capitalize on their learning-style strengths when they concentrate on new and difficult information (Roberts, 1999; 2001; Honigsfeld & Schiering, 2004; Schiering & Dunn, 2001).

In their studies, Dunn and Dunn (1993; 1999) employed an analysis of variance (ANOVA) to determine statistical significance within and between group differences of 7,196 participants. The Dunn and Dunn report concluded that, regardless of academic level, students can earn statistically higher standardized achievement and aptitude test scores when they are taught and/or tested with resources and strategies responsive to their learning-styles (Kristonis, 2006). Sullivan (1993), performing meta-analyses on both the previous and current findings in Dunn's research supported the efficacy of the Dunn and Dunn Learning Styles Model (1993, 1999). Sullivan's findings revealed that, although several moderating variables influenced the study's outcomes, they overwhelmingly supported the position of the Dunn and Dunn Learning-Style Model that matching students' learning style preferences with complementary instruction significantly improved academic achievement and student attitudes toward learning.

Dunn and Dunn's (1993, 1999) research model, as comprehensive in scope as it is, is particularly relevant to the educational training of both documented and

undocumented students with known or presumed learning disorders. Accordingly, the need for additional (brain based) research possessing the rigor and spirit of Dunn and Dunn is both immediate and vital to the future of special education. Indeed, we begin to glean from Dunn's research that the qualitatively discrepant learning-styles that vary from one student to another form the justification upon which a differentiated instruction model rather than a "one-learning-style-fits-all" instructional paradigm becomes clear. Dunn and Dunn, in fact, have authored in excess of twenty books and three hundred manuscripts describing how children and adults learn in different ways from one another. Their writings further depict how specific instructional strategies and resources appear to be responsive to diverse learners (Dunn, Denig, & Lovelace, 2001).

Social and Life Skills

According to Vygotsky (1993), full cognitive development requires social interaction. He explained that individuals interact with one another to socially regulate meaning. Vygotsky stated that education was a result of social learning and the internal processing of social relationships. Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people [interpersonal] and then inside the child [intrapersonal]. Accordingly, cognitive evolution depends upon the zone of proximal development, a level of development attained when children engage in social behavior (Vygotsky). At the Academy, this development is attained through the support of the student's instructors and through guided peer interactions.

Social skills are imperative for positive social and academic performance of students (Gresham & Elliott, 1990). Social skills are appropriate learned behaviors that

allow individuals to interact with others in ways that brings forth constructive responses (Gresham & Elliott). Fussell, Macias, and Saylor, (2005) determined that 75% of students with learning disabilities (LD) have social skill deficits. Gresham and Elliott (1989) established that students with LD show weakness in social skills as well as a weakness in peer acceptance. Students with LD are susceptible to low self-concept.

Elbaum and Vaughn (1999) link LD with poor self-concept as LD students experience academic challenges that can exhaust self-esteem. They conducted a research synthesis of school based interventions from 1975 to 1997 that included thirty-one separate studies. This meta-analysis found that school based interventions of skill development and skill enhancements lead to positive changes in the self-perception of students with LD. The skill development approach presumes that enhancing and highlighting a student's academic knowledge and understanding will improve the student's self-perception and will provide that student with the anticipation of future academic success (Elbaum & Vaughn). The Academy provides the skill development approach through the individualized academic instructional program offered to the students. The self enhancement approaches are a collection of interventions whose focus is to eradicate students' self-defeating thoughts and behaviors that are interfering with attaining success. The researchers found that defining self concept globally, and encompassing the student's self perception in a variety of ways allowed for more significantly positive benefits (Elbaum & Vaughn).

Cartledge and Johnson (1996) recommend that social skill instruction be an unequivocal and fundamental part of the ongoing school curriculum. According to Raskind, Goldberg, Higgins, and Herman (1999), programs provided by schools for

students with LD should balance teaching academics with the development of success attributes. The researchers identify success attributes as self-awareness, pro-activity, decision-making, empowerment, and perseverance when facing difficulty, goal setting, and emotional stability. This research reveals that these success attributes are more accurate at predicting success than such variables as IQ and academic achievement.

The Academy facilitates the development of positive self-images, self-concepts and promotes positive social and life interactions through the implementation of Kovalik's (1997) Lifelong Guidelines and Lifeskills program. The Lifelong Guidelines and Lifeskills are mental parameters that guide students in a learning environment. They provide parameters that help students evaluate their own performance; to guide them to an understanding of which social behaviors will enhance their success. Levine (2003a) reminds educators that many students with social cognitive gaps do not know how to deal with the setbacks, the impasses, and the interpersonal glitches of day-to-day human interactions. Accordingly, there is no such thing as a social relationship immune from conflict. Learning to interpret social feedback and to produce positive social interactions is an integral part of the Lifelong Guidelines and Lifeskills Program (Kovalik). Begley (2007) explains that mental training has the ability to change the physical structures of the brain and this mind sculpting can result from one's positive or negative thoughts. The Lifelong Guidelines and Lifeskills Program (Kovalik) allows the student to not only develop skills to interact with others, but also to identify the appropriate skills to interact with oneself in thought. Lifelong Guidelines and Lifeskills (Kovalik, 1997) training can develop in students the ability to face adversity and produce more positive social interactions. This curriculum is demonstrated and incorporated in all facets of the program including lesson plans and

behavioral objectives. Roeser, Midley, and Urban (1996) determined that the climate of a school environment contributes to the shaping of student's beliefs, affect, and behaviors. The climate of the Academy is shaped by the social and life skills programs that guide students to attain their personal best.

All students can learn and succeed if they are provided with the opportunity to grow at their own pace within an environment of educational expertise and knowledgeable support (Kovalik, 1997). The formula for success at the Academy is to develop and strengthen a child's confidence and self-esteem through an array of research-based multi-method and multimodal educational strategies based largely upon cognitive learning theories. Lemonick (2007) explains that memory and emotions are connected. An emotional experience will create a resilient memory as these are associated biochemically through hormones. Through the incorporation of Lifelong Guidelines and Lifeskills (Kovalik), the Academy recognizes the connection between emotions and learning by emphasizing the student's self esteem by incorporating character education, and by providing a nurturing and supportive environment. Lemonick continues by emphasizing the overwhelming impact of positive emotions on the learning experience. The learning brain shuts down when overwhelmed by emotion and knowledge acquisition stops (Begley, 2007; Lemonick). The emotional well being of every student is at the forefront of all activities within the Academy.

Mastery Learning

The Academy's goal is to maximize each student's growth and individual success by meeting each student at his/her level of mastery of a target skill and assisting each in the learning process. According to Benjamin Bloom (1971), mastery learning does not

focus on content, but on the process of mastering it. The teacher provides frequent and specific feedback by using diagnostic, formative tests, as well as regularly correcting mistakes students make during the target lesson. Teachers evaluate students with criterion-referenced tests rather than norm-referenced test. Mastery level application provides opportunities to generalize the use of a student's new knowledge in a variety of real-world contexts (Kovalik, 1997). According to Huitt (1996), mastery learning can break the cycle of failure experienced by so many students with unique learning styles. This criterion permeates the development/ implementation of individualized lesson plans incorporating all of the differentiated instruction applications such as the accommodations necessary to facilitate the learning process. At the heart of this approach is the achievement of eighty percent mastery of an educational objective before a student proceeds to a more complex skill level. According to Levine (2003) and Bloom (1971), in this type of learning environment, the challenge becomes providing enough instructional strategies so that all students can achieve the same level of learning.

The theory of mastery learning was first employed by John Carroll in 1963. He posits that student aptitudes are reflective of an individual's learning rate. Bloom (1971) continued to investigate individual differences as applied to learning and determined that aptitude could predict a student's learning success. He further concluded that given sufficient time and quality instruction, nearly all students could learn successfully. Bloom and Krathwohl (1989) believed that a student's natural aptitude should be able to set the degree of learning expected of a student to some level of mastery or performance. According to Anderson's (1994) meta-analysis, two hundred seventy

three of the research studies have demonstrated that mastery learning has a positive affect on achievement at all levels and for all subjects. Positive affective outcomes were also demonstrated for teachers and students. According to Guskey (2005), mastery learning provides feedback that is both diagnostic and prescriptive, for it reinforces precisely what students are expected to learn, identifies what was learned well, and describes what needs to be learned better.

There are many alternative strategies available in mastery learning; among them, along with differentiated instruction, is diagnostic-prescriptive instruction. White explains that the diagnostic-prescriptive approach focuses directly on the student by diagnosing and identifying the strengths and weaknesses of each student and then establishing a teaching prescription of instruction. The assessments to determine diagnosis and identification of strengths and weaknesses in academic performance may take many forms; textbook-made, cumulative reviews, running record scores, formal and informal inventories, teacher observations, and teacher made assessments. White (1998) continues by explaining that the student is the agent of change in mastery learning. The teacher prescribes instruction to the student in order for him/her to learn. Accordingly, the learning is the responsibility of the student.

The Academy respects the fact that children attain their goals through circuitous routes and that they achieve their successes with the necessary support. Levine (2003b) states that it is important to reevaluate the speed demands imposed on students for there are students that naturally process information more slowly. Each student will progress if he or she has been provided the necessary support to process the information they have received. Guskey (2005) states that along with the individualized time necessary

for mastering a target skill, students should be given specific feedback on how well they have learned the target skills, coupled with directions on how to correct any learning errors. Accordingly, the process of mastery learning has been shown to yield improvements in students' confidence in learning situations, school attendance rates, involvement in class lessons, attitudes toward learning, and a host of other affective measures (Guskey).

Differentiated Instruction.

Differentiated instruction as a model has received research attention within the related disciplines of neuroscience, special education, and child development. Brain based education models in conjunction with a growing appreciation for individual learning styles have appeared in research especially for students demonstrating specific learning disorders in reading, writing and mathematics. Vygotsky (1993) intimates that generalized instruction should be curtailed by the teacher in order to serve the unique needs of every student. He explains that instruction must be provided at the student's appropriate level of development (Vygotsky). Moats (2004) reflects particularly substantive support and justification for the provision and implementation of brain based differentiated education models with students documented as possessing learning disabilities.

Carolane and Guinn (2007) explain that differentiated instruction occurs when teaching is matched to the needs of the learners. They continue by describing how scaffolding student learning is a crucial component of differentiation. Scaffolding involves transitory supports provided by the teacher that help a student bridge the gap between what he or she can do and what he or she needs to do in order to learn a new

task. In his research, Swanson (1996; 1999b) identifies the control of task difficulty as one of the components most linked to student achievement. He explains that this individualized differentiation occurs when teachers provide individual students with essential assistance and with tasks sequenced from simple to difficult. Another component of differentiated instruction that is highlighted is the multiple ways students may demonstrate what they have learned to attain defined learning goals which is a hallmark of this type of instruction (Carolane & Guinn). Teachers must create a synergy between structure and choice within their instruction. Guskey (2005) highlights that the teaching and learning process has three basic components: 1. The learning goals, or what the students want to learn, and what they will be able to do. 2. Instruction that results in competent learners, and students who have learned well and whose competence can be evaluated through some form of assessment. 3. The final step is feedback which is the corrective component that allows the teacher to determine for whom the initial instruction was appropriate, and for whom learning alternatives may be needed.

Applying the broad research of Dunn in the 1990's, the Academy's model program employs differentiated instruction believing that, once learning styles have been identified, instructors can estimate the approach (es), method(s) and sequence(s) that are likely to make learning relatively comfortable for each person (Dunn, Griggs, Olsen, Beasley, & Gorman, 1995). Specifically, the differentiated instruction model includes methods of identification, planning, and application of students' specific and unique learning styles, and multiple intelligences. It creates an accommodating environment that nurtures the processes of reflective thinking, develops interesting and relevant scholastic content, and provides for choices relative to the what and how of

learning. The differentiated instruction model provides instructional strategies that also complement students' learning styles. These styles can include: incorporating (body) movement to enhance learning; creating opportunities for flexible time frames to facilitate information processing, storage and retrieval; employing resource-rich academic learning environment; collaboration opportunities; enhancing opportunities for immediate feedback in order to attain mastery levels of newly acquired knowledge in an optimal time frame (Gardner, 1997, Kovalik, 1997).

Gardner (1997; 2004) endorses differentiated instruction as he encourages teachers to provide rich experiences to help students learn along several dimensions at the same time (Moran et al., 2006). In this scenario, students are provided with options on how to demonstrate understanding of a concept. Levine (2003a; 2004) also emphasizes the importance of active learners. He explains that by incorporating multiple intelligences, rich experiences, and collaboration among students, students will: become aware of their multiple intelligences; develop self-regulation; understand their particular combinations of strengths and weaknesses; and will participate more actively in the learning process (Moran et al., 2006).

In an interview with Scherer (2006), Mel Levine highlights the importance of differentiated instruction for students. Levine explains that differentiation is the only way to allow all kinds of learners within a class to gain access to ideas and concepts of the curriculum. He continues by incorporating prescriptive teaching as part of differentiated instruction. Levine states that teachers should be able to prescribe educational opportunities based upon student observation; he continues that teachers

should be familiar with the academic breakdowns or deficits in order to better prescribe an educational remedy to the individual student (Scherer).

Tomlinson (1999) best describes the concept of differentiated instruction as an approach that recognizes and accepts student's varying background knowledge, readiness, language, preferences in learning and interests, in order to create opportunities for them to learn in different ways. Thus, there is a process in place to approach teaching and learning for students with differing abilities within the same class. According to Tomlinson and McTighe (2006), and supported through Gardner's (1994; 2004) works on multiple intelligences, a teacher can examine any task or assessment to determine whether some students might benefit from a differentiated version of work and how such tasks might be varied to optimally benefit particular learners.

In the United States, and perhaps around the world, the field of specialized education for students with learning disabilities will continue to grow and to evolve. Advanced educational research designs and assessment methods, particularly incorporating multiple intelligences and mastery learning models, will assuredly contribute to an increase in the early identification of childhood learning concerns; this early identification will encourage early intervention and prevention of secondary challenges, emotional, social, and behavioral difficulties. Brain based research supports the furtherance of expertise in the development and implementation of individual learning plans that attend to year-over-year analyses and findings relating to children's unique learning styles. Within this spirit, the Academy espouses the historical and current educational research of Piaget, Vygotsky, Bloom, Dunn, Guskey, Flavell,

Kovalik, Gardner, Levine and others, and in so doing, has and continues to employ a facilitative educational program rooted in the principles and practices of brain based education. The investigation herein presented seeks to advance the science and aims of brain based learning and to support the educational and learning needs of many students in our nation.

The Program Evaluation Processes

According to Hirsch (1988), every citizen needs to have immediately at hand a critical mass of specific information in order to possess that skill known as literacy or functional education. This specific information comes to children not only through life experiences, but also through the formal presentation and delivery of curriculum in quality educational programs. Schools are expected to train students for the broader activities of society (Hirsch). Program evaluations investigate the infra-structure of the school, its curriculum, personnel, policies and procedures. The purpose of a program evaluation is to investigate what is going on in the everyday operation of the academics of the school, and to determine to what extent the goals of the program have been achieved (McNamara, 1998). It is an opportunity to reflect on daily practices, and ultimately to assess the areas that are working and those in need of improvement. A program evaluation is a very comprehensive process. This study, one of the many components of a program evaluation, focuses on the effects of the reading, writing, and mathematical academic program and the social and Lifeskills program at the Academy. As a result, long-term goals are determined, as are short-term objectives. Through this investigation, areas of excellence are highlighted and recommendations are provided. The most important product of all schools is an appropriate education within a safe

environment. Ultimately a strong structure is essential for a successful educational program, both instructionally and financially.

Program evaluation, according to McNamara (1998), is carefully collecting information about a program or some aspect of a program in order to make necessary decisions about the program; program evaluation can include one or a variety of more than thirty five different types of evaluations, such as need for assessments, accreditation, cost/benefit analysis, effectiveness, efficiency, formative, summative, goal-based evaluations, and outcome-based evaluations. Implicit within McNamara's (1998) discussion and findings was the type of evaluation chosen by a given program to improve upon its service provision which is largely predicated upon what the executive administrator (and Board of Directors if applicable) desired to learn about the program. In effect, the type of program evaluation chosen would rest upon the platform of knowledge that identifies what one would need to know to render the decision the administrator would need to exercise; and to determine how best to accurately acquire both quantitative and qualitative data so as to understand the accumulated information.

A program evaluation requires a discussion encompassing two interwoven domains. First, it is necessary to identify and define the type and purpose of the intended evaluation. Second, it is necessary to specify and define the administrative body entrusted to organize, to delegate responsibility, to oversee, and to report upon the findings of this highly structured and formal assessment process. According to Borg and Gall (1983), within the formative evaluation process, there is an opportunity for "in-house" evaluators to collect data while a program is still being developed or considered. It is during this process that the administrative body overseeing the program can make

modifications. In some instances, the evaluation findings may lead to a decision to abort further development so that resources are not wasted on a program that ultimately has little chance of being effective (Borg & Gall, 1983). The summative program evaluation is important because it helps administrators determine whether or not to maintain an existent program. Unlike the formative program whose data is collected through observations, questionnaires, and interviews, summative data tends to be collected with standardized instruments having validity and reliability (Borg & Gall, 1983). Goals-based evaluations according to McNamara (1998) observe the extent to which programs are meeting predetermined goals or objectives and then allow the administrator to determine how priorities should be changed to put more focus on achieving the goals. Not-for-profit organizations will sometimes choose an outcomes-based evaluation which analyzes the impact the program will have on its participants. Outcome evaluation helps to determine what changes occurred as a result of the services or activities the program provides (Nunn, 2005).

Nunn (2005) identified a formal program evaluation often called upon in the (school) accreditation process. The process evaluation is designed to provide immediate feedback on program implementation that in effect allows for preferred administrative and/or programmatic modifications (i.e. - curricular adjustments, staffing/personnel changes, etc.) Typically, the process evaluation will respond to the evaluator's questions: What was actually accomplished vs. the accomplishments that were actually proposed? When are scheduled activities to be held and are they done? The process evaluation takes place while the program functions (e.g. during the academic day) in part to facilitate the evaluator's appreciation of how the program integrates its various systems (Nunn, 2005).

When private schools are going through a reflective self-study process of evaluation, the administrative entity (e.g. Director, President, etc.) responsible for the overall daily governance of the organization would additionally oversee and “govern” the evaluation proceedings. The administrator is expected to identify and find a resolution for the areas of concern within the program. The trend in evaluations, according to Nolan (2005), is that the heart of evaluations has evolved from a summative evaluation of student performance to a diagnostic evaluation of student performance and implications of instruction. Indeed, this is the focus of the current evaluation.

According to Nolan (2005), it is the administrator, or evaluator, that needs to identify strategies to develop a collaborative process. The administrator has to be clear on the focusing questions, respectful of the participant’s input and vigilant about keeping the discussion focused. The role of the administrator continues to grow throughout the program evaluation process. Aubel (1999) reflects that the success of a program evaluation largely depends upon on careful logistical and administrative planning. In most instances, a process-driven format is predicated upon guidelines and standards set forth by a formal accrediting body (Aubel, 1999). The ensuing self-study conducted by a school under the direction of its chief administrator/Director in effect becomes a formal in-house evaluation of the school’s operational systems. The needs assessment is created to be sensitive enough to detect subtle changes. The internal needs assessment is in part designed to reflect a programmatic outcome measure. Accordingly, the administrator greatly benefits from the evaluative findings by virtue of tracking curricular and programmatic efficacy, as well as measuring progression toward longer term (master-plan) objectives.

Ultimately, it is the responsibility of every administrative body to consistently monitor their program(s) by designing and implementing an ongoing self-evaluation process. There are many methods to choose from, but essentially it is the continuous feedback that allows an administrator to determine whether the program is benefiting the target customer, the students. No Child Left Behind (PL 107-110, 2001) requires that states develop an accountability system in which all fifty states have to meet Adequate Yearly Progress (AYP) goals for all students including students with disabilities (School Improvement in Maryland, 2006). Private schools must undergo the same accountability process. Children must be tested annually utilizing a nationally normed test to determine whether achievement and progress has been noted in the different cognitive areas. Quantitative in nature, this data is found in most educational program evaluations. The administrator or administrative body must analyze not only overall school performance, but also the performance of the individual students and determine what factors can be changed or manipulated to improve the performance of those students that were not successful.

Summary

The premise of this research study is based upon the hypothesis that differentiated instruction incorporating brain based mastery learning techniques with an infusion of a social and life skills program yields quantitative gains in student achievement and learning related behavior. A pilot model was successfully implemented employing differentiated instruction using a broad range of scientific brain based educational strategies. Individualized strategies, stemming from brain based research, are integrated into the instructional methods implemented in class with students (kindergarten-twelfth

grade) with learning disabilities and/or ADD/ADHD. This study evaluated the effectiveness of the academic program of the Academy's summer program for students that are classified with learning disabilities and/or ADD/ADHD. These students were identified but not limited to attention deficits, specific learning disorders such as dyslexia, dysgraphia, and dyscalculia, and disorders of executive function notwithstanding central processing disorders. It was hypothesized that students enrolled in the summer program would demonstrate statistically significant achievement gains in academics- reading, writing, mathematics and social/ life skills.

CHAPTER III

Methodology

Study Design

To evaluate the effectiveness of the Academy's summer program, this investigation used a quasi-experimental pre-and post-test design to determine if students in the study demonstrated statistically significant gains in core academic achievement and social and life skills development. The summer school evaluation of the Academy was assessed by using two instruments: 1) For academic gains, the Woodcock Johnson III Achievement [WJ-III] [Forms A and B] (Woodcock, McGrew, & Mather, 2001) was administered using equivalent forms for the pre- and post-tests. 2) For social and life skills gains, the Social Skills Rating Systems [SSRS], (Gresham & Elliott, 1990). Respectively, the two instruments statistically measured participant achievement gains in the three core academic areas of reading, writing, and mathematics, and in social/ life skills assessing cooperation, assertiveness, self-control, externalizing, internalizing, hyperactive behaviors, and academic competence.

Participants

Due to the nature of the Academy's summer school study, the participants in this summer school study included a convenience sample of students attending the Academy's 2007 summer school program. All current students attending the school during the academic school year of 2006-2007 will be invited to attend the summer school program and participate in the study. If a student, or parent of a student, did not want to participate in the study, the student was part of the summer school program, but

his or her data was not included in this study. As an ongoing procedure, students who have a deficit in reading, writing, or math greater than or equal to two years, as determined by SAT scores, were part of the summer school program. Parents typically receive a letter written by the Academy's psychologist explaining the SAT scores as well as demonstrated deficits and lags in subject areas. The letter invites parents to register students in the summer school program or to schedule a parent-teacher meeting so that the Academy may provide an individualized program for the student to work on independently at home during summer vacation. Students who were new to the school were also accepted into the summer school program.

Upon enrollment into the summer program, the academy's registrar introduced, explained, and clarified the nature and purpose of this research study, including the option of withdrawing from the evaluation at any time without explanation or consequence. Agreement to participate in the study was accompanied by an informed consent document for parent signature and an assent form for student's signature. To ensure confidentiality the academy's registrar was assign a participant number to each student.

The sample size (N) of the student cohort was 40 students. Students' ages ranged from six to seventeen years. The students in this study represented a broad multi-cultural sample including but not limited to: Caucasian, Hispanic, African-American, and Asian persons. The Academy's instructors participated in the data collection activities required to complete the program study. The instructors collected and reviewed completed in-class assignments. The collection of in-class data facilitated the instructor's ability to complete the SSRS.

A highly qualified, licensed psychologist with no affiliation to the school administered the WJ-III individually to the students. The psychologist was not aware of the purpose of or the details of the study. The psychologist administered, interpreted, and scored the pre and post-test results of the WJ-III and scored and interpreted the teacher completed SSRS. Once this had been completed, all compiled data was forwarded directly to the principal investigator.

The Academy is organized by departments: reading, writing, math, electives/activities. Students received daily instruction from six teachers each day. Therefore, each instructor taught only one subject. Two teachers taught within the individual departments for three periods during the academic portion of the summer program. Hence, there were two reading teachers, two writing teachers, and two math teachers. Additionally, there was one performing arts teacher, one art teacher, one P.E. teacher and one technology teacher. In all, 10 instructional staff members provided educational opportunities to the student participants and completed the SSRS. The homeroom teacher spent over an hour every day with the students during AM homeroom, lunch, and PM homeroom periods daily. The homeroom teacher became the student's advisor and was familiar with their complete educational programs. Therefore it was the homeroom teacher that was responsible for completing the teacher form of the SSRS.

Instrumentation

The Academy's essential mission and purpose is to provide an individualized and carefully sequenced curriculum based upon the specific individual needs of each student. The assessment instrument selected for use in this study to determine student academic gain within a summer school program was the Woodcock Johnson III Achievement (WJ-

III), Forms A and B. Specifically, the reading, writing, and mathematics subtests were used to objectively measure each student's level of function within these three core academic domains. The WJ-III is a broad range, comprehensive set of individually administered tests for measuring cognitive abilities, scholastic aptitudes, and achievement. The tests were nationally standardized on 6,359 subjects, aged 24 months to 95 years of age. The WJ has been used throughout the country since 1978. The current revision, WJ-III, has been in use since 1990. This evaluation tool is standardized and norm referenced. It has a reliability coefficient ranging from .88 to .94 (Woodcock, McGrew, & Mather, 2001).

The WJ-III contains two forms that are matched in content-Forms A and B. Alternating use of the two forms prevents the subject's familiarity with specific item content and thus allows the examiner to administer the achievement tests more frequently to the same subject. Form A was administered to the student participants at the commencement of the summer program and Form B was administered at the close of the program. The WJ-III provides interpretable measures suitable for discussions and decisions referencing educational program efficacy. The WJ-III's utility spans the entire educational continuum from early childhood through adult. Continuous data collection incorporating this norm referenced instrument strengthens its utility as a formal school reporting instrument.

In this study, the investigator employed the standard WJ-III test battery incorporating both Forms A and B. The specific curricular areas included reading, mathematics and written language. Subsumed within the reading section are tests one, two and nine. Respectively they incorporate letter-word (l-w) identification, reading fluency and

passage comprehension. Included within the mathematics section are mathematics calculation skills, math fluency, and applied problems. The written language section incorporates basic writing skills, writing fluency, and written expression. Respectively, the written language skills are assessed in tests seven (spelling), eight (writing fluency), and eleven (writing samples).

In reading, l-w identification has a median reliability of .91 representing the chronological age group of 5-18 year old United States students (Woodcock et al., 2001); l-w is designed to measure the examinee's word identification skills. As a power-test, the examinee is required to identify and correctly pronounce letters appearing in large type on the subject's side of the test; reading fluency has a median reliability of .90 across the 5-18 year old age group (Woodcock et al.). Reading fluency measures the examinee's ability to rapidly decode and read simplistic sentences from the subject response booklet within three minutes. The examinee decides whether or not the statement read is true or false and then circles the appropriate Yes or No response. Passage comprehension has a median reliability measure of .83 across the student population age 5-19 years. Symbolic learning, one's ability to match a rebus (a pictographic representation of a word) with an actual picture of the object is a core rudiment of this test. Picture-phrase associations are subsequently presented in a multiple choice format and therein addresses the examinee's abstract-conceptual reasoning ability. Increased passage length with a reduction of pictorial stimuli renders this power test particularly challenging for students who rely on concrete context clues for comprehension. The items increase in difficulty although the student is not required to know the meaning of any word.

Respectively, the three math skill areas are evaluated by administering tests five (calculation items), six (math fluency), and ten (applied problems). Calculation has a median reliability of .85 representing the student population of 5-18 years (Woodcock et al., 2001). Calculation items are an achievement test measuring the examinee's ability to correctly perform mathematical computations. The items are presented in a traditional format in the Subject Response Booklet. This power test initially presents the examinee with questions including written number configurations. The math operations of addition, subtraction, multiplication and division are incorporated into the calculation items subtest and advance to include positive and negative numbers, fractions, decimals, percents and whole numbers. Toward the end of the subtest, geometry along with some trigonometry and pre-calculus, items are designed to test the examinee's math knowledge ceiling. Math fluency assesses the student's ability to rapidly solve simplistic addition, subtraction, multiplication and division problems. Math fluency reflects an established median reliability of .89 across the student population of 5-18 years of age (Woodcock et al.). Problem analysis and computation represent the core math achievement abilities in test ten, applied problems. In the applied problems test, the examinee listens to the problem. He or she is then required to establish the design of the problem, determine the correct math operations, and solve the problem. Inherent within a number of problems is the use of extraneous information designed to measure the examinee's ability to differentiate the relevant versus irrelevant details of the question. Attention and concentration are particularly necessary cognitive abilities to successfully perform on this test.

The written language domain includes basic writing skills, writing fluency and written expression. The administration of tests seven, eight and eleven respectively assess

spelling ability, writing fluency and writing samples. The spelling section assesses the examinee's ability to correctly write orally presented words. The median reliability for the spelling test section is .89 in the population of students aged 5-18 years (Woodcock et al., 2001). This power test becomes more challenging as the presented items become increasingly difficult both in terms of required knowledge of upper and lower case letters as well as in native spelling ability. Writing fluency has a median reliability coefficient of .86 across ages 5-18 years (Woodcock et al.). Writing fluency measures the examinee's skill in the rapid formulation and writing ability of simple sentences. The sentences require a minimum use of three words and are predicated upon the examinee's interpretation of presented stimulus pictures. The writing samples' evaluation reflects increasing item difficulty through the design of sentences responding to stories of increasing passage length, level of vocabulary, grammatical complexity, and level of abstract conceptual reasoning. The examinee is not, however, penalized for incorrect spelling or punctuation errors. The writing samples test has a median reliability of .84 representing the student population of 5-18 year olds (Woodcock et al.).

The determination of each student's (academic) needs was established via achievement testing within the domains of reading, writing, and mathematics. This procedure afforded the examiner two significant levels or "types" of awareness.

1) Achievement scores in reading, writing and math were reviewed for discrepancies. 2) Intra-achievement discrepancies were identified thus facilitating the student's educational team to appreciate the "within and between" differences that may exist on each student's examination findings. Such information was particularly vital to the development of an individualized curriculum plan.

The program's essential mission and purpose is to provide an individualized and carefully sequenced curriculum based upon the specific individual needs of each student. As a norm-referenced instrument, the Woodcock Johnson III Achievement effectively measures the core academics that a student's scholastic program is built upon. This program's evaluation was based on the effectiveness of the summer school program in raising reading, writing, and math achievement of students with LD, ADD/ADHD using the WJ-III.

Social skills and behavior significantly affect academic learning (Gresham & Elliott, 1984); therefore, this study required an objective measure to assess social and behavioral influences that could impact student learning. The Social Skills Rating System (SSRS) was employed in this study to assess the impact of the social and life skills education program on the students. The Social Skills Rating Systems developed by Frank M. Gresham and Stephen N. Elliott, (1990) are constructed to form the basis for a detailed assessment of a child's social and behavioral level of function. Social skills are socially acceptable behaviors enabling adaptive interpersonal interactions to operate (Gresham & Elliott, 1984). As exists with the Academy's Lifelong Guidelines and Lifeskills (Kovalik, 1997), the development of socially acceptable behaviors supports a child's endeavor to succeed and to avoid socially unacceptable alternatives when presented with barriers that inhibit learning and relationship building (Gresham & Elliott, 1984). Further, Cole and Dodge, (1983); Cowen, Pederson, Babigan, Izzo, and Frost, (1972); Parker and Asher, (1987) state that left untreated, social problems become persistent and are related to poor academic performance and may later impact one's quality of life through social maladjustment and more serious forms of mental illness.

The researchers continue that the early identification and treatment of social difficulties in students are important tasks for educators, psychologists and other mental health professionals.

The SSRS factors are in part, designed to assess and to measure four social skills behaviors including cooperation, assertion, self-control and empathy. The four social skills behaviors are consistent with and targeted in the Academy's Lifelong Guidelines and Lifeskills (Kovalik, 1997) program. In the SSRS, cooperation is defined as behaviors such as helping others, sharing materials, and complying with rules and directions. Assertion is defined as initiating behaviors such as asking others for information, and responding to the statements or actions of others such as peer pressure or put-downs. Responsibility is defined as demonstrated behaviors reflecting the ability to communicate with others and exhibiting regard for property or work. Empathy is defined as the demonstration of care and respect for the feelings and viewpoints of others. Self-control is defined as adaptive self-governed behavior in the presence of conflict or when situations require compromise and patience (Gresham & Elliott, 1984).

The Lifelong Guidelines and Lifeskills program Kovalik, (1997) define cooperation as the behavior of working together toward a common goal or purpose. Initiative, the behavior of starting and following through on a task because it needs to be done, in conjunction with common sense, the use of sound judgment and caring, the behavior of demonstrating concern for others operate in concordance with the SSRS subscale of assertion. Responsibility is defined as an appropriate social response reflecting accountability to ones' self for his or her own actions (Kovalik). Caring and friendship are respectively defined as the demonstration of concern and reciprocal trust in

others. Caring and friendship are consistent with the SSRS subscale of empathy. Patience is defined as the behavior of calmly waiting for a person or activity to occur (Kovalik).

Patience is consistent with the SSRS subscale of self-control.

Grade variables were considered in this study. Study participant grade groups were established on the basis of their enrollment in kindergarten through sixth grade (elementary level) and seventh through twelfth grade (secondary level). The Academy's summer school enrolled twenty-two elementary grade level participants and eighteen secondary grade level participants. Accordingly, fifty-five percent of the participants were in kindergarten through sixth grade and forty-five percent were in seventh through twelfth grade.

The Social Skills Rating System is particularly well-suited for this study in keeping with the school's sensitivity to employ normatively based instruments that include both mainstream students and children with learning disabilities (Gresham & Elliott, 1990). For example, among a sample of elementary school students using the teacher version of the SSRS, Gresham and Elliott (1990) identify the three behavioral measures of the SSRS. The measures include the domains of social skills, externalizing/internalizing behaviors, and academic competence that sample behavioral functioning in specific situations and settings. A discriminant validity coefficient of 0.88 reflects total scores obtained on the SSRS. Across all forms and levels, the median coefficient alpha reliability for the Social Skills Scales is .90, .84 for externalizing/internalizing behaviors, and .95 for academic competence (Gresham & Elliott, 1984). The SSRS provides an integrated measure of social and behavioral findings that determined the growth and development of the social and life skills program

during the summer school session. The SSRS was filled out by each student's homeroom teacher. The completed document was handed in to the psychologist during the first week of the summer school program and again following completion of the SSRS at the conclusion of the program. The completed forms were placed in a locked file cabinet awaiting the psychologist's scoring and interpretation. The SSRS is comprised of a norm-referenced multi-factor self report checklist. The Academy's teachers are familiar with completing self-report instruments; therefore, no training was required to familiarize the participants with the tool. The Academy's psychologist was available in the event that a related study question arose. All testing materials were directly forwarded to the principal investigator who secured the materials in a locked file cabinet.

Data Collection Procedures

The data collected during this study originated from the subtests of the WJ-III and the teacher completed SSRS. The outside psychologist administered, interpreted, and scored the results of the WJ-III as well as scored and interpreted the SSRS. Once this was completed, the psychologist provided the data to the principle investigator. Each subject was evaluated during the first week of the summer school program and again, at the close of the final week of the program. The evaluations took place in a distraction free classroom within the Academy. The testing environment was well-illuminated with comfortable levels of temperature and humidity. The participants were provided with a brief resting break between each section of the WJ-III.

Data Analysis Procedures

An evaluation of achievement gains in the Academy's summer school program followed a pre- and post-test quasi-experimental design format. Data was collected and then statistically analyzed. Because the investigator analyzed variability (the size of the differences in academic achievement from the beginning of the program to its conclusion), the employed statistical analysis incorporated a paired analysis of variance (ANOVA) with an Alpha= 0.05. The ANOVA is an inferential hypothesis-testing procedure used to evaluate mean differences between two or more treatments or populations (Gravetter & Wallnau, 1995). The ANOVA provides research flexibility as it can be used to compare two or more treatments. This study used a paired repeated measures design. Accordingly, the same subject cohort was tested in all of the treatment (instructional) conditions. Between-treatment variability was analyzed as well as within-treatment variability (Gravetter & Wallnau). Between-treatment variability looked at the measured variability of achievement in students between three core academic domains. Within treatment variability assessed the size of the differences among students within each of the three core academic domains. Statistical testing yielded an *F-ratio (F)*. Significance was established at $p=0.05$. Hence, the findings enabled the investigator to objectively establish whether the sample mean differences were significant as a result of chance or the experimental treatments (instructional methods).

Within this summer school program evaluation research design there exist four primary dependent variables. The primary dependent (outcome) measures represented the primary effects of student achievement and the required behaviors toward learning. The four dependent variables include:

- 1.) The quantitative impact of the summer school program on reading achievement.
- 2.) The quantitative impact of the summer school program on writing achievement.
- 3.) The quantitative impact of the summer school program on mathematics achievement.
- 4.) The impact of the summer school program on students' social and life skills.

In this study, the summer school program is the independent measure.

CHAPTER IV

Results

Introduction

The sample for this study included forty ($N = 40$) participants and all analyses were based upon this total. Participants' demographic information, including gender, grade level, and nature of disability, is presented in Table 1 below.

In this quasi-experimental study, the experimental procedures incorporating brain based academic instruction in reading, writing, and mathematics occurred each morning in three fifty-minute classes. The experimental procedures incorporating social/life skills training took place in each of the three morning classes and in four fifty minute afternoon classes. Having been evaluated by an independent clinical psychologist prior to enrollment in the summer study program, participants in this investigation represented participants with learning disabilities (LD) [$n = 23$] or attention deficit disorder with or without hyperactivity (ADD and ADHD) [$n = 23$]. The dependent variables in this study consisted of the pre- and post- test values obtained on the Woodcock-Johnson III tests of achievement and the Social Skills Rating System (Gresham & Elliott, 1989).

The research questions of this study support the implementation of a parametric statistic. A one-tailed Analysis of Variance (ANOVA) was employed to test the treatment effects of the academy's summer school program. For this study, while the ANOVA is a desirable statistic to apply as the population distributions are assumed to be normal with homogeneity of variance, there exists a consideration regarding this study's small sample size however. When applying the one-tailed ANOVA, homogeneity of variance is assumed as the comparison group's pre- and post- test participants will share the same

variance. Gravetter and Wallnau (1995) discuss the advantage of a one-tailed statistical test in research consistent with a study of this exploratory nature. Gravetter and Wallnau elaborate that research involving the exploration of new treatment/intervention methods should be subject to a more sensitive statistical test even if the risk of committing a Type-I error is heightened. In such research, the authors continue, the commission of a Type-I error with minimal outcome damage is a tolerable trade-off, for increasing the probability of establishing a significant treatment effect. Specifically, a participant of average intelligence absent of a diagnosis of LD, ADD, or ADHD receiving their education in a school incorporating a brain based program will likely perform as well or perhaps better than having received their education in a traditional school program. However, if the research concludes that a brain based education program is significantly effective in educating average IQ children diagnosed with LD, ADD, and ADHD the risk of overlooking this treatment effect using a one-tailed test is reduced. In this study, the gain/loss measures are derived from the calculation of difference scores on the pretest and post test administrations of nine Woodcock-Johnson III subtests. Thus in view of the aforementioned, it was decided to select ANOVA as the best analysis for this study.

Table 1

<i>Demographic Information</i>		
	<i>n</i>	<i>%</i>
<i>Gender</i>		
Male	26	65.00%
Female	14	35.00%
Total	40	100.00%
<i>Grade Level</i>		
Elementary	22	55.00%
Secondary	18	45.00%
Total	40	100.00%
<i>Nature of Disability*</i>		
LD	23	57.50%
ADD	13	32.50%
ADHD	10	25.00%

* Due to comorbidity, the total number of participants is greater than $N=40$.

Preliminary Descriptive Analyses

Preliminary descriptive analyses considering pre-intervention participant differences in gender, grade, and nature of disability were investigated.

Gender

In this study, and consistent with literature on LD (Bender, 2004), Demographic Table 2 reflects a larger number of males than females with diagnosed LD, ADD and ADHD. This table presents the number and proportion of participants in the different grades and nature of disabilities by gender.

Table 2

Grade Level and Disability by Gender

	Female		Male	
	<i>n</i>	%	<i>n</i>	%
<i>Grade Level</i>				
Elementary	7	50.00	15	57.69
Secondary	7	50.00	11	42.31
Total	14	100.00	26	100.00
<i>Nature of Disability</i>				
LD	10	71.43	13	50.00
ADD	3	21.43	10	38.46
ADHD	2	14.29	8	30.77

* Due to comorbidity, the total number of participants is greater than $N=40$

Nature of Disability

This study establishes the need for and effectiveness of a brain based learning model for children diagnosed with LD, ADD, and ADHD. Demographic Table 3 shows the gender and grade level and reflects the larger number of participants with LD in this study.

Table 3

*Gender and Grade Level by Disability **

	ADHD		ADD		LD	
	<i>N</i>	%	<i>n</i>	%	<i>N</i>	%
<i>Gender</i>						
Male	8	80.00	10	72.92	13	56.52
Female	2	20.00	3	23.08	10	43.48
Total	10	100.00	13	100.00	23	100.00
<i>Grade Level</i>						
Elementary	6	60.00	6	46.15	13	56.52
Secondary	4	40.00	7	53.85	10	43.48
Total	10	100.00	13	100.00	23	100.00

* Due to comorbidity, the total number of participants is greater than $N=40$

Inferential Statistical Analysis

As previously mentioned, the ANOVA was applied as the statistic-of-choice to test the pre-test and post-test measures at the level of specific treatment effects. Means and Standard Deviations for the pre- and post- test measures of reading, writing, math, and social skills are presented in Table 4.

Table 4

Mean Test Scores and Standard Deviation for Pre- and Post- Test Scores

Groups		Pre-Test	Post-Test
Total Reading	<i>M</i>	107.50	122.07
	<i>SD</i>	46.62	50.58
Reading Fluency	<i>M</i>	37.94	46.57
	<i>SD</i>	419.83	618.84
Total Writing	<i>M</i>	65.82	72.42
	<i>SD</i>	30.33	31.18
Total Math	<i>M</i>	98.15	110.17
	<i>SD</i>	50.31	56.13
Total Reading, Writing, Math	<i>M</i>	271.47	304.67
	<i>SD</i>	123.34	133.60
Total Social Skills	<i>M</i>	272.6	289.85
	<i>SD</i>	30.03	23.22

* $p < 0.05$

Subsequent analyses using the Chi-square goodness-of-fit analyses were conducted to determine if the number of participants who produced post- program differences across the measures of reading, writing, math, and social skills was significantly different from those who did not produce post-program differences. Table 5 reveals the ANOVA analyses of the three core academic domains of all participants.

Table 5

Analysis of Variance for Combined Total: Reading, Writing, Math- All Participants

Source	Sum of Squares	df	MS	F	P
Pre-Post Test Scores	22044.80	79	22045	1.30	0.26

p<.05 p<.01

Academic Testing

An ANOVA tested the data from pre- and post- tests on the WJ-III. Table 5 depicts the aggregate results from all participants assessed in core academic areas including reading, writing, and mathematics. ($F_{(1,79)} = 1.3, p > .05$). The findings establish that statistical significance was not produced. In the mean writing skills of all participants ($F_{(1,79)} = .90, p > .05$), in the average reading scores of all participants ($F_{(1,79)} = 1.75, p > .05$) and in the mean mathematics scores of all participants ($F_{(1,79)} = .99, p > .05$). Table 6 shows the combined reading scores only ($F_{(1,79)}=2.72, p > .05$). These further analyses of within group differences showed that secondary grade level post test scores on one of the reading subtests- reading fluency produced statistical significance. However, the other analyses of within group differences showed no statistical difference.

Table 6

Analysis of Variance for Combined Reading: Letter Word Identification, Reading Fluency, Passage Comprehension- All Participants

Source	Sum of Squares	df	MS	F	P
Pre-Post Test Scores	1415.57	79	1415.60	2.72	0.10

p<.05 p<.01

Additional analyses were conducted to investigate whether the sample differed on the measures of interest based on gender, grade, and nature of disability. The analyses did not produce statistically significant results.

Gender.

Reading Skills: Male ($F_{(1,51)}=.93, p>.05$) and female ($F_{(1,27)}=.87, p>.05$) post- test scores did not produce significant differences between male and female on this dependent variable.

Writing Skills: Male ($F_{(1,51)}=.62, p>.05$) and female ($F_{(1,27)}=.27, p>.05$) post- test scores did not produce significant differences between male and female on this dependent variable.

Mathematics: Male ($F_{(1,51)}=.39, p>.05$) and female ($F_{(1,27)}=.85, p>.05$) post- test scores did not produce significant differences between male and female on this dependent variable.

Grade.

Reading Skills: Secondary grade level participants demonstrated statistically significant post program improvement in reading fluency ($F_{(1,35)}= 4.68, p< .05$), low effect size ($\eta^2 = 0.02$). Elementary age post test scores on combined reading skills did not produce statistical significance ($F_{(1,43)}= .85, p> .05$). This information is reflected in Table 7 and Figure 1.

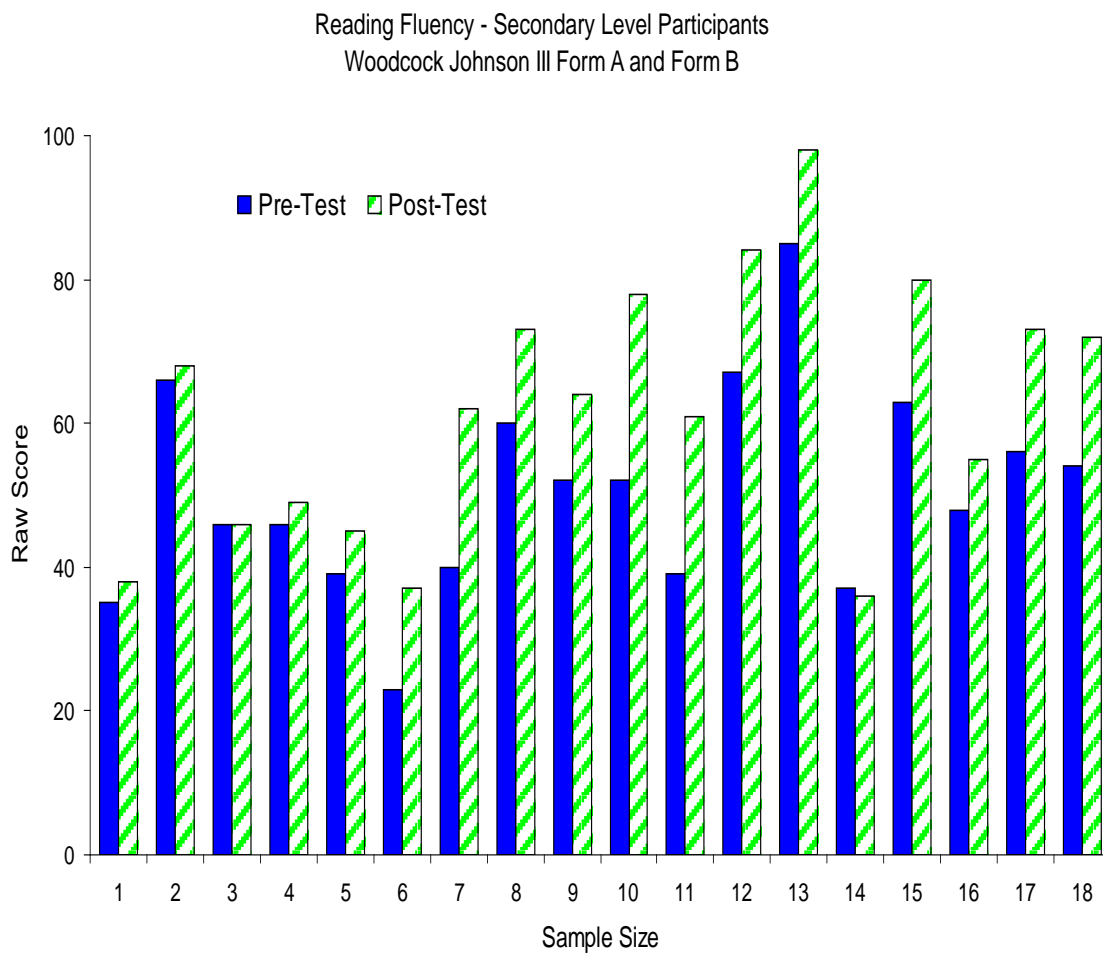
Table 7

Analysis of Variance for Reading Fluency- Secondary Level Participants

Source	Sum of Squares	df	MS	F	P
Pre-Post Test Scores	1236.70	35	1236.70	4.68	0.04*

*p<.05

Figure1



Combined Writing Skills: Neither elementary age ($F_{(1,43)} = .64, p > .05$) nor secondary age participants ($F_{(1,35)} = 1.11, p > .05$) produced significant post test differences on this dependent variable.

Combined Mathematics Skills: Post- test differences were not significant for elementary age ($F_{(1,43)} = .84, p > .05$) or secondary age participants ($F_{(1,35)} = .75, p > .05$).

Nature of Disability.

Combined Reading Skills: Post- test results on the WJ-III did not produce results of statistical significance in the participants with LD ($F_{(1,45)} = .633, p > .05$), ADD ($F_{(1,25)} = 1.46, p > .05$), and ADHD ($F_{(1,19)} = .59, p > .05$) participants on this dependent variable.

Combined Writing Skills: The post test results on the WJ-III did not produce statistical significance among this study's participants with LD ($F_{(1,45)} = .18, p > .05$), ADD ($F_{(1,25)} = .702, p > .05$), and ADHD ($F_{(1,19)} = .535, p > .05$).

Combined Mathematics Skills: The participants' with LD ($F_{(1,45)} = .51, p > .05$), ADD ($F_{(1,25)} = .26, p > .05$) and ADHD ($F_{(1,19)} = .59, p > .05$) did not produce statistically significant post test results as measured on the WJ-III.

Social Skills Testing

ANOVA was applied to test the data used to assess social skills.

Table 8 identifies that across the participants in the study statistically significant improvement ($F_{(1,79)} = 8.05, p < .01$) was demonstrated. The post- program gains were observed in the overall scores for social skills as measured by Gresham and Elliott (1989b). This information is also graphically displayed in Figure 2 and Figure 3.

Table 8

Analysis of Variance for Social Skills: Combined Total- Cooperation + Assertion + Self Control, Externalized Behavior + Internalized Behavior + Hyperactivity, Academic Competency- All Participants

Source	Sum of Squares	Df	MS	F	P
Pre-Post Test Scores	5951.25	79	5951.30	8.05	0.01**

*p<.05 **p<.01

Figure 2

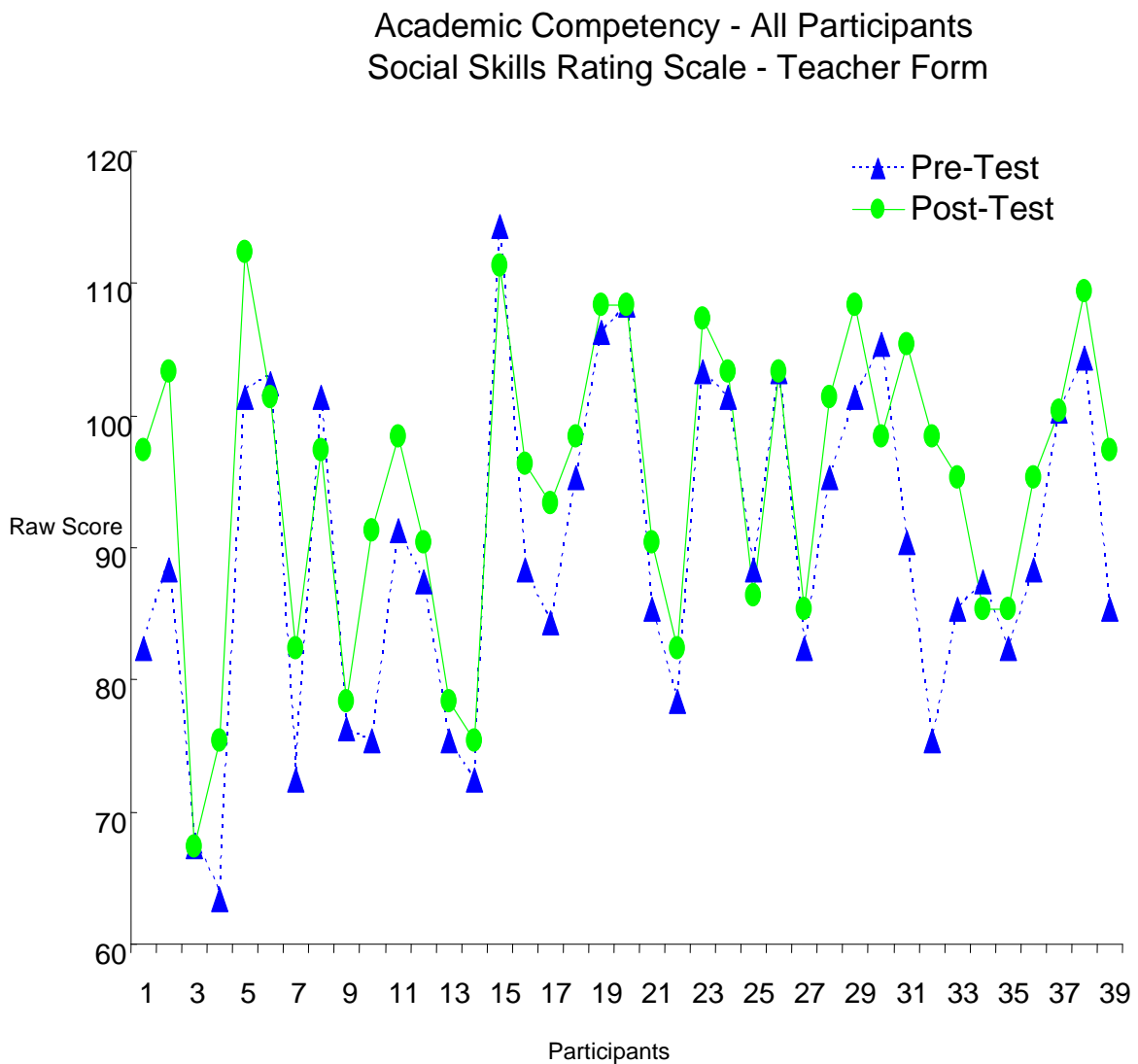
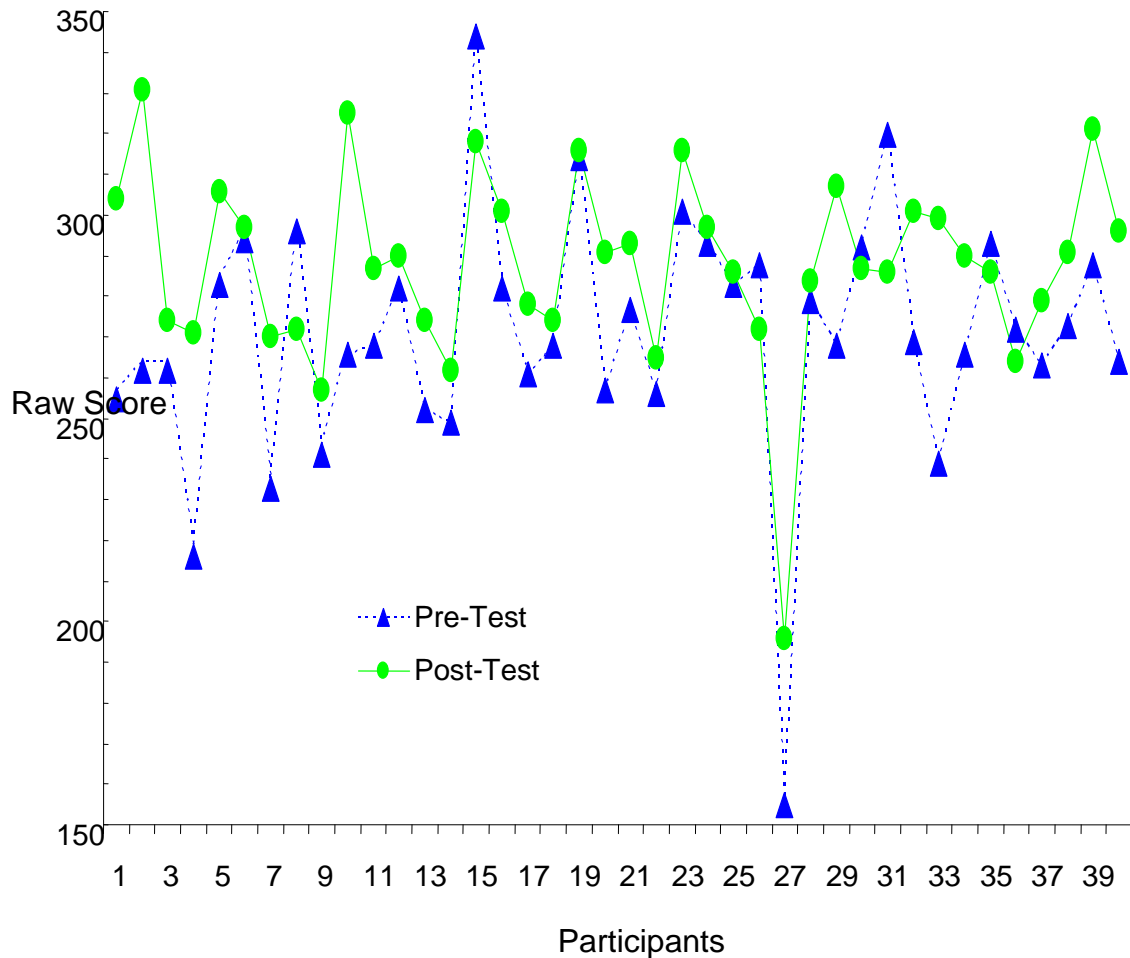


Figure 3

Total Social Skills: Cooperation + Assertion + Self-Control, Externalized Behavior + Internalized Behavior + Hyperactivity, Academic Competency- All Participants Social Skills Rating Scale-Teacher Form



Additional analyses were conducted to investigate whether the sample differed on the measures of interest - gender, grade, and nature of disability.

Gender.

Applying the ANOVA, female participants produced significant improvement ($F_{(1,27)} = 6.54, p < .05$) across all of the social and life skill domains whereas males did not demonstrate such improvement ($F_{(1,51)} = 3.23, p > .05$).

Grade.

Upon inspection the ANOVA findings ($F_{(1,35)} = 12.5, p < .05$) reflect that the secondary grade participants demonstrated significantly improved social and life skills post test results. However, scores of their elementary grade level counterparts did not show significant improvement from pre-and post- tests ($F_{(1,43)} = 1.32, p > .05$).

Nature of Disability.

Post test results measuring development in social and life skills produced statistical significance in participants with LD ($F_{(1,45)} = 6.75, p < .05$). However, statistical significance was not obtained in participants with ADD ($F_{(1,25)} = 2.82, p > .05$), or ADHD participants ($F_{(1,19)} = 2.57, p > .05$).

*Other Statistical Testing**Chi-square*

Subsequent analyses using Chi- square (χ^2) were used to investigate whether there was a higher proportion or number of participants who improved on pre-and post test assessment scores versus the number of participants who did not improve. As can be seen in Table 9, an arithmetic proportion of 92.5% representing thirty-seven of the forty participants demonstrated post test gain scores in the three core academic areas. A chi-square analysis of the participants' core academic post- test scores from the WJ-III expressed as a percentage produced a finding of 99.76%, $\chi^2 (1, N=40) = 259.29, p = .01$.

Table 9

*Student Improvement in Post Test Scores as a Proportion - By Count & χ^2
 Combined Total: Reading, Writing, Math - All Participants*

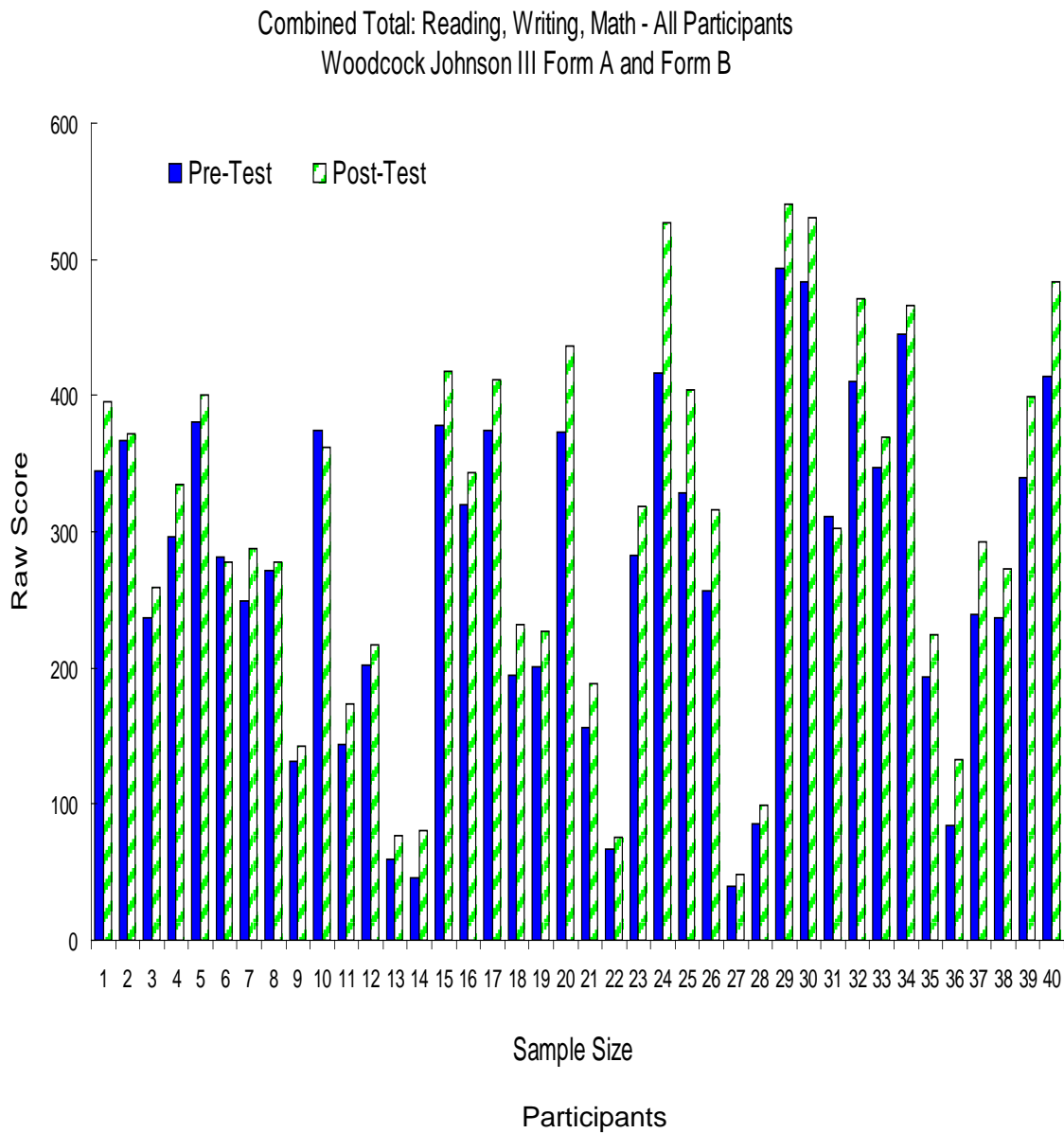
Source	<i>n</i>	%
Students who showed improvement	37	92.50%
Students who showed no improvement	3	7.50%
Total	40	100.00%

Source	χ^2	%
Students who showed improvement	259.29	99.76%
Students who showed no improvement	0.62	0.24%
Total	259.92	100.00%

** $p=0.01$

In addition, Figure 4 shows graphically that there was an overall growth trend for most students' academic pre- to post- test scores.

Figure 4



As seen in Table 10 below, while 82.50% ($n = 33$) of the participants showed improvement in social skills, 17.50% ($n = 7$) did not improve $\chi^2 = 123.78, p < .001$. A chi-square analysis of the participants' social and life skills post test gain scores expressed as a percentage produced a finding of 93.33%. The Chi-square findings expressed as percentages demonstrate the significant magnitude of the Academy's

summer school participants' improvement and takes into account the degree to which the participants improved.

Table 10

*Student Improvement in Post Test Scores as a Proportion - Count & χ^2
Total Social Skills: Cooperation+Assertion+Self-Control, Externalized Behavior+
Internalized Behavior+Hyperactivity, Academic Competency – All Participants*

Source	N	%
Students who showed improvement	33	82.50%
Students who showed no improvement	7	17.50%
Total	40	100.00%

Source	χ^2	%
Students who showed improvement	123.78	93.33%
Students who showed no improvement	8.84	6.67%
Total	132.62	100.00%

$P= 0.001$

In this study there are indications that nearly every participant produced a numerical improvement in post- test gain scores in reading, writing, mathematics and social and life skills, thus passing the Chi-square test. In these cases, the acceptance of the null hypotheses in the ANOVA is likely explained by high degrees of variance, limited sample size, or a combination of the two. Accordingly, the ANOVA analyses produced some statistically non-significant findings referencing the treatment effects.

In view of the ANOVA's robust power, Chi-Square becomes useful as it conveys to the observer if there is a relationship between two variables (in this case pre- and post test scores). The Chi-square value measures proportionate differences between the expected test scores (pre-test) and the actual (post test) scores. When the Chi-square is greater than the Chi-Critical value, the critical-region of the distribution curve representing the proportionate value beyond which rejection of the null hypothesis occurs (Gravetter & Wallnau, 1995), one can say with confidence that there is a relationship between the two variables (Gay & Airasian, 2003). The larger the Chi-square value is in relation to the Chi-critical value the more significant the relationship. (This can also be read as the Chi-Squared p-value being less than alpha, with p-values significantly smaller than alpha evidencing a more significant relationship.) However, it is important to note that Chi-square does not directly measure the strength of this relationship.

Cronbach's Alpha

This study invites inquiry regarding how reliable the WJ-III and the SSRS measured in the constructs of academic achievement gains and social/ life skills development. Cronbach's alpha was conducted to assess the internal consistency of the instruments used in the study. Cronbach's alpha is a coefficient of reliability measuring a given number of test items on an evaluative instrument and the average inter-correlation among the items. Cronbach's alpha of .99 obtained on the WJ-III scales of reading, writing, and mathematics suggests significant consistency in the assessment instrument's ability to evaluate the core academic constructs in this study. Cronbach's alpha of .88 obtained on the social and life skills measures of cooperation, assertiveness and self-control scales on the SSRS are well within the acceptable levels of reliability. Cronk (2004) establishes

that a Cronbach's alpha of 1.00 is very good and numbers approaching 0.0 represent poor internal consistency.

Gain Scores

Of importance and interest to this study was the awareness of which demographic groups benefited the most or least from the Academy's brain based mastery learning summer school program. To determine the gain scores in this study, a difference in standardized means was calculated. One widely used calculation for measuring the difference in standardized means is Cohen's *d* calculation (Warmbrod, 2001). Cohen's *d* measures the difference between two means (pre- test and post- test) divided by the pooled standard deviation for those means, sample size has no influence on this calculation. Cohen's *d* is expressed in terms of a decimal (i.e. .33) meaning that there is a difference of one-third standard deviation between the means the two groups (pre- test and post- test). In this study pre- and post- test score gains were produced. The Cohen's *d* calculation for all study participants reflected positive gain scores on the core academic dependent measures of reading, writing, and mathematics $d = .25$. The Cohen's *d* calculation for all study participants reflected significant positive gain scores on the dependent measures of social/ life skills $d = .63$.

Effect size

Abelson (1995) states that estimates of magnitude (strength) of effect or *effect size* address how strongly two or more variables are related, or how large the between-group differences are. Abelson continues that scientists will predictably call upon the increasingly popular effect-size to analyze data. Levine and Hullet (2002) discussed Eta-squared (η^2) as an accepted and respected effect-size measurement particularly within an

ANOVA context. Eta-squared is interpreted as the proportion of the total variability in the dependent variable that is accounted for by variation in the independent variable. Eta-squared is the ratio of the between-group sum of squares to the total sum of squares:

$$\eta^2 = SS_{\text{between}} / SS_{\text{total}}.$$

For all participants, $\eta^2 = .02$ in the domain of combined core academic achievement indicates a low effect size.

For all participants, $\eta^2 = .09$ in combined social and life skills represents a medium effect size.

Maruyama and Deno (1992) state that effect sizes present the established differences in a study in terms of how many standard deviations the condition means are apart from one another. For this study, the Pearson Product-Moment Correlation (Pearson r) was employed to statistically assess the effect size of the relationship between the aggregate core academic and social and life skills variables upon pre-and post testing of the participants. Of note is the Pearson product-moment correlation is among the most frequently applied measures determining scientific relationships in educational research (Salkind, 2003).

The Pearson product-moment correlation coefficient is a widely accepted and versatile measure of effect size. It estimates the tendency of variables to increase or decrease together. The closer the Pearson r is to 1 (or -1), the stronger their linear relationship. A Pearson r of 0 indicates there is no linear relationship. Large degrees of variance will lower the Pearson calculation, even if every post test score in a given data set is larger than the pre test score. This means that if some participants improve by a score of 20 points and others only improve by a score of 2 points the Pearson calculation

will be less than 1. For this reason, the Pearson Coefficient of Correlation is most preferred in determining the linear relationship of the variables but may be less than 1 in cases where all the participant's post test scores were greater than pre test scores.

In this study the Pearson r produced significant positive linear correlation between the pre-and post- test assessments ($r = .99, p < .05$), measuring reading, writing, and mathematics in the Academy's summer school program. On the SSRS, the Pearson r produced a strong positive linear correlation between the pre-and post test measures in social/ life skills development ($r = .65, p < .05$)

The aggregate statistical improvements produced by the participants on post testing likely accounts for the strong positive Pearson correlations between the obtained scores in the domains of core academic achievement and social and life skills development.

Research Hypotheses

Hypothesis I: The first null hypothesis of the study states that there would be no significant increase in reading achievement in participants attending the Academy's summer school program based upon pre- and post testing using the Woodcock-Johnson III. Statistical analyses produced a partial rejection of the null hypothesis as the secondary school age students with LD, ADD, and ADHD produced statistically significant achievement gains in reading fluency.

Hypothesis II: The second null hypothesis of the study stated that there would be no significant increase in writing achievement in participants attending the Academy's summer school program based upon pre- and post- testing using the Woodcock-Johnson III. The null hypothesis was not rejected.

Hypothesis III: The third null hypothesis of the study stated that there would be no significant increase in mathematics achievement in participants attending the Academy's summer school program based upon pre- and post- testing using the Woodcock-Johnson III. The null hypothesis was not rejected.

Hypothesis IV: The fourth null hypothesis of the study stated that there would be no significant difference in social and life skill development in participants attending the Academy's summer school program based upon pre- and post- testing using the Social Skills Rating System. The null hypothesis was rejected, since participants improved significantly in their pre- to post- test scores in social skills.

Summary

Having applied the one-tailed Analysis of Variance, the relatively small sample size in this study in conjunction with a large variance in post test gain scores with some participants improving by a score of two-points while others improved by twenty-points, contributed to the absence of statistical significance in the summer school program's core academic achievement domains.

Subsequent Chi-square analyses were applied to determine the presence of statistical differences, although not determining the strength of these differences, in the participants' pre- and post test academic assessment scores. Positive statistical gain score differences were produced in reading, writing, and mathematics.

The Social Skills Rating System (SSRS) was administered on a pre- and post-test program basis measuring each participant's social skills, externalizing, internalizing, and hyperactivity behaviors and academic competence. A one-tailed Analysis of Variance was applied to determine the treatment effects of the social and life skills

program. Statistically significant differences were produced in the aggregate scores of all participants in the domains of cooperation, assertiveness, self-control, externalizing, internalizing, and hyperactivity, and academic competence. Subsequent Chi-square analyses were applied and determined the presence of statistical differences in pre- and post test social skills scores of participants in the study. Positive statistical differences in pre- and post test scores assessing social and life skills were produced.

In addition to the four aforementioned hypothesis testing, this study found that the percentage of students who improved across the academic and social skills areas was significantly higher than those who did not improve from pre- to post- test scores, ($\chi^2_{(1)} = 259.99, p < .01$ and $\chi^2_{(1)} = 123.78, p < .001$ respectively).

CHAPTER V

Discussion

The overall goal of this study was to determine the effect of a brain based mastery learning program on participants enrolled in a summer school program. Meeting the special learning and social development needs of children diagnosed with LD, ADD, and ADHD is a foremost consideration in this investigation. To accomplish this goal, this study evaluated the effectiveness of an Academy's summer school program for participants with specific learning and attention/hyperactivity disorders using pre-and post-test scores from standardized tests in both academic achievement in reading, writing, and mathematics and in social/ life skills development. Additionally, the purpose of this study was to contribute to the current educational and social research base espousing brain based mastery learning with children diagnosed with LD, ADD, and ADHD. In part, this investigation was designed to build upon the cognitive theoretical framework of brain based mastery learning instruction espoused by the research of Burton (2007), Gardner (1997), Kovalik (1997), and Moats (2004). The theoretical framework supported this study's premise to evaluate the effects of such a program in children with LD, ADD, or ADHD.

Academic Skills Findings

A one-tailed Analysis of Variance (ANOVA) produced a partial rejection of Null Hypothesis I in the core academic area of reading; the ANOVA failed to reject the null hypothesis in writing (Hypothesis II), and mathematics (Hypothesis III). The ANOVA is a robust parametric statistic designed to evaluate investigational hypotheses at the level of treatment effects. A study's sample size may affect the ANOVA statistic

and the assumption of homogeneity of variance is required. In this study, the small sample size with significant score variance contributed to the failure to reject the null hypotheses in the core academic areas of reading, writing, and mathematics with one exception, reading fluency among the secondary grade level participants which produced statistical significance.

Partial rejection and acceptance of Null Hypothesis I was obtained in the academic domain of reading fluency. Specifically, the significant WJ-III post-test results $F(1, 35) = 4.68, p < .05$ in reading fluency were produced by the secondary school age participants. The statistical significance produced in the secondary school age participants is accounted for through two considerations. First, reading fluency requires consistent patterns of repeated exposure and rehearsal of reading material to augment cognitive processing systems at the level of synaptic development. Accordingly, the secondary grade level participants may have possessed greater cortical development than their younger counterparts to have more efficiently and effectively benefited from the brain based instructional methods used to teach reading fluency during the shorter duration of summer instruction. Second, all five participants who produced lower WJ-III post-test scores were among the elementary grade participants. However, statistical significance was not produced in writing (Hypothesis II) or in mathematics (Hypothesis III). Statistical significance was obtained in the social and life skills (Hypothesis IV). Further, the failure to reject Hypotheses II and III may have been accounted for by the small sample size, the shortened duration of instruction, and the somewhat diminished student motivation often observed when students attend summer school.

Additional statistical analyses using ANOVA were conducted to investigate the degree to which the participant sample differed on the measures under study. Specifically, the additional analyses included gender, grade, and nature of disability. Respectively, neither male nor female participants produced statistically significant improvement on the post-test measures of reading, ($F_{(1,51)}=.93, p>.05$); ($F_{(1,27)}=.87, p>.05$), writing, ($F_{(1,51)}=.62, p>.05$); ($F_{(1,27)}=.27, p>.05$), and mathematics, $F_{(1,51)}=.39, p>.05$, $F_{(1,27)}=.85, p>.05$). When observing grade level participant differences, the secondary grade participants produced statistically significant differences on the WJ-III post-test measures of reading fluency, ($F_{(1,35)}=4.68, p<.05$) whereas their elementary grade level counterparts did not, ($F_{(1,43)}=.85, p>.05$). Respectively, statistical significance was not obtained in either elementary or secondary grade levels in combined writing skills, ($F_{(1,43)}=.64, p>.05$), ($F_{(1,35)}=1.11, p>.05$), nor in mathematics, ($F_{(1,43)}=.84, p>.05$), ($F_{(1,35)}=.75, p>.05$). The participants whose nature of disability respectively included LD, ADD, or ADHD did not produce statistically significant improvement on WJ-III post test measures of combined reading, writing, and mathematics skills. LD/Reading: ($F_{(1,45)}=.633, p>.05$), ADD/Reading: ($F_{(1,25)}=1.46, p>.05$), and ADHD/Reading: ($F_{(1,19)}=.59, p>.05$). LD/Writing: ($F_{(1,45)}=.18, p>.05$), ADD/Writing: ($F_{(1,25)}=.702, p>.05$), and ADHD/Writing: ($F_{(1,19)}=.535, p>.05$). LD/Mathematics: ($F_{(1,45)}=.51, p>.05$), ADD/Mathematics: ($F_{(1,25)}=.26, p>.05$), and ADHD/Mathematics: ($F_{(1,19)}=.59, p>.05$).

In view of the hypothesis-testing results using ANOVA, subsequent analyses applying Chi-square demonstrated measurable proportionate improvement $X^2_{(1)}: (1,40)=259.29, p=.01$ in post-test measures of reading, writing, and mathematics. The Chi-square finding expressed as a percentage represents that 99.76% of the male and female

participants with LD, ADD, and ADHD demonstrated improvement on the WJ-III post-test assessing the core academic areas of reading, writing, and mathematics. The large proportionate gains are explained by Chi-square's configuration measuring proportionate frequency differences between observed and expected pre-and post-test results. Further, Chi-square is not adversely affected by small sample size or absence of homogeneity of variance. These findings are consistent with a body of contemporary brain based research involving the neurobiological aspects of linguistic development and cognition.

Fontoura, Nunes, and Schrimmer (2004) posit that LD is primarily considered a neurobiological based problem concerned with abnormal development of verbal and/or written expression and reception. Fontoura and associates continue that in view of the primarily neurobiological basis of LD, early detection and intervention becomes an essential rudiment in supporting the child's future linguistic development. Based on a hypothesis regarding the nature of LD, theories linking LD to perceptual, linguistic, attention, and memory deficits were conceptualized but generally failed to provide a broad perspective about LD (Kavale & Forness, 1985; Wong, 1979). Generally, students with LD and their non-disabled peers differed by approximately two-thirds SD across domains. This suggests that roughly seventy-five percent of LD subjects could be clearly differentiated from non-disabled subjects, and would demonstrate deficits interfering with their academic abilities. On average, the greatest differentiation between groups with LD and non-disabled groups was identified within the linguistic domain with LD subjects consistently scoring lower on language measures when compared with outcome assessments in other domains (Kavale & Nye, 2001). In view of these investigations, it is reasonable to consider that the participants whose nature of disability included LD, ADD,

and ADHD would have required a longer duration of time than that provided in the summer school program to have produced statistically significant academic achievement gains in reading, writing, and mathematics. Additionally, it remains particularly important to note that educational research continues to reveal the propensity of performance deficits in students with specific learning challenges when taking standardized tests (Cooper, 2003). Accordingly, the post-test results produced on the standardized WJ-III may have been further affected, specifically in the more complex problem solving domains of writing and mathematics, due to the established inherent difficulties of standardized testing for students with LD, ADD, and ADHD. For example, there is a reasonably large discrepancy between academic achievement of students with LD, ADD, and ADHD and their non-disabled peers (Frazier, Youngstrom, Glutting, & Watkins, 2007). Students with disabilities experience great performance deficits when taking standardized tests (Malgren, McLaughlin, & Nolet, 2005). In the 2002-2003 school year, Malgren and others reported various low levels of ability on assessments in reading and math for students with LD, ADD, and ADHD, and many of these students were scored below the performance objectives that had been set for them. According to research, 20% to 30% of students with LD attained the criteria for proficiency as determined on standardized tests (Malgren et al.). It has been noted that students with LD, ADD, and ADHD who obtain low scores on standardized achievement tests due so as a consequence of errors in attention yet often demonstrate elevated performance in academic classes (Frazier et al.)

ADHD and achievement speaks to seminal research considerations referencing the meta-analysis of the child, adolescent, and adult literature in conjunction with a

concomitant study with college students. Frazier and colleagues (2007) establish that poor academic performance is among the most prominent features associated with attention deficit hyperactivity disorder (ADHD). Failing grades together with elevated rates of grade retention are among the most significant risk factors involving academic complications for the ADHD student. (Fergusson & Horwood, 1995; Fergusson, Lynskey, & Horwood, 1997). Both students with LD and ADHD students similarly demonstrate difficulty on standardized tests of achievement commencing early in the students' education and extending beyond childhood well into adolescence and young adulthood (i.e. college) (Carlson & Tamm, 2000; Hoza, Pelham, Dobbs, Owens, & Pilow, 2002; Semrud-Clikeman, Guy, Griffin, & Hynd, 2000). Literature continues to demonstrate the additive effects of ADHD and LD. Johnson et al., (1999); Kataria et al., (1992); McInnes et al., (2003); and Webster et al., (1996). According to the investigators, while the additive effects for delayed academic achievement in children diagnosed with ADHD and LD is established, the studies fall short in suggesting why or how this additive effect occurs. The investigators hypothesize that a plausible explanation to the why and how question may in part exist within an exploration of a cognitive model of educational instruction. A proposed examination of the cognitive model was indeed advanced by Waugh and Norman, (1965) and Bower (1975), where the additive effects of ADHD and LD could more clearly be understood. Waugh and Norman, and Bower's investigations contained small sample sizes. Nonetheless, the results of their studies confirmed that children with ADHD and LD were suffering from encoding and decoding problems between short and long term memory systems as well as significant lexical and numerical information processing difficulties and were cognitively operating within two

separate forms of learning interference that likely resulted in the student population's poor academic achievement. (Aaron, Joshi, & Williams, 1999; Crovetti, 1999) Grow (1996) and Levine (2003a; 2003b) establishes the basis for and support for the Academy's summer school program's theoretical platform incorporating cognitive learning theory into the educational model. The theoretical basis of this study is further reflected in the research of Bell, McCallum, and Cox, 2003; Bender, 2004; Swanson (1989b). Bell and others espoused that significant positional explanations addressing the basis of learning disabilities includes the empirical evidence citing specific difficulties in the cognitive learning processes of encoding and decoding as well as significant lexical and numerical information processing difficulties (Aaron et al., 1999; Crovetti, 1999). Waugh and Norman support additional brain based research exploring cognitive learning challenges in children with LD, ADD, and ADHD. The investigators caution that while investigational results continue to be impacted by relatively small sample size studies, such research would continue to contribute to the vital information platform necessary to respond to the 'why and how' inquiry regarding achievement delays in children with LD, ADD, and ADHD.

Supporting the purpose of this study and the brain based educational method employed, McKinney, Montague, and Hocutt (1993) established that behavior regulation, particularly during task performance in conjunction with the ability to attend, are requisite scholastic skills adversely impacted in students with ADHD. The research results of Lamminmaki, Ahonen, Narhi, and Lyytinen (1995) reveal that the prevalence of academic difficulties are most frequently demonstrated in students whose nature of disability is ADHD- Predominantly Inattentive Type and ADHD- Predominantly

Combined Type. Neurological studies have revealed the significant considerations circumventing academic and social skill challenges in children with ADHD. Branch, Cohen, and Hynd (1995) examined academic achievement and ADHD in students with right versus left hemispheric neuropsychological dysfunction (RHD). While their findings did not produce conclusive evidence that RHD would yield attention difficulties, the central nervous system investigations of Lyoo, Noam, Lee, Kennedy, and Renshaw (1996) revealed upon neuroimaging that consistent brain structure differences are present in children whose symptoms are consistent with ADHD.

Further support for the introduction of brain based instructional interventions in students with LD, ADD, and ADHD is elucidated in the studies Riccio, Hynd, Cohen, Hall and Molt (1994) who suggest that a comorbidity rate as significant as 60% may exist in children with Central Auditory Processing Disorder (CAPD) and ADHD. Riccio and colleagues continue that inattention, impulsivity, and hyperactivity may be caused by CAPD, and in fact, may arise as a consequence of a language based learning disability. Their study further suggests that children referred for ADHD evaluations should concurrently be assessed for level of language function. Assessing language function would facilitate an opinion regarding auditory-linguistic deficits thought to impede adaptive social and behavioral skill development. Further, in this study, secondary grade level participants produced statistically significant improvement in reading fluency. This finding is consistent with the research as articulated in Purvis and Tannock (1997), Dykman and Ackerman (1991), and O'Neil and Douglas (1996).

Additionally, Hallowell and Thompson (1997) report that as a person who himself has and continues to live with ADHD, his school experiences were replete with

frustration and stress: “It’s like being super-charged...” You get one idea and you have to act on it, and then, what do you know, you’ve got another idea before you’ve finished up with the first one...” Hallowell goes on to discuss that persons with ADHD have cognitive styles vastly dissimilar than those absent of the disorder and as such require special learning environments. Hearne and Stone (1995) cite that students with LD may represent a number of differing learners whose learning styles are a mismatch with the design and values of many schools. They continue that Howard Gardner’s (1983) multiple intelligence theory be considered when educating children with LD.

The Academy’s brain based summer school study secondary grade level participants produced statistical significance in their post-test assessment of reading fluency. The significant findings are noteworthy in view of the research addressing the challenges in reading development particularly in younger children with LD. Reading fluency and writing represent the most challenging dimensions of core academic skills to remediate for students with LD (Kamps & Greenwood, 2005; O’Conner, White & Swanson, 2007). Research indicates that ADHD has the greatest adverse impact on reading performance (Malgren et al., 2005). This study’s results produced findings somewhat contrary to current notions relating to the adverse impact of LD, ADD, and ADHD on linguistic and cognitive development. The substantial proportionate academic and social/life skill gains produced in the Academy’s summer school program supports the belief that children with LD, ADD, and ADHD effectively and efficiently achieve in a brain based mastery learning school environment. According to Graham, Harris, and Larsen (2001), merely one in one hundred students achieve advanced writing skills during schooling. Difficulties mastering the writing process are more widespread among

students with LD, ADD, and ADHD, and the writing of these students is usually of a much lesser quality than their non-disabled peers (Harris & Graham, 1999). Students with LD often demonstrate deficits in mathematics, particularly in problem solving (Cawley, Parmer, Foley, Salmon, & Roy, 2001; Xin, Jitendra, & Deatline-Buchman, 2005). Additionally, students with LD also perform at significantly lower levels than students without disabilities on all types of math problems (Cawley et al., 2001; Xin et al.).

The research of Dykman, and Ackerman (1991), O'Neil and Douglas (1996) and Purvis and Tannock (1997) investigated children with ADHD, some of whom possessed documented reading disabilities (RD). The children presenting with comorbid ADHD and RD did not differ significantly in their severity of ADHD symptoms. Similarly, the ADHD and RD children were deficient in higher-order executive function skills. In the Purvis and Tannock research, executive function deficiency produced significant compromise in the students' abilities to linguistically organize story retelling facts in an accurate and logical sequence. Consistent with Purvis and Tanock, Dykman and Ackerman revealed that over half of their study's participants with ADD were poor readers, as demonstrated by a ten-point differential between their measured IQ scores and results produced on the Wide Range Achievement Test (WRAT-R). O'Neil and Douglas researched the recall strategies of male students with ADHD. The compelling results established that, when compared with their male counterparts absent of ADHD, the experimental cohort demonstrated less time rehearsing information, recalled less information, and dedicated less time attempting to retrieve information. O'Neil and Douglas concluded that males with ADHD would benefit from instructional interventions

specifically incorporating overt rehearsal procedures coupled with overcorrection teaching methods. Overcorrection would include repeated exposure to the highly organized and detailed classroom lessons and supported by instructor positive reinforcement designed to reduce the incidence of learned helplessness often exhibited as frustration in children with ADHD.

In view of the ANOVA findings, a Chi-square analysis was applied to the data to determine if improvement occurred in academic achievement and in the development of social and life skills. The Chi-square statistic is a non-parametric statistic analyzing data at the level of frequencies of observed versus expected results. In this study, the Chi-square findings produced positive gain score differences in both core academic achievement and the development of social/ life skills. Subsequent analyses of the findings applying Chi-square in this study reveal that the Academy's summer school program was successful in achieving its stated academic objectives. Proportionate grade equivalent increases were produced in 99.76% percent of the participants with LD, ADD, and ADHD from pre-test to post-test when provided with brain based instructional methods in reading, writing, and mathematics.

Social/Life Skills Findings

The ANOVA reflected statistical significance in Hypothesis IV. In this study, the participants produced improvements from pre/post testing in their development of social and life skills including cooperation, assertiveness, self-control, externalizing, internalizing, and hyperactivity behaviors. Statistical significance in social and life skills ($F(1, 79) = 8.05, p < .01$) was likely obtained due to the life skills instructional program being introduced, rehearsed, and positively reinforced during both the morning and

afternoon sessions. Subsequent analysis applying Chi-square showed that 93.33% of the male and female elementary and secondary grade level participants with LD, ADD, and ADHD demonstrated post-test improvement on the SSRS measuring social and life skills, $X^2_{(1)}: (1, 40) = 123.78, p < .001$. These findings support the research confirming the need for, and effectiveness of, formal social and life skills education integrated within an academic program (Cartledge & Johnson, 1996). Students whose nature of disability includes LD, ADD, and ADHD are more likely to experience confidence, motivation, and become better equipped to focus and concentrate on their lessons when they develop self-assurance, belief, and conviction in their own scholastic abilities (Elbaum & Vaughn, 1999).

Additionally, ANOVA was used to observe whether the sample differed on the social/ life skills measures when applied to gender, grade, and nature of disability.

Gender

Statistical significance was obtained among the female participants, ($F_{(1,27)} = 6.54, p < .05$). This finding may be explained through older females' inherent attention, awareness, and interest in the further development of social and life skills. The Academy's summer school participants' production of significant post-test improvement in social/ life skills is consistent with research expectancy, particularly in secondary grade level female LD participants (Bear et al., 1991). It is reasonable to conclude that the secondary grade level females produced the highest SSRS post-test elevations due to the nurturing environment of the Academy, its consistent provision of positive reinforcement and its social/life skills program contributing to the females' increased awareness of and inherent desire to further improve their self-worth and social graces.

Having provided the participants with individualized brain based instruction incorporating their development and mastery of cooperation, assertiveness, and self-control, in the social/life skills program, the aggregate of all female participants produced statistically significant improvement consistent with established research.

In their study of 360 patients with ADHD, Aricia and Connors (1998) established when compared to males, adolescent females self-reported their experiences of possessing fewer learning assets, heightened distractibility, less self-confidence, more anxiety and deeper feelings of depression. This investigation supports Aricia and Connors' study as pre-and post test analysis of internalizing behaviors on the SSRS (e.g. feelings of sadness, aloneness, and social withdrawnness) were more notably demonstrated among the secondary grade level female participants whose nature of disability was LD. This finding is extended to younger females as well. Bear, Clever, and Proctor (1991) espouse the adverse impact of internalizing emotions and its role in the development of distorted self-perceptions in ten year-old female students. In Bear and colleagues, 341 females were observed and assessed using the Self-Perception Profile for Children (SPP-C). From the original sample, 52 females were diagnosed with learning disabilities and attended integrated classes. The study results revealed the female students with LD demonstrated significantly increased levels of social anxiety coupled with lower scores designed to measure global self-worth. The 52 females in the research cohort additionally scored lower on measures of self-esteem, physical attractiveness and further, produced lowered scores measuring self-perceptions regarding scholastic competence and behavioral conduct. Bear's research points toward the consideration of employing formal

social skills development programs in schools supporting the adaptive development of (female) students' global self-worth, social confidence and scholastic competence.

Grade

The identification of difficulties and the provision of a consistent, differentiated instructional environment, such as provided in the Academy, can lessen students' frustration and nurture a more accepting environment conducive to growth in social/life skills. In this investigation, secondary grade level participants most notably produced particularly significant SSRS post-test gains ($F_{(1, 35)} = 12.5, p < .05$).

In June, 2002 The Advocacy Institute, a division of the U. S. Department of Education in their report to Congress, established that for the first time in a decade the number of children in the primary grades with learning disabilities (LD) declined from 1,119, 500 in 1998-1999 to 1,118,152 in 1999-2007. The favorable findings were in part related to the early identification and the provision of specialized education programs within the students' classrooms. However, the report continued that secondary grades and early adulthood reflected increases in the number of identified students with LD. This finding is explained by students who became identified by their instructors as evidencing academic and/or social difficulties in the presence of increasing scholastic demands that were not apparent in younger childhood. The Advocacy Institute's findings noted in their Congressional report that educators hold an important role in observing the nature, age of onset, and the severity of difficulties in children with LD, ADD, and ADHD. Age factors are a critical consideration in school age children as the early identification in conjunction with the provision for specialized learning environments and learning strategies are an inherent element in protecting the rights of children with diagnosed

learning disorders (Individuals with Disabilities Education Act, 1997; National Research Council, 2001).

Nature of disability

Participants with learning disabilities produced significantly improved post-test social/life skills, $F_{(1,45)} = 6.75, p < .05$. Participants with ADD and ADHD did not produce statistical significance on the SSRS post-test assessment.

In McConaughty & Ritter, (1985) 123 six through eleven year old male students with learning difficulties were found to experience significantly higher prevalence rates in social incompetence and problematic behavior than was expected for non-disabled males of the same age. Further, Swanson and Malone (1992) established that when compared with their non-learning disabled counterparts, students with learning disabilities experience less peer acceptance, are more socially withdrawn and isolated, and are less socially proficient in their interactions with others. Gresham & Elliott (1989) identified social skills as a primary deficit of students with learning disabilities and further noted that in these students particularly, receiving formal social skills instruction improves both their abilities to facilitate resolution to difficulties involving peers and their capacity to problem-solve in the classroom.

As in the Academic Center, the focus of the Academy's summer school program is the provision of specialized educational strategies predicated upon each child's unique learning style. The National Institute of Health (1994) establishes that when compared to children in the general education arena, many children with ADHD, particularly younger children and males, experience more frequent and intense levels of anxiety, tension, fear or uneasiness particularly in school. The research continues that their emotions often

exacerbate sadness, anger, and depression and compromise their capacity to focus, concentrate, think, and learn. This may have contributed to the lack of statistical significance for these two groups - ADD and ADHD.

Additional statistics: Chi square

Further, the results in this investigation revealed significant proportional improvement in the domains of social and life skills, externalizing versus internalizing behaviors, and academic competence in 93.3% percent of the participants with LD, ADD, and ADHD. The findings of this study were consistent with the research of Elbaum and Vaughn (1999), Gresham and Elliot (1990), and Levine (2003a).

The direction of special education will continue to aspire toward an early identification and early intervention paradigm (Moats, 2004). Supporting the premise of early identification and intervention in the realm of socio-educational issues is the research of Diamond (2001). He notes that among a sample of third and fourth grade youngsters, demonstrated sensitivity (i.e. compassion and caring) to the unique emotional cues of others received higher teacher ratings on measures of adaptive behavior. Accordingly, the integration of the social and life skills program into the core academic domain of the Academy's summer school program is consistent with the established research supporting the need for adaptive social and life skills training commencing in early childhood and continuing through high school. Educators involved in the administration and instruction of students with LD, ADD, and ADHD are encouraged to consider that students will be more apt to strive for success when their educational program is individualized, predicated upon early assessments that are regularly updated, and presented in a quiet, nurturing, patterned, organized and positive instructional style.

The study participants in the Academy's summer school program endeavor for success was reinforced through a consistent, patterned, and organized implementation of individualized academic and social strategies. Repeated exposures to lessons, instructor modeling, nurturing social reinforcement methods and ever-present encouragement were employed to support the differentiated instructional strategies openly received by the participants and applied to the directed lessons and educational activities. In view of the effective academic strategies, and indeed reflected in this study, were the core academic achievement gains particularly in reading fluency that in part likely resulted from the measurable improvements in 93.33% of the participants in their social and life skills. Further supporting the importance of individualized understanding, appreciation, and responsiveness to the scholastic needs for students with LD, ADD, and ADHD is the research of Perkins-Gough (2007). Their research reflects that children with learning challenges respond to formal education best when they are in close and enduring relationships with their teachers among other caregivers. A brain based approach is effective in that it engages everyone as a community that is seeking and achieving consistent improvement (Kovalik, 1997; Fussell, Macias, & Saylor, 2005). Consistent with Perkins-Gough, and Kovalik and others, was the sense of "community" in conjunction with the measured achievement gains demonstrated in the Academy's summer school program. The findings add to the burgeoning support favoring the ongoing availability of specialized brain based summer school education with this student population.

Student gains in the Academy's summer school

The findings in the Academy's summer school program evaluation present evidence that participants with LD, ADD, and ADHD show positive growth in response to brain based instructional methods. (Moats, 2004). The participants in the Academy's summer school program were introduced to an optimal learning environment. In this learning environment, the participants patterned the highly organized and methodical instructional processes modeled by their instructors. Teacher observations, as documented in the SSRS, confirm the significant level of receptiveness the participants possess relative to working within peaceful and organized classrooms. Indeed, educational research establishes that students, particularly those with LD, ADD, and ADHD, greatly benefit from individualized program planning and instruction when paired with differentiated instructional methods. To augment such benefit, children require an emotional sense of comfort, compassion, and confidence to focus their attention, to open their minds to receive, to process and to apply the details of knowledge imparted by their teachers. Factoring in the small sample size in this study and the short period of time involved the Academy's summer school program produced significant improvements in both core academic and social/ life skills. The improved grade equivalent levels in reading, writing, and mathematics were accounted for by the quiet, consistent delivery of a socially reinforcing, patterned, and organized instructional approach. Within each classroom, there was a gentle sensory theme supporting the teacher's instruction. The sensory systems of children are susceptible to extraneous sounds in a classroom (Caine & Caine, 1990; Levine, 2003b) Children diagnosed with LD, ADD, and ADHD are particularly vulnerable to extraneous classroom activity and

internal distractions often observed as “daydreaming.” The Academy’s summer school program incorporates research based instructional methods specifically designed to facilitate in-class focus, concentration, and attention. These instructional methods include the consistent presentation of nurturing styles of verbal prompting to redirect and return the student’s attention back to assigned tasks, individually established accommodations to attenuate distress and augment keyed responses to academic inquiry, and the implementation of just-discernable Baroque music (Campbell, 1997); incorporating these supportive in-class instructional methods have proved to reduce distractibility, stress, and depression while improving attention span coordination and sense of well-being.

Academic Gains

This investigation supports the expanding educational research base establishing the advantages and efficacy in providing primary and secondary grade students with LD, ADD, and ADHD with a brain based mastery learning program (Jensen, 2005; Levine, 2003a). Each participant’s individualized learning program was consistently presented in a quiet, patterned, and highly organized classroom environment that contributed to the student’s comfort and ability to focus, concentrate, and attend to both their teacher’s presentations and their classroom assignments (Carolane & Guinn, 2007). The academy’s brain based summer school program additionally supported contemporary research espousing favorable scholastic outcomes when a nurturing, positively reinforcing, and stimulating instructional style is introduced and consistently employed (Gardner, 1997; Jensen, 2005; Kavolic, 1997).

The academy’s summer school program incorporates differentiated instructional methods into the brain based education model. In doing so, each participant was assessed

and received a learning program uniquely independent of any other student (Bloom & Krathwohl, 1989; Guskey, 2005). Each participant, learning at his and her own rate and pace with the guidance, support, and prompting of the instructor, gradually develops a student's conscience to seek out and develop independent thinking and working abilities. Independent thinking and working abilities contributed to the development of initiating behaviors in their achievement efforts and to feelings of confidence that inspire them to attempt academic challenges once believed to be beyond their capacity. A student's scholastic confidence, sense of self-assuredness, and their inspiration to satisfy the thirst for knowledge acquisition are essential elements in the development of a positive attitude toward school and in his/her overall self-image. (Bloom, 1971; Levine, 2003b). In his research, Vygotsky (1993) establishes the teacher as the facilitator and primary support of students. He established that the learning experiences of children are advanced through the linkages in the development of mental processes with socio-cultural learning. The linkage facilitates the student's transition into and familiarity within the "zone of proximal development", a zone wherein each student evolves into an independently thinking, feeling, and intuiting person. The research findings in the academy's summer school program indeed contribute to the growing research addressing the delivery of education to primary and secondary students with LD, ADD, and ADHD. This student population benefits from a brain based instructional approach that is both nurturing to the students as well as responsive to their identified need for scholastic accommodations (Jensen, 2005). This investigation supports the findings of The National Center for Learning Disabilities (2003), which verifies that early interventions prevent learning problems in secondary education for students with LD.

Social Skills and Learning Strategies

Likewise, this research confirms the need for and effectiveness of formal social life skills education integrated within a comprehensive academic program as a requisite for scholastic success (Gresham & Elliott, 1989; Cartledge & Johnson, 1996). Students with LD, ADD, and ADHD are more likely to feel confident, motivated and better equipped to focus and concentrate upon their studies when they develop self-assurance and belief in their own abilities (Elbaum & Vaughn, 1999). These students require consistency in instruction, encouragement and reinforcement to advance their best personal effort in the development of social skills. When students are guided through instruction, positive reinforcement, and effective modeling toward the acquisition of self-monitoring skills over their behaviors; together with the understanding and appreciation of citizenship; including but not limited to empathy, compassion and integrity, their resulting thirst for academic knowledge and purpose for social learning yields increased measures of success (Raskind, Goldberg, Higgins, & Herman, 1999).

The findings of this investigation reveal that the participants demonstrated statistically significant improvement in social/ life skills, externalizing and internalizing behaviors, and academic competence subsequent to their participation in the summer school program. The participants showed improvement in the social skills of cooperation, assertion, and self-control. Further, significant improvement was demonstrated in both externalizing (e.g. shouting-out answers, argues with others) as well as internalizing behaviors (e.g. appears lonely, acts sad, or depressed) along with perceptions of improved academic competence such as reading, mathematics skills, and motivation to succeed. Consistent with the research of Kovalik (1997) and Gresham and Elliott (1989), the

participants favorably responded to the daily instruction of the social/ life skill topic of the day. Kindergarten participants actively engaged in and demonstrated particular improvement with hands-on structured activities (e.g. Circle time, a cooperative learning exercise involving each student placing a puzzle piece on a template to create a completed product, among other activities) designed in part to develop the social and life skills of active listening, cooperation, sharing, patience and putting forth one's best effort. In grades one through six, the results of the study established that academic and social skills development was facilitated in part through individual and small group discussion. For example, the participants were instructed to read a passage from their textbook addressing the United States Constitution. The instructor subsequently introduced and facilitated discussion relating to the social/ life skills of responsibility, cooperation, integrity, and honesty. In the secondary school grades seven through twelve, the study results suggest that academic competence is particularly influenced by the behavioral variants incorporating the social/ life skills of self-control and externalizing behaviors. Explanations for these findings are represented in the research of Cooper (2003) and Roeser, Midley and Urban (1996).

Brain based differentiated instructional methods such as didactic instruction, modeling, coaching, rehearsal, and role play were used to develop the social/life skills. Consistent with Jensen (2005), Kovalik (1997), Levine (2003a) and Moats (2004), this study supports the hypothesis that a patterned and highly organized brain based mastery learning model employing differentiated instructional techniques will augment both core academic achievement and adaptive social and life skills in primary and secondary school students. However of note, while students with LD, ADD, and ADHD, demonstrated

improvement in grade equivalent scores, statistical significance in academic achievement was not achieved in this investigation. According to Cooper (2003) success can be measured in many different ways, for students with LD sustaining cognitive information and testing lower in a pre-skills test in itself is an achievement. According to Cooper for summer school, achievement should be measured by other indicators such as the prevention of loss of previously learned material, improved attitude toward school, and an increase in positive self image through the improvement in life skills.

Students who continue their studies during the summer vacation months do not experience the academic losses suffered by others (Cooper, 2003). Cooper's research indicates that summer school is most effective in the upper grades. In his meta-analysis of research discussing the effects of summer school on students with and without LD, Cooper indicates that the performance of students with LD attending summer school improves by approximately one tenth to one quarter of a standard deviation. However, he does warn that other measures of success, besides standardized achieving tests, must be employed to successfully measure students' core academic improvement (Cooper). Cooper's research is reflected in the objective of the Academy's summer school program that is; to maintain and exceed each student's assessed core academic achievement level. The purpose of the Academy's summer school program is to improve the student's learning rate, pace, and efficiency through individualized attention in the context of small, quiet and organized classes. Consistent with Cooper's findings, this study produced significance pre-to-post growth among the participants' with LD and ADHD in the domain of academic competence measuring each individual's learning rate, pace, and efficiency. Improved academic competence in the Academy's summer school program

contributed to the observed increase in the participants' scholastic motivation. Improved motivation, in conjunction with academic confidence as noted in this study's participants, facilitated the development of targeted learning behaviors. According to Cooper, students that participate in a summer studies program might not demonstrate academic gains, but academic losses should not prevail. Cooper found that summer school education is effective for attaining core academic and social goals suggesting further the unmistakable benefits of summer school. Consistent with Cooper's findings, the Academy's brain based mastery learning program revealed a positive impact on academic skills development, more especially in secondary grade level reading fluency and social/life skills. Further, this investigation's positive research findings support the provision of brain based summer school education for students with LD, ADD, and ADHD.

Limitations

Quantitative investigations often generate significant implications regarding the investigator's ability to generalize study results to the population from which the study sample was derived. Accordingly, there exist several related limitations to both internal and external validity that are relevant to this discussion.

In this quasi-experimental design study, while the homogeneous participant sample contributed to this study's ability to focus on a small clearly defined group, (Maruyama & Deno, 1992), a small sample size likely contributed to the failure to reject the null hypotheses particularly within the core academic achievement domain of the investigation. The established study hypotheses held that the Academy's brain based summer program and design would yield statistically significant findings in the direction of improved academic achievement outcomes and social and life skill development. The

research findings produced overall proportionate gains in the core academic areas, albeit falling short of establishing clear treatment effects when applying ANOVA.

A limitation impacting internal validity arose in this study. While observed positive differences on the dependent variables herein, core academics and social/ life skills were produced across both domains, the limiting impact of sample size in conjunction with the absence of homogeneity of variance statistically challenged the findings. Accordingly, the conclusion that significant treatment effects alone produced the measurable positive differences in reading, writing, and mathematics as well as in the participants' development of social and life scales could not be fully ascertained. Hence, the generalizability of the findings comes under question as a larger sample size and homogeneity of variance would be required to aptly test the strength of treatment effects with a robust parametric statistic such as a one-tailed ANOVA.

Lower post-test scores were produced by five participants in both core academic achievement assessments and in the social/ life skills measurement scales. Three participants were physically-ill throughout the duration of the post testing time period. The participants expressed their strong desire to sit for the assessment. The three participants produced lower scores in both core academic achievement and in social and life skills. Two participants likewise expressed their desires to sit for the post test assessments during a time when they were experiencing family difficulties. The two participants also produced lower scores in both academic achievement and social/ life skills. The lower scores may have skewed the data particularly in the core academic domains as the five children were of elementary age.

Teacher experience is another limitation in the study. Students received instruction from different teachers and not all teachers had the same years of experience or specializations. Therefore, inter-instructor reliability regarding instructional style and delivery may have impacted the results of the study. Students respond differently to different instructors. Also, teacher expectancy becomes a potential limitation in this study. In the study of Rosenthal and Jacobson (1966), teacher expectancies, particularly with younger children, were found to impact the students' rate of achievement gains. Educators' rates of speech, the volume of their voices, their gazes, and their movements about the class room can and often impact the levels and rates in which students receive, process, and apply knowledge. It is imperative that the Academy's instructors maximize their self-awareness in classrooms relative to their styles of presentation in a manner that provides each student a comforting and inspiring in-class learning experience. The absence of a control group in this study was considered a potential threat to internal validity.

Another limitation of this study is that the results were obtained from only one school. The sample in this group did not include a random sample. When interpreting the results of this study, it should be acknowledged that the sample does not represent the general population of students with learning disabilities. Additionally, the educational setting of a school can not be controlled. This study was conducted in a small private school in Miami Dade County. The students participating in this study were mainly from middle to upper socio-economic backgrounds, limiting the generalizability of findings to other populations.

This study had a disproportionate number of male to female participants. There were 26 male and 14 female participants in this study. While the fewer number of LD females in the study are representative of the general LD, ADD, and ADHD student population as a whole, the fewer number of females may have lowered the statistical results of the current study when compared to the general population. Therefore, only speculation can be made regarding any findings based on the gender analysis.

This study did not have a control group. Lacking a control group, there was no way of determining whether the changes measured were actually due to the program.

Also, this study was conducted for a six week period. It is probable, given the proportionate improvement in pre-post test gains that the students would benefit from a longer intervention.

It should be noted in view of this study's limitations that research in an educational setting is, in general, often limited. Swanson (2000) explains that approximately 75% of LD studies focused on education have no control groups. She continues to explain that only 5% of studies pertaining to LD students meet high standards of scientific criteria including: breath of sample description, adequacy of treatment sessions, sampling procedures, and reliable dependent measures (Swanson).

Recommendations for Future Research

The purpose of educational research is to systematically employ established investigational methods providing sustainable information to other interested persons regarding education-based issues, topics, and problems. The purpose of *The Evaluation of an Academy's Summer School Program* was to assess, using a pre-and post-test design, the effects of the program's brain based mastery learning program on forty elementary

and secondary school age children whose nature of disability included LD, ADD, and/or ADHD. As educational research additionally endeavors to advance the professional state-of-the-art in teaching and learning, an objective of this investigation was to provide future research considerations that would advance this study's findings and conclusions.

Currently, there is a modicum of quantitative research investigating the efficacy of brain based instructional methods in students whose nature of disability is LD, ADD, and ADHD. Accordingly, in view of this study, a future research consideration may include using a similar population of LD, ADD, and ADHD students but incorporating a larger sample size over the duration of an entire academic year. The participants in such a study would experience the educational benefit of significantly increased quantities of repeated exposures to the scholastic-tasks-at-hand, increased experiences of positive reinforcement, and additional instructional guidance to the individualized lessons designed to support the core academic areas and social and life skills curriculum.

A particularly important future research consideration may include a control group within the study design. A control group with a random student sample could include male and female elementary and secondary grade children whose nature of disability includes LD, ADD, and ADHD. A similarly constituted student population would receive the brain based mastery learning program at the Academy, and would constitute the treatment group. The control group would receive their education in a school designed to provide special education, although not incorporating a brain based model. A pre-and post-test control group design could significantly clarify the derived findings and conclusions relative to the treatment effects of a brain based educational program for students with LD, ADD, and ADHD. Further, threats to external validity and

generalizability would be diminished through a control group design (Campbell & Stanley, 1971; Bracht & Glass, 1968).

One representative area of ongoing future investigation includes the understanding of individual learning styles and the positive effects of educating children with LD, ADD, and ADHD in a brain based learning environment that consistently provides a nurturing, positively reinforcing, and highly organized environment.

Implications

The results of this study reveal that the Academy's brain based mastery learning summer school program produced positive achievement gains in the core academic areas of reading, writing, and mathematics and in social/ life skills development. Statistical significance evaluating the relationship strength of the instructional program on the dependent measures was produced in the secondary grade level participants in reading fluency and in all of the participants in social/life skills. Statistical significance in this study was challenged on three levels by small sample size, significant variance in pre-to post test gain scores, and the relatively short duration of exposure to the instructional program.

A theoretical and practical implication arising out the findings in this program evaluation is that the participants improved grade equivalent scores were achieved within the context of a highly specialized instructional summer program wherein three hours of core academic instruction was provided in the morning program session and social and life skills training integrated within the morning session and continued through the three hour afternoon structured activity session. The increased instructional exposure to the social/ life skills provides a plausible explanation for the statistical significance in

treatment effect upon application of a one-tailed ANOVA. Further, the improved gain scores in the core academic domain may be accounted for in part through the research of Cooper, Nye, Charlton, Lindsay, and Greathouse, S. (1996). The investigators summarized through assessment the factors associated with a specialized albeit, not brain based summer program's effect on a student sample including LD, ADHD and socially challenged youngsters of a middle socioeconomic background. Their findings based on a meta-analysis of the research data produced several conclusions. The findings established that the summer school program was an effective system for attaining specific educational and social goals and both remediation and acceleration effects were produced in reading, writing, and mathematics and in social development skills. Further, the study concluded that the overall students completing the remediation component of the summer program scored one fifth of a standard deviation, or between one seventh and one quarter of a standard deviation, higher than the control group on outcome measures; finally, the ostensibly positive effects of the specialized summer school program were unmistakable and thus, justified continued funding for the program the following summer. Hence, in view of Cooper and Charlton's research, the practical implication for the Academy's summer school brain based program lies within the positive statistical improvements produced in both the core academic areas and in social/ life skills incorporating a particularly specialized instructional model in a highly organized, quiet, nurturing, and positively reinforcing learning environment.

The results of this study support the burgeoning brain research establishing the neurobiological antecedents of students possessing developmental learning challenges. Accordingly, this investigation obviates the importance in early identification of learning

differences and the introduction of brain based intervention and education strategies. (Fontoura, Nunes, & Schirmer 2004). This study further contributes to the evolving educational research literature positing the efficacy of summer school for remediation, scholastic reinforcement, and academic/social and life skill acceleration in students with LD, ADD, and ADHD (Cooper, 2003).

The findings and the implications of this study support the conclusion that children whose nature of disability includes LD, ADD, and ADHD are favorably responsive to and benefit from a brain based mastery learning approach to instruction. This investigation contributes to the expanding literature domain addressing learning styles and teaching methods in students whose nature of disability is LD, ADD, and ADHD. Emanating from this study's results is the encouragement that educators consider the favorable impact of specialized instructional methods through the assessment and understanding of each student's educational needs and learning styles. This investigation supports the research findings of Jensen (2000) establishing that students with LD, ADD, and ADHD will optimally perform in a quiet, nurturing, and positively reinforcing learning milieu. Additionally, the findings in this study together with the identified educational research, underscores the need for employing differentiated teaching strategies necessary to accommodate the unique learning and cognitive processing styles of students. In doing so, as observed in this investigation, increasingly motivated students will begin to demonstrate academic independence and in-class success working on their individualized learning plan. This study establishes the recipe for scholastic success in the realm of educating elementary and secondary grade students whose nature of disability includes LD, ADD, and ADHD. This program evaluation further establishes

the effective educational model upon which academic confidence and adaptive social awareness develops. Students with diagnosed learning disorders experience increased core academic problem solving abilities and social and life skill development when their instruction is consistently reinforced through inspiring encouragement, and repetitive practice. In conclusion, as demonstrated by the participants in the Academy's summer school program, the cognitive learning and adaptive social abilities of students with LD, ADD, and ADHD are substantial. Indeed, future investigations addressing the cortical circuitry and information processing systems of students possessing unique learning styles are indicated and will continue. It is reasonable to consider that the findings in the investigations will further validate and augment support toward the provision of brain based mastering learning in the classrooms of elementary and secondary school students possessing specialized instructional needs.

Summary

In the aggregate, the participants' in the Academy's summer school program produced improved core academic and social/life skills scores on post-test assessments designed to evaluate the respective study measures. The brain based mastery learning instructional methods comprising the Academy's summer school program are consistent with current education research literature. In this population, brain based (Caine & Caine, 2006) mastery learning (Anderson, 1994), employing an individualized format in conjunction with differentiated instructional methods (Carolane & Guinn, 2007), and multiple intelligences (Moran, Kornhaber, & Gardner, 2006) have established positive results and accordingly, support this educational method with students who possess academic learning and social/life skills difficulties.

The statistically significant reading fluency achievement gains and aggregate social/life skills improvement is not, however, consistent with the established education research literature suggesting that students with learning differences demonstrate a tendency to achieve scholastic gains at an attenuated rate (Moats, 2004). To this end, this investigation established that when students are presented with an individualized brain based mastery learning educational program, all students can efficiently and effectively learn (Levine, 2003a).

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APPENDIX A

Informed Consent Form

and

Voluntary Consent Form

Barry University Informed Consent Form

Dear Research Participant:

Your participation in a research project is requested. The title of the study is *The Evaluation of an Academy's Summer School Program*. The research is being conducted by Mercedes Ricon, a student in the Exceptional Student Education department at Barry University, and is seeking information that will be useful in the field of Special Education. The aims of the research are to evaluate the effectiveness of an academy's brain based summer school program on the development of reading, writing, mathematical achievement, and social and life skills of students with LD and ADD/ADHD. In accordance with these aims, the following procedures will be used: 40 boys and girls, ages five to seventeen years enrolled in the summer program will be administered an achievement test before and after the program. An independent psychologist will administer, score, and interpret the results of the Woodcock-Johnson-Third Revision Achievement Test (WJ-III) Forms A and B. The teachers and parents will complete a social/life skills instrument before and after the program. The length of time required for the administration of the WJ-III will be ninety minutes. The length of time required for the social/life skills instrument-parent form will be twenty minutes. The length of time required for the administration of the social / life skills instrument-teacher form will be twenty minutes. We anticipate the number of participants to be 40.

If you decide to allow your child to participate in this research, you will be asked to do the following: sign a consent document and complete a social/life skills instrument. In addition, teachers will complete a social/life skills instrument. If your child agrees to participate he/she will sign an assent form. An achievement test will be administered to him/her before and after the summer school program. In addition, teachers will complete a social/life skills instrument.

Your consent to allow your child to be a research participant is strictly voluntary and should you decline to have your child participate or should you choose to allow him/her to drop out at any time during the study, there will be no adverse effects on your child's grades or transcripts or enrollment status at the school. If the student does not wish to continue in the study, the student will continue their enrollment and participation in the academy's summer school program absent of adverse impact for non-participation in the study. Further, any data that may have been collected while participating in the study will not be analyzed.

There are no known risks to your child. If your child will not participate in the study, he/she will be part of the Summer Program, but his/her data will not be included in the study. Although there are no direct benefits to you or your child, participation in this study may help our understanding of the effectiveness of a highly organized and specialized instructional program for children with unique learning styles.

As a research participant, information collected will be kept confidential, that is, no names or other identifiers will be collected on any of the instruments used. Data will be kept in a locked file in the researcher's office. By completing and returning this letter, you have shown your agreement to allow your child to participate in the study.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Mercedes Ricon, at (305) 510-0048, my supervisor, Dr. Catherine Roberts at (305) 899-4829, or the Institutional Review Board point of contact, Ms. Nildy Polanco, at (305) 899-3020.

Thank you for your participation.

Sincerely,

Mercedes Ricon

Barry University Consent Form

Voluntary Consent

I acknowledge that I have been informed of the nature and purposes of this experiment by _____ and that I have read and understand the information presented above, and that I have received a copy of this form for my records. I give my voluntary consent to participate in this experiment.

Signature of Participant

Date

Researcher

Date

Witness

Date

(Witness signature is required only if research involves pregnant women, children, other vulnerable populations, or if more than minimal risk is present.)

APPENDIX B

Assent Form Involving Minors

Barry University

ASSENT FORM INVOLVING MINORS

Assent for Children

The age of majority in Florida is 18. For subjects under 18 years of age, consent must be obtained from the parent or court-appointed legal guardian. In addition, the Institutional Review Board requires assent from children aged 7-17. The following assent statement should be included with the parental consent form.

We are doing a research study that includes children such as you. We have explained the study to you, and we need to know whether you are willing to participate. Please sign your name below so that we can be certain whether you want to be in the study or not. Thank you.

_____ I am willing

_____ I am not willing

to participate in the research study which has been explained to me by

Meredes Ricon _____

Signature of Researcher

_____ *Date*

_____ *Signature of Child*

_____ *Date*

_____ *Signature of Parent*

_____ *Date*

APPENDIX C

Script for Registrar

SCRIPT FOR REGISTRAR

Registrar: Will complete the regular enrollment procedures

Will then state the following:

To the Parent (Prior to handing out the Consent Form and Assent Form):

We are in the process of evaluating the Academy's summer school program in its effectiveness of both the academic and social/life skills curriculum. We would like your consent to have your child participate in this research, and also for you to complete a life skills survey on your child. All information is confidential and your consent is voluntary; if you should decline to have your child participate, or drop out of the study, there will be no adverse affects on your child's grades, transcripts, or enrollment status. Please read the consent form; if you have any questions, please feel free to ask for clarification. Thank you for helping us to improve the educational services that we provide for your child.

To the Students (Ages 7-12) [Prior handing out Assent Form]:

We are doing a study that includes students your age. This study will help us to give you more ways to be successful. You will be tested before summer school begins and also when it ends. There will be two testing sessions; each testing session will take no more than 90 minutes. Your scores will not affect your school grades and will be kept confidential. If you have any questions, please feel free to ask? If you want to participate in the study, please read and sign the assent form that has been given to you. Thank you.

To the Students (Ages 13-17) [Prior handing out Assent Form]:

We are doing a study that includes students your age. This study will help us to evaluate our summer school program in order to provide more opportunities for you to be successful. Testing will occur at the beginning and end of the summer program and each testing session will take no more than 90 minutes. Your test scores will not be computed in your grade point average and all results will be kept confidential. If you have any questions, please feel free to ask for clarification? Only if you wish to participate in the study, read and sign the assent form that has been given to you. Thank you.