2011

The Impact of Collaborative-Inclusion Education on the Academic Achievement of Students in General Education and Measured by the End of the Year Mathematics Assessment in Grade 2

Felice Harrison
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THE IMPACT OF COLLABORATIVE-INCLUSION EDUCATION ON THE ACADEMIC ACHIEVEMENT OF STUDENTS IN GENERAL EDUCATION AS MEASURED BY THE END OF YEAR MATHEMATICS ASSESSMENT IN GRADE 2

BY

FELICE A. HARRISON

Dissertation Committee
Barbara Strobert, Ed.D., Mentor
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Adunni Slackman Anderson, Ed.D.

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Education
Seton Hall University

2011
ABSTRACT

The Impact of Collaborative-Inclusion Education on the Academic
Achievement of Students in General Education as Measured by the
End of Year Mathematics Assessment in Grade 2

The purpose of this study is to investigate the impact of
collaborative-inclusion (CI) education on the academic achievement of students in general education, as measured by the end-of-year mathematics assessment in second grade. The study utilizes a retrospective data analysis for students in grade 2 in a northern New Jersey, I district factor group (DFG), elementary school (K-2), lending itself to implications affecting policy, practice and future research.

The Everyday Mathematics end-of-year assessment for students in grade 2 was used to compare mathematics results/scores from the students in the collaborative-inclusion (CI) and non-collaborative-inclusion (NCI) classrooms. Independent T tests were conducted for the purpose of this study to ascertain if the CI model has a statistically significant impact on the test scores of students in general education in the CI classroom setting.

The results of this study revealed no statistically significant difference between the mean test scores of students in general education in a CI classroom compared to the mean test scores of students in general education in the NCI classrooms.

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Doctoral Candidate, Felice A. Harrison, has successfully defended and made the required modifications to the text of the doctoral dissertation for the Ed.D. during this Spring Semester 2011.

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To my colleagues and friends who have encouraged, supported and guided me, I say 'Thank you'. Thank you, Adunni, Alexis, Audrey, Frank, Loren, Mel, Michael C., and Michael O..

Living Life Like It’s Golden!
Felice A. Harrison, B.S.; M.A.T.; M.A.; Ed.D.

iv
DEDICATION

To My Dearest Uncle - Patrick Winfield Reed (1938-2010)

I dedicate this work in loving memory,

…and how deeply you’ve touched my heart.

Holla’back!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>v</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vili</td>
</tr>
<tr>
<td>CHAPTER I – INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Background of the Problem</td>
</tr>
<tr>
<td></td>
<td>Problem Statement</td>
</tr>
<tr>
<td></td>
<td>Purpose Statement</td>
</tr>
<tr>
<td></td>
<td>Research Questions</td>
</tr>
<tr>
<td></td>
<td>Limitations/Delimitations</td>
</tr>
<tr>
<td></td>
<td>Assumptions</td>
</tr>
<tr>
<td></td>
<td>Design/Methodology</td>
</tr>
<tr>
<td></td>
<td>Significance of the Study</td>
</tr>
<tr>
<td></td>
<td>Organization of the Research</td>
</tr>
<tr>
<td></td>
<td>Definition of Terms</td>
</tr>
<tr>
<td>CHAPTER II – REVIEW OF RELATED LITERATURE</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Inclusion - Historical Perspective</td>
</tr>
<tr>
<td></td>
<td>Definition and Models for Inclusion</td>
</tr>
<tr>
<td></td>
<td>Attitudes and Perceptions on Inclusion</td>
</tr>
<tr>
<td></td>
<td>Effects of Inclusion on Mathematics Achievement</td>
</tr>
<tr>
<td></td>
<td>Collaborative-Inclusion Approach</td>
</tr>
<tr>
<td></td>
<td>Summary</td>
</tr>
<tr>
<td>CHAPTER III – METHODOLOGY</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Setting /Subjects</td>
</tr>
<tr>
<td></td>
<td>Design/Data Collection</td>
</tr>
<tr>
<td></td>
<td>Data Sources/Instruments</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Headings – Categories for Classroom and Student Data</td>
</tr>
<tr>
<td>2</td>
<td>Grade 2 - Student Demographics</td>
</tr>
<tr>
<td>3</td>
<td>Grade 2 - Classifications of Students with Special Needs by Classroom</td>
</tr>
<tr>
<td>4</td>
<td>New Jersey – State Codes for Categories of classifications for Special Education</td>
</tr>
<tr>
<td>5</td>
<td>Grade 2 – Students with IEPs (grouped) compared to Students in General Education (grouped); (Students with IEPs in the Collaborative-Inclusion (CI) Classroom and Non-Collaborative-Inclusion (NCI) Classrooms compared to Students in General Education in the Collaborative-Inclusion (CI) Classroom and Non-Collaborative-Inclusion (NCI) Classrooms)</td>
</tr>
<tr>
<td>6</td>
<td>Grade 2 – Students in the Collaborative-Inclusion (CI) Classrooms compared to Students in the Non-Collaborative-Inclusion (NCI) Classrooms; (Students in General Education and Students with IEPs (grouped) in the Collaborative-Inclusion (CI) Classroom compared to Students in General Education and Students with IEPs (grouped) in the Non-Collaborative-Inclusion (NCI) Classrooms)</td>
</tr>
<tr>
<td>7</td>
<td>Grade 2 – Students in General Education in the Collaborative-Inclusion (CI) Classroom compared to Students in General Education in the Non-Collaborative-Inclusion (NCI) Classrooms</td>
</tr>
<tr>
<td>8</td>
<td>Grade 2 – Students with IEPs in the Collaborative-Inclusion (CI) Classroom compared to Students with IEPs in the Non-Collaborative-Inclusion (NCI) Classrooms</td>
</tr>
</tbody>
</table>
Chapter I

INTRODUCTION

Background of the Problem

Historically, educational laws have focused on providing quality and appropriate education for all students. The Rehabilitation Act of 1973 defines the educational right of children to receive a free public education which includes all support services identified in the students' individual educational plans. These services, for example, may include speech therapy, occupational therapy, physical therapy, supplemental subject matter instruction, and counseling. Under Section 504 of The Rehabilitation Act, governing Free Appropriate Public Education (FAPE) law, and the Individuals with Disabilities Education Act (IDEA) of 1991, children with disabilities have the educational right to receive “an educational program that is individualized to a specific child, designed to meet the child’s unique needs, provides access to the general curriculum, meets the grade-level standards established by the state, and from which the child receives educational benefit” (p. 1).

The Individuals with Disabilities Education Act (IDEA) formerly known as the Education for All Handicapped Children Act, authorized in 1975, was re-authorized in 1990. IDEA was re-authorized again in 1997, and states that “to the maximum extent appropriate, students with disabilities are to be educated with students who do not have a disability,
and that special classes, separate schools or other removal from the regular educational environment occurs only when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily” (p. 1). This statement is known as the Least Restrictive Environment (LRE). IDEA was reformed again in 2004, as the Improving Education Results for Children with Disabilities Act. It is simply referred to as IDEA 2004; however, its major revisions affect the requirements regarding the “highly-qualified” status of teachers of special education, and increase the parental role in all aspects of the special education process.

Although Free Appropriate Public Education (FAPE) and the Individuals with Disabilities Education Act (IDEA) establish the law governing free and appropriate public education, there has been a long history of legal challenges and debates involving the dispute of the provisions that are to be included in programming and services for individual children.

Almazan and Quirk (2002) noted legal cases, such as Mills v. Board of Education of 1972, in which a group of parents in the District of Columbia challenged the “separate but equal” schooling of seven children with disabilities. The suit was filed stating that the district was denying the children access to public education. In this case, the court ruled in favor of the plaintiffs. Furthermore, the court ruled that each child was entitled to a free, public education regardless of the extent of the student’s disability.
The court ruled that under IDEA, the school district was not required to retain an expert. This meant that the district was responsible for meeting the needs of the children, although they were not required to consult with an “expert” in the area of the student’s disability, in order to develop the individual educational program for the child.

Other cases, such as *Roncker v. Walter* in 1983 (as cited in Almazan & Quirk, 2002), set precedent in interpreting the LRE provisions under IDEA. In this case, the parents requested a continuation of the current neighborhood school placement for their son with special needs. The school district argued that the student was not realizing success at the neighborhood school, and needed the specialized program available at the segregated county school. The Federal Court of Appeals positioned that the issue was whether or not the student could receive the same services, as was afforded him at the county school. These services were necessary in an effort to “improve the student’s performance at his neighborhood school” (Almazan & Quirk, 2002, p.5). Furthermore, the court questioned whether the services provided in the segregated school could be provided in the neighborhood school. Thus, the “portability doctrine” was determined to be an essential factor in the provision of special education services and the environment for their delivery.

In another case, *Hartmann v. Loudon County Board of Education*, in 1998 (as cited in Almazan & Quirk, 2002), parents of a student with autism wanted full inclusion in regular education for their child. However, the
court ruled in favor of the school district, stating that the district had attempted to include the student to the "maximum extent appropriate," but that the student's behavior interfered with the educational benefit of inclusion. The court also dismissed the parents' claim that the student's failure in the inclusive environment was due to the school district's unwillingness to consult with a qualified expert on autism in developing the student's program in a general education environment. It should be noted that there are hundreds of similar cases, from federal to state locales, which stem from these types of disagreements regarding the interpretations of provisions under the law.

In the 1980's and 90's, the issues surrounding inclusive practices continued to surge, as factors such as accountability, advocacy and standards have been given priority in education (Shade & Stewart, 2001). Those in support and opposition to inclusion, both, tout as their rationale, that there must be a standard for the educational benefit and appropriateness, for including students with special needs into the general education classroom. Brehn (2003) makes clear this debate, reporting that "At this level 'us' versus 'them' regarding inclusion, the meaning of what we see in any classroom is in danger of becoming more a question of opinion than data-based analysis" (p. 88). Studies, as detailed in Brehn (2003), report "mixed results," and "some recent studies have concluded that students with mild learning disabilities in inclusive programs can make achievement gains that are comparable to or greater than gains made by
students in traditional special education pull-out programs” (p. 88). She further reports that “other studies have found that included students with learning disabilities make less than anticipated achievement gains, even when the programs offer atypically high levels of support” (p. 88).

While research from the Centre for Education Research and Policy (2009) concludes that “Attending school with a higher percentage of students with disabilities is found to have only extremely small and statistically insignificant effects on the reading and numeracy achievement of non-disabled students” (para. 4). Leadley (2004) states that “Placing ‘special needs’ students in the regular classroom can obviously retard their intellectual development, but can also have a negative impact on the regular education students” (p. 3). In just this last decade, there has been an increased concern, although unpopular, regarding the effects of inclusion practices on the achievement of students in general education. Parents, administrators, teachers, and students themselves, have expressed mixed support of inclusion. They question the amount of time needed to provide effective teaching to particular students, the impact of addressing behavioral issues within the classroom, the teacher’s skill set in meeting the needs of all of the students, in addition to the availability of resources, and support from the administration.

In effort to get at the core of the effectiveness or ineffectiveness of inclusive practices, there have been numerous studies and research that focus on the aspects of inclusion in education and academic achievement.
Burstein, Sears, Wilcoxen, Cabello and Spagna (2004) report that 
"approaches in implementing inclusive practices differed, however, 
resulting in significant variability among schools in services provided to 
students with special needs" (p. 104). They further state that "balancing 
inclusion with specialized instruction for all students emerges as an 
important component of inclusive practices" (p. 104).

On February 17, 2009, President Barack Obama announced in his 
State of the Union Address his agenda for the renewal and revitalization of 
the American economy. This plan, involving an array of economic 
stimulus initiatives, is focused on taxation, employment, health, and 
education. Now, as law, and known as the American Recovery and 
Reinvestment Act (ARRA), this statute holds accountable the government 
and education leaders to provide an effective use of funds for the viability 
of all individuals (American Speech-Language-Hearing Association, 
2009).

Under ARRA, leaders in education and governing bodies are 
challenged to meet the education standards, specifically identified under 
Title I; for students at-risk, and the Individuals with Disabilities Education 
Act (IDEA); for 3 to 5 year olds, including those with special needs.

The current economic crisis has added to the urgency for educators 
and politicians to provide for effective instructional practices which are, 
both, educationally and cost effective. Very often the instructional practices 
are research based and data-driven. Accountability and transparency are
components of a necessary foundation to ensure the academic achievement and inclusion of all students. Educators must be careful to engage all of the stakeholders in this process.

More specifically, in 2009, former New Jersey Governor Corzine mandated that funding under ARRA must be utilized to provide programs and services to ensure that pupils with disabilities in New Jersey receive full educational opportunities (State of New Jersey, 2009). In 2006, the New Jersey Office of Special Education Programs was created to monitor the delivery of all special education programs. The governor then established that the New Jersey Commissioner of Education, at the time, Lucille Davey, monitor and review each school district’s plans and programs for the utilization of these funds. This would be accomplished through an assessment of the components of each plan, and through the reporting of student achievement data, thus, again, assuring accountability and transparency.

Education leaders and policy makers are, thus, exploring educational approaches and practices which maximize the academic achievement of all students. They are also looking for the most effective and efficient use of resources and funding. With more than twelve billion dollars allocated for students classified with special needs and students identified as “at-risk” in the United States in 2009, the enactment of the American Recovery and Reinvestment Act has created a greater scrutiny of educational institutions, by politicians and a host of stakeholders.
This debate continues to be the impetus on which educational leaders, policy makers, school administrators, parents, and students themselves, are struggling to determine the most effective and efficient means for assuring the academic achievement of individuals in the least restrictive, most inclusive, and appropriate educational environment.

In a global context, a significant movement toward educational reform occurred in 1983, with the release of the report from the National Commission on Excellence in Education, called A Nation At Risk. "The most famous line of the widely publicized report declared that 'the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people'" (National Commission on Excellence in Education, 1983, p. 9). The report indicated that students must be prepared to compete in the global economy, workforce, and to be viable, contributing citizens to society. Essentially four areas for focus were highlighted in the report. The emphasis was on content, expectations, time, and teaching. Although there are some criticisms of the report by policy makers and educational leaders, even 25 years later its findings and data have played a significant role in shaping education policy, standards, and accountability.

For over 50 years, policy makers and educational leaders have examined and re-examined, funded and reformulated, standardized and assessed, reformed and re-authorized, and re-enacted and reinvested in almost every aspect of education, in an effort to improve the academic
achievement of students. However, there still remains a need to identify a model and approach for inclusion in which resources and services are proven to positively impact the academic achievement of all of the students.

Problem Statement

In a quest for fair and appropriate education for all children, governed by the least restrictive environment, educators struggle with making sure they meet the needs of all students, including those with special needs. There have been numerous studies and research surrounding the topic of inclusion education practices, however, much of this research is based on qualitative data, including questionnaires, interviews, surveys, observations, and focus groups. Some researchers also argue that educational leaders must look at the identification of successful inclusive service delivery models, as opposed to a blanket policy on inclusion (Fennick & Liddy, 2001; Kavale & Forness, 2000; Pivik, MComas, & LaFlamme, 2002). The current emphasis in education focuses on formative assessments, including standardized tests and standards for academic performance. In light of the current focus on data driven instruction, this study utilized a quantitative data analysis, in which there is limited research and study from this perspective on this topic.

This research is further supported with focus on mathematics assessment data. The Teaching At Risk: A Call to Action (The Teaching Commission, 2004) report indicates that American employment
opportunities are "scientifically and technologically based" and that the performance of our American students in mathematics and science has a direct impact on their future, the economy and the protection of our nation. Brehm (2003) references the National Center on Educational Restructuring and Inclusion’s definition on inclusive education: that of providing all students with effective educational services with the goal of helping to assure that all students are prepared to be contributing and productive citizens in society.

Burke and Sutherland (2004) study the relationship between teacher attitude and knowledge, which similar to the No Child Left Behind legislation states that these factors are significant in increasing student learning and results on performance assessments.

Rea and Connell (2005) indicates that collaborative teaching is one of the major growing provision for services provided by teachers of general and special education in working together to instruct a majority of students in general education along with students with IEPs.

Purpose Statement
Although the research on inclusion largely shows some academic gains to both, students in general education and special education, the research does not, in general, identify the effectiveness or ineffectiveness of any specific inclusion educational model. The purpose of this study is to investigate the impact of collaborative-inclusion (CI) education on the
mathematical achievement of students in a school in northern New Jersey, in grade 2, in general education, as measured by the Everyday Mathematics end-of-year assessment. In the CI model, services are provided to the student with an IEP and students in general education in the general education setting. In addition, the teacher of special education and the teacher of general education share/combine their resources, skills and perspectives, to strengthen the teaching and learning opportunities, methods and effectiveness.

In the non-collaborative-inclusion (NCI) model, services are provided in the general education setting to the student with special needs by the teacher of general education. The teacher of special education may make modifications and accommodations to the instructional plans, which have been prepared by the teacher of general education. These modifications are made in accordance with the goals and objectives of the individual educational plans of students classified with special needs. The teacher of special education may also provide some instructional support to the teacher of general education and the students who have special needs, within the general education classroom. However, the teacher of general education is primarily responsible for the daily instruction of all of the students in the classroom.

The study will be a retrospective analysis of mathematics data for these students in a northern New Jersey, I District Factor Group.
elementary school, K-2, with implications for policy, practice and future research.

The key hypothesis or null hypothesis for this study is:

H₀: Collaborative-inclusion (CI), as defined in this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

This hypothesis is tested against the alternative:

Hₐ: Collaborative-inclusion (CI), as defined by this study, has an impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

Significance at the .05 level will be used as a determiner of the null hypothesis or the hypothesis (or its alternative).

Research Questions

The following research questions are included in this study.

1. What are the implications regarding the effects of inclusion practices, in general, on the mathematical achievement of students with IEPs compared to the mathematical achievement of students in general education, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

2. What are the differences in the testing results when the scores of all of the students in the Collaborative-Inclusion classroom are compared to the scores of all of the students in the Non-Collaborative-Inclusion
classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

3. What does the data from the Everyday Mathematics end-of-year assessment scores indicate about the effectiveness of the Collaborative-Inclusion model on the mathematical achievement of students in general education in the Collaborative-Inclusion classroom compared to the mean end-of-year Everyday Mathematics assessment scores of students in general education in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school?

4. What are the differences in the mean testing results when students with IEPs in a Collaborative-Inclusion classroom are compared to students with IEPs in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

Limitations/DeIimitations

This study is based on a data collection from a K-2 public school in a northern New Jersey suburban/urban area. It is noted that the school is located in a district, identified as a district of wealth with a high tax base, and designated as an I district factor grouping (DFG). This aspect limits the validity and reliability of generalizing the outcome of this study to districts other than those designated with a DFG of I.
It is also noted this research is limited to the only K-2 elementary school in the school district. The other elementary schools in the district, except for one other grade 3-5 school, provide curricular instruction to grades K-5.

The researcher recognizes that limiting the research to one school and one grade level, creates an opportunity for bias, where as factors such as teacher "buy in," parent and "school community" support, and administrative support may have influence.

The researcher also recognizes that this research does not control for teacher quality as it relates to the teacher’s experiences and instructional skill set. In addition, in the CI model, students with IEPs and students in general education are instructed by both a teacher with certification in special education, and a teacher with certification in general education. Therefore, it is assumed that the method of instruction, CI versus NCI, is the key factor in influencing the impact on the mathematical achievement of the students and on the results of this study.

Furthermore, it is noted that the population of students in the CI classroom compared to the students in the NCI classrooms represent an approximate ratio of 1:10. It is also noted that students with IEPs in the CI classroom compared to students with IEPs in each of the individual NCI classrooms represent ratios of 2:1 in two of the classrooms, 3:1 in three of the classrooms, and an approximate ratio of 4:1 in two other classrooms. In sum, the CI classroom has a higher percentage of students with IEPs
than the NCI classrooms. The researcher recognizes that this variable of group or sample size may have an impact on the results of this study.

Assumptions

For the purpose of this study, it was assumed that the students in general education, in both the CI and NCI classrooms were randomly assigned, that the teachers in the CI classrooms were agreeable to the assignment, and that these teachers embraced the concept of meeting the needs of diverse learners, including those students classified with special needs, in the least restrictive environment. It was also assumed that, in addition to the teachers, the building and central office/district administrators were in support of the CI program, providing resources, including, but not limited to materials, time, and professional development, to conduct an effective educational program.

Design/Methodology

The criterion referenced test data from the end-of-year Everyday Mathematics Assessment from the students in grade 2 was used to determine the academic effect of CI instructional practices on the students receiving general education services in the CI classroom. The researcher conducted a retrospective data analysis of the Everyday Mathematics end-of-year assessment by Wright Group/McGraw-Hill publishing company, developed by the University of Chicago School Mathematics Project in
The data analysis compared the mathematics achievement of students receiving general education services in the CI classroom with those in the NCI classrooms.

The researcher conducted independent cross-sectional studies of end of year results of the math scores. Independent-sample, two-tailed t-tests were used to compare the means of the following groups:

- Students with IEPs (grouped) compared to students in general education (grouped);
- Students in general education and students with IEPs (grouped) in the CI classroom compared to students in general education and students with IEPs (grouped) in the NCI classrooms;
- Students in general education in the CI classroom compared to students in general education in the NCI classrooms;
- Students with IEPs in the CI classroom compared to students with IEPs in the NCI classrooms.

Mathematics data was obtained from the school's data base system from the 2007-2008 school year. This is the last year that the school district utilized a CI model in which one teacher of special education and one teacher of general education co-taught in a full day program. The study compares second grade students with IEP's and those who are in general education in both CI and NCI classrooms. Ethnicity, gender, educational program classifications, general education or special education
classification, as well as students receiving basic skills support, was coded, recorded and analyzed using SPSS 10.0, a comprehensive computerized system for analyzing data.

The students with IEPs in this research were qualified to receive special education services in accordance with the New Jersey Administrative Code (NJAC 6A:14-3.5.). The students classified with special needs were assigned to the CI classroom and NCI classroom based on recommendations from the child study team and as a result of their annual review meetings, in accordance with the needs determined by their IEPs. The students in general education were assigned to their classrooms according to the administrative procedures established within the school. The decisions regarding placement were determined by considering a balance of gender, minority and non-minority designation, and the grade level abilities of the students. Parental concerns, requests, and feedback, as well as teacher recommendations and peer interactions, were also weighed as factors in the students' class assignments.

The student placements were made without any relevance to this researcher, ensuring no influence on the results of this study. The district enrollment and class placement data, by school, is available to the public in the district's annual Report of District Enrollment. The data from the 7 second grade classrooms was gathered from the database system of 173 students, 19 of whom are classified. For the purpose of analyzing data,
SPSS 10.0 (George & Mallery, 2007) was used in this research which involved 82 male and 91 female students in grade 2.

Significance of the Study

Current research data and researchers have indicated a need to further explore the effects of special education inclusion practices in the education of all students, including students in general education. The studies and research aim to identify data which creates a basis on which educational policies and practices can be developed. Taylor, Smiley, Ramasamy (2003) in their article "Effects of Educational Background and Experience on Teacher Views of Inclusion," identifies full inclusion as "the provision of appropriate educational services to all students in regular classes attended by non-disabled students of the same chronological age in their neighborhood school, including students with severe disabilities" (p.3). Furthermore, Burstein, Sears, Wilcoxen, Cabello & Spagna (2004) reference Ferguson’s (1996) position in relationship to inclusion, in that "the intention is to alter education for all students, benefiting not only students with disabilities but also those without disabilities" (p. 104). Rea and Connell (2005) indicate that collaborative teaching is one of the major growing provisions of service that teachers of general and special education provide by working together to instruct a majority of students in general education along with students with IEPs.
Organization of the Research

This study is organized in five chapters. Chapter I, Introduction, provides detailed information about the study including the background of the problem, a problem statement, significance of the study, its purpose, research questions, definition of terms, assumptions, limitations/delimitations and the organizational outline for this study.

Chapter II, Review of Related Literature, references the current and relevant literature related to this study, including a historical overview, definitions and models, attitudes and perceptions, implications, and effects.

Chapter III, Methodology, details the setting and subjects, design of the study, data collection, data sources, instrument, and data analysis tools and methods.

Chapter IV, Analysis of Data, will report the outcomes of the methodology from this body of research. Descriptive analysis and summaries will be provided.

Chapter V, Summary Conclusions and Recommendations, will provide a summary of information from each of the chapters, and include the summary of the purpose of this research, conclusions from the findings, and recommendations for future research.
Definition of Terms

*Academic Achievement*: The attainment of a certain level of achievement or competency versus an individual's potential to acquire the skills needed to be successful. For example: a student may have the tested potential to read on a 12th grade level, but may only be reading on a 4th grade level (Packer, 2002).

*Assessment*: A measure of the level of competency one has achieved. Assessment can be formative or summative, focused on one area or more areas. The methods of assessment may include standardized tests (Packer, 2002).

*Classification*: The category by which the student has been determined eligible for special education and related services (NJDOE, 2007).

*Collaborative-inclusion (CI)*: Services are provided to the student with an IEP and students in general education in the regular classroom. In the collaborative model of inclusion, the teacher of special education and the teacher of general education share/combine their resources, skills and perspectives, as resources to strengthen teaching and learning opportunities, methods and effectiveness (Friend, 2002).

*Co-Teaching*: Co-Teaching is one approach for bringing the best of teacher talents together to benefit all students. Most commonly, a special education teacher and general education teacher will teach a class together. Special education students benefit by having exposure to highly
rigorous content. General education students benefit by having more ways to learn the content. When teachers combine their expertise in content knowledge, learning strategy, and classroom management, more students achieve to higher levels of proficiency (Hallahan & Kaufman, 2006).

**Criterion-referenced Assessment**: A method of assessment in which the individual’s performance (or score) is compared to an established cutoff or criterion; the individual is not compared to others but to this standard or criterion (Packer, 2002).

**Curriculum Based Assessment (CBA)**: Measurement that uses “direct observation and recording of a student’s performance in the local curriculum as a basis for gathering information to make instructional decisions” (Deno, 1987, p. 41).

**District Factor Group (DFG)**: First developed by the New Jersey Department of Education in 1975 for the purpose of comparing student performance on statewide assessments across demographically similar school districts. The categories are updated every ten years when the United States Census Bureau releases the data from each new census. The DFGs represent an approximate measure of a community’s relative socioeconomic status (SES). From lowest socioeconomic status to highest, the categories are A, B, CD, DE, FG, GH, I and J (New Jersey Department of Education, 2009).

**General Education**: Also referred to as “regular education.” General education comprises a core of knowledge and skills that a student
or graduate should possess at any grade level of their education (N. J. S. A. 18A: 38-25, 2009).

**Inclusion:** The term means to provide services to the student in the regular classroom (instead of pulling the student out for services or segregating them in special classes). In different areas, the term “inclusion” may take on additional meanings such as modifying the curriculum downwards so that a student who would not be able to keep up with the school work of a “regular” class can be educated in the regular classroom (Packer, 2002).

**Individualized Education Program (IEP):** A written plan which sets forth present levels of academic achievement and functional performance, measurable annual goals and short-term objectives or benchmarks and describes an integrated, sequential program of individually designed instructional activities and related services necessary to achieve the stated goals and objectives. This plan shall establish the rationale for the student’s educational placement, serve as the basis for program implementation and comply with the mandates set forth in this chapter (N. J. A. C. 6A: 14-1.3, 2009).

**Mainstreamed:** Students with disabilities, still enrolled in self-contained special education classes, participate in the nonacademic portions of the general education program, such as art, music, and physical education (Council for Exceptional Children, 2003).
Non-collaborative-inclusion (NCI): Services are provided to the student with an IEP and students in general education in the regular classroom. In the non-collaborative model of inclusion, the teacher of general education is primarily responsible for the instruction of all students. The teacher of special needs may provide instructional support to the teacher or direct instruction to the students with IEPs (Friend, 2002).

Pull-Out: Services or support are provided to students with special needs in a separate room or different class than their regular classroom environment (Packer, 2002).

Push-In: Services or support are provided to students with special needs in their regular classroom environment. Also known as “in-class Support” (Packer, 2002).

Resource Room: A classroom or location where students with special needs receive specialized services or support (Packer 2002).

Special Education: Specially designed instruction, at no cost to parents, to meet the unique needs of a child with a disability, including instruction conducted in the classroom, in the home, in hospitals and institutions, and in other settings; and instruction in physical education (N.J.A.C. 6A: 14-1.3, 2009).

Student with a disability: A student who has been determined to be eligible for special education and related services (N.J.A.C. 6A: 14-1.3, 2002).
Teacher of General Education: Referred to as a certificate holder with either a provisional or standard certification (elementary school endorsement), issued by the State board of examiners (N.J.A.C. 6A: 9-2.1, 2009).

Teacher of Special Education: Referred to as a certificate holder with either a provisional or standard certification, with an endorsement to instruct in special education, issued by the State board of examiners (N.J.A.C. 6A: 9-11.3 2009).

Team Teaching: A teacher of special education and a teacher of general education work with students in the regular education classroom providing instruction to the students. Normally, the teacher of special education provides any adaptations and modifications, and support to students with special needs. Normally, the teacher of general education is responsible for providing the general curriculum to all of the students, including those with special needs (Game & Metcalfe, 2009).
Chapter I
REVIEW OF RELATED LITERATURE

Introduction
This chapter is a review of related literature that is germane to the topic of inclusion and the academic achievement of students. The chapter includes this introduction, a historical overview, definition and models for inclusion, attitudes and perceptions on inclusion, implications of inclusion, and reported effects on academic achievement.

The historical overview expands upon the literature included in Chapter I, highlighting the laws, regulations, and policies that have been established over decades. Definitions of inclusion are presented from a variety of sources and perspectives. Different models for inclusion are also presented, representing a spectrum of viewpoints. Included is an introspection of the attitudes and perceptions of key individuals who are involved in the process of inclusion and its practices. The key individuals are the students, teachers and staff, parents, and administrators.
Furthermore, the implications surrounding inclusion, such as program planning, staff development, and resource allocation are shared. Last, the aspects of inclusion and academic achievement in mathematics were explored.
Inclusion – Historical Overview

For almost 40 years, the debate over how to best provide an effective and appropriate educational program for students, especially those with special needs, has been a growing challenge for policy makers and education leaders. Nationally, there is a movement towards inclusion; the education of students with special needs in the general education classroom (Barlow, 2005). There has also been a noted increase in the number of students with disabilities who are provided with services within the general education classrooms. In the 1984-1985 school year, less than 25% of students with special needs were educated in the general education classroom. In 1998-1999, this percentage almost doubled, with 47% of the students with special needs having their educational programs provided in the general education classroom (Burnstein, Sears, Wilcoxen, Cabello, & Spagna, 2004). In addition, in 2001, the U.S. Department of Education (as cited in Turner, 2003) indicated that more than 95% of the students with special needs were educated in general education schools.

Since passing into law The Individuals with Disabilities Act (IDEA), formerly Public Law 94-142 in 1975, and with reauthorization in 1997, there is a keen awareness that, to the maximum extent appropriate, students with disabilities are to be educated with students who do not have a disability, and that special classes, separate schools or other removal from the regular educational environment occurs only when the nature or severity
of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. (Individuals with Disabilities Act of 1991 Amendments of 1997, 20 USC 1412)

The Rehabilitation Act of 1973 defined the educational rights of children to receive a free public education which includes all services. Furthermore, section 504 of The Rehabilitation Act regulates Free Appropriate Public Education (FAPE), in which within the general curriculum and standards for the grade level, an individualized program is crafted to assure for the maximum educational benefit to the student. IDEA in essence, defines the least restrictive environment (LRE) in which the education of students with special needs, and all related services and supplemental aids and services, occurs in a regular educational environment according to the student’s individual educational program. “This requirement is met by providing personalized instruction and support services to permit the child to benefit educationally from the instruction...” (Bateman, 2008, p.74).

Furthermore, The Improving Education Results for Children with Disabilities Act, known as IDEA 2004, reforms the earlier provisions under the law, thus, expanding upon the trends in special education to include:

- increased accountability for students with disabilities;
- ensuring highly qualified teachers are in the classrooms;
• expanding the types of methods used to identify students with learning disabilities;
• reducing litigation;
• streamlining IEP and other paperwork requirements;
• increasing the age at which transition plans are required to 16 years of age;
• instituting measures that will make it easier for schools to discipline students with disabilities;
• implementing measures to reduce the over-representation of students from diverse backgrounds in special education; and
• moving special education research to the Institute of Education Sciences (IES). (Council for Exceptional Children, 2005)

However, before IDEA, and even after its enactment, there continues to be disagreement as to what constitutes ‘free and appropriate education’, and a ‘least restrictive environment’. As early as 1954, the landmark case of Brown v. Board of Education, brought precedent to the issue that separate education was not equal under the law. This class action suit was brought about to challenge the actions of the school district in providing educational services in separate schools for African American children. Over a decade later, the New Jersey State Education Commissioner, Carl L. Marburger, ruled in favor of the plaintiffs, in the case of Rice v. Board of Education of 1967 (as cited in The Montclair Times, 1967). On behalf of their children, a group of parents in a suburban
northern New Jersey township challenged the "separate but equal" schooling of African American children in the school district. The suit was filed stating that the district was maintaining racially segregated schools, and refused to formulate and to put into operation effective plans and procedures to eliminate the existing pattern of racial segregation. The ruling determined that the racially segregated schools in the Montclair school district, and the failure of the school district to formulate a desegregation plan, was unlawful. In another case, P.A.R.C. v. Pennsylvania (as cited in Almazan & Quirk, 2002), a 1971 class action suit filed on behalf of 14 children with mental retardation, challenged the district on establishing statutes and practices that denied access to public education for children with mental retardation. The U.S. District Court ruled in favor of the parents, stating that the district violated the Equal Protection Clause of the 14th Amendment of the U.S. Constitution. The ruling also included directives and guidance regarding the least restrictive environment (LRE). These cases, in essence, were the foundation of the enactment of the Individuals with Disabilities Education Act.

Yet, and still, after the initial authorization of IDEA in 1975, the case of Board of Education v. Rowley, in 1982 (as cited in Bateman, 2008), resulted in a Supreme Court decision which provided clarification to the meaning of "appropriate" education, under the law. It was determined that an appropriate education must be specifically designed to meet the unique needs of the student, which allows the student to benefit
from the instruction. Although the Supreme Court ruled that the school district had not provided a free appropriate public education for the student, it also ruled that under IDEA a school district is not required to develop an individual educational program that maximizes the child's educational potential. The school district is only required to provide an appropriate program for the student. Other legal cases, such as Daniel R. R. v. State Board of Education, in 1989 (as cited in Almazan & Quirk, 2002), occurred when parents appealed the school district's recommendation regarding the removal of a student from a half-day regular education program, to receive all of his educational instruction in a segregated classroom. The court ruled in favor of the school district, but inquired into the extent of the district's actions to meet the requirements under LRE. The court considered three factors in the analysis of the LRE decision: (a) whether the school system has made attempts to accommodate students in general education, and if the efforts were sufficient; (b) whether the student can receive academic or non-academic benefits from the placement in the general education environment, and; (c) whether there are negative or adverse effects to the student with special needs, or the peers who are in general education.

In addition, many lawsuits, such as Oberti v. Board of Education in 1993 (as cited in Almazan & Quirk, 2002), gain support and stimulus from previous court cases. In this case, the Third Circuit Court ruled in favor of the parents, of an 8 year old student with Down's syndrome, who
wanted full inclusion in a general education classroom. The Court
determined that the school district failed to prove that the student was
incapable of being included, and did not consider the range of
supplementary aids and services that may have facilitated an appropriate
placement in the general education environment. The Court utilized the
"Daniel R.R. test" and subsequently ordered the school district to provide
the student with "a supplementary teacher's aide to a regular
classroom.....if necessary, to accommodate the special needs of included
students with disabilities" (p. 8).

It is precisely these discrepancies in the definition and
interpretation of inclusion which have sparked numerous legal issues, law
suits and cases, and subsequent rulings and enactments, surrounding the
education, programs and services provided for students with special needs.
Furthermore, the intense focus in education on high quality educational
programming, standards, and best practices, all falling within the
parameters of the law, have given rise to disputes regarding the extent of
the provisions for services to students classified with special needs, in the
least restrictive environment, and to the interpretations and descriptions of
inclusion and inclusive practices in special education. As a result, the
various legal issues, law suits, findings and rulings are being followed and
scrutinized by parents, policy makers, school administrators and staff,
special education advocacy groups, education associations and
organizations, as well as students, themselves, to help in determining the
Definitions and Models for Inclusion

From a broad perspective, the National Center of Educational Restructuring and Inclusion (NCERI) (as cited in Brehm, 2003) defines inclusion as "providing to all students, including those with significant disabilities, equitable opportunities to receive effective educational services, with the needed supplementary aids and support services, in age-appropriate classrooms in their neighborhood schools, in order to prepare students for productive lives as full members of society" (p. 88). As reported by Burke and Sutherland (2004), inclusion is also defined as "the provision of educational services to students with a full range of abilities and disabilities in the general education classroom with appropriate in-class support" (p. 164). Burnstein, Sears, Wilcoxen, Cabello, and Spagna (2004) further report that inclusion is "educating students with disabilities in general education classrooms" (p. 105).

The Council for Exceptional Children (2005) describes inclusion as an ideology wherein children with special needs, should be educated in the general classroom and school in which the student would attend.
Placement in the general educational environment would require that supplemental services be provided within the classroom, and that the student “benefits” from the placement. Burke and Sutherland (2004) further define inclusion as a philosophy that “all students in a school, regardless of their strengths or weaknesses in any area, become a part of the school community” (p. 164). Therefore, there is a “feeling of belonging” with one’s peers and teachers.

In addition to the variations in defining inclusion, there are also different models for how services can be provided. A popular practice, through the 80’s and 90’s, and before the advent of IDEA 1997, was the categorical model (Huxtable, 1997). This model supported services to students with special needs, in general education classrooms, depending on specific categories of classifications. The intent was to support the provision of services and resources to students who were identified with the most, and severe, special needs. The concerns, however, regarding this model, were the stringent criteria involving assessment and the stipulations on the type of placements (i.e. general education classroom, resource room, self-contained, etc.), according to the classification. In addition, a concern emerged regarding the over-representation of African American students identified with special needs involved in this model. Additionally, there were concerns regarding the federal funding regulations provided for students who are classified, as opposed to students who require additional support which is provided under the
auspices of regular education. If this were the case, the school district would not receive funding under special education, in an effort to provide for the services and resources to the students (National Association of School Psychologists, 1994).

A review of related literature identifies numerous placement and service delivery models for the inclusion of individuals with special needs. However, with the Education for All Handicapped Children Act (Public Law 94-142), enacted in 1975, and with the mandate regarding the least restrictive environment, under IDEA 1997, various reform initiatives were spearheaded by different advocacy groups.

One of the initiatives, the "Full Inclusion" movement, conceptualized in the 1980's, has gained momentum in the 21st century. Advocates, in support of full inclusion, state that "the provision of appropriate educational services to all students in regular classes attended by non-disabled students of the same chronological age in their neighborhood school, including students with severe disabilities" (Taylor, Smiley, & Ramasamy, 2003, p.3) is the foundation for this model. Another model, the Regular Education Initiative (REI) of 1986, was instrumental in fostering the inclusion practice of educating students with special needs in the general education classrooms (Shade & Stewart, 2001). Assistant Secretary of Education Madelaine Will, in 1986, submitted a position paper defining this model for inclusion of children with mild and moderate disabilities into the general education classroom. The approach required
that teachers of general and special education collaborate through a team teaching approach, with special education teachers and support staff providing consultation and direct services within the classroom (Hick, 2005).

However, other research and researchers provided dissenting data and views on the issue of inclusion. These differences involve the educational setting, duration of inclusion, and the provision for services, whether in the general or special education setting. The types of service provisions include approaches such as mainstreaming, pull-out or resource room supplemental services, self-contained classrooms, inclusion, and collaborative-inclusion environments, as issues for discussion (Daniel & King, 2001). Other research shows that there is a lack of empirical data that supports the benefits of full inclusion, especially when the students are identified with more severe needs or disabilities (Billingsley, Jackson, & Ryndak, 2000; Brehm, 2003). As an issue of debate, Daniel and King (2001) report that some opponents of inclusion argue that the individual learning styles and unique needs of students identified with special needs should be considered in determining an appropriate educational environment. Others argue, however, that ideally, it would be in a general education setting where the students with special needs and the students who are “typically developing” would most benefit (Idol, 2006), and where the value of inclusive practices can be realized, as long as all of the support services are in place. These services include, but are not limited to
accommodations and modifications of lessons, curriculum and assessments, speech therapy, occupational therapy, behavioral modifications, and so forth.

In other research, Hoban (1999) hypothesized that inclusion practices would be detrimental to students in general education. However, the findings from this study indicated that the students in general education were not negatively affected, and, reportedly, benefited from inclusion.

Praisner (2003) asserts the position that, inclusion, just for the sake of inclusion, is a huge error in judgment with implications on the effectiveness of inclusion in special education.

The Council for Exceptional Children (2003a) gave a report of five, controversial, issues of inclusion. These issues were debated between advocates for REI and advocates of other models for inclusion practices. The issues included:

- the exclusion of many students who needed special educational support;
- the withholding of special programs until the student failed rather than making specially designed instruction available earlier to prevent failure;
- no support for promoting cooperative, supported partnerships between educators and parents, and;
• using pull-out programs to serve students with disabilities rather than adapting the general education program to accommodate their needs.

Regardless of the model, the philosophy and practice of inclusion is grounded in the belief that access to quality education provides opportunity and benefit in a larger social scheme (Bradshaw & Mundia, 2006).

Although the authorization and reauthorization of IDEA has greatly impacted the movement and development of inclusion practices in education, these laws, however, only provide the parameters and criteria to be considered in regulating special education. The school leaders and teachers are the individuals who set into practice the approaches and program for special education in the schools. Each year, the trend shows an increase in inclusive practices in special education in which students with disabilities receive support services in the general education classroom (McLeskey, Henry, & Hodges, 1999). The success of implementing some of the educational services, such as modifications, adaptations and accommodations to the curriculum and activities, is rooted in the teachers’ ability to engage effective instructional strategies and students, the parents’ acceptance and agreement of the educational plans for the students, and the administration’s support, including resources, surrounding this educational initiative.
Attitudes and Perceptions on Inclusion

Coombs and Mead (2001) suggest that the best way to help ensure the effectiveness of inclusion is with the support and collaboration from all of the stakeholders. Successful inclusion requires a strong support system involving key individuals who, not only influence policy and decision making, but who are actively engaged in promoting and implementing inclusion (Coombs & Mead, 2001; Fullan, 2001; McLeskey & Waldron, 2000). Kavale and Forness (2000) state that “inclusion is not something that simply happens, but something that requires careful thought and preparation...implemented with proper attitude, accommodations and adaptations in place” (p. 287).

Teacher attitude is one of the essential factors in determining the effectiveness of inclusion in special education (Weiner, 2003). Campbell and Gillmore (2003) contend that teachers are guided by their beliefs and values about the importance of inclusion, and thus, the effectiveness of its implementation. In research by Sharma, Forlin and Loreman (2008) the literature reveals that many of the teachers expressed concerns regarding the dynamics involved in the implementation of inclusion. There are different factors and aspects to consider, such as individualizing lessons, collaborating with other teachers, modifying lesson plans, etc. In addition, other research (Jung, 2007; Leatherman & Niemeyer, 2005) indicated that training and professional development has an impact on teachers' attitude towards inclusion. Teachers who have confidence in their skills and
strategies, and believe that their input, ideas and contributions are valued, tend to have a positive attitude towards inclusion (Hodkinson, 2006).

Several educational organizations have conducted research on the attitudes and perceptions of teachers and educators, students, and parents, regarding the issue of inclusion. Research by the National Association of Special Education Teachers (NASPT, 2007) revealed positive results of inclusion, for both, students in general education, and those in special education.

The survey was conducted to determine the attitudinal and learning impacts of inclusion. High school students, in general and special education, in inclusion classrooms, completed attitudinal and self-reported learning survey. The survey data reflected “significant positive attitudinal and self-reported learning impacts of inclusion” for both students with special needs and for their peers in general education.

Research also reveals that educational groups, as an organization, have taken different positions, either in support or non-support, to varying degrees, of inclusion practices. A large majority of this research supports the belief that inclusion practices result in increased educational gains for students in general and special education (Walker & Ovington, 1998). However, there are varying views on the types of inclusion practices which are considered beneficial, and to which students, according to their classification.
Organizations such as the National Education Association (NEA) take the position that appropriate inclusion, "which includes those programs that have placement options, professional development programs, time for teacher collaboration and planning, adequate support services, and appropriate class size" result in positive benefits for students (NCERI, 1996).

The Learning Disabilities Association of America (LDAA) reported that the "decisions regarding educational placement of students with disabilities must be based on the needs of each individual student" instead of broadly supported inclusion practices" (p. 30). Therefore, they are not in support of full inclusion practices for the "administrative convenience or budgetary considerations" (NCERI, 1996, p. 30).

In research by Hammond and Ingalls (2003) elementary teachers were surveyed regarding their attitudes towards inclusion. A survey was given to 455 teachers in 13 schools from three school districts. The majority of teachers who participated in this study were found to implement "inclusion practices," but lacked a firm commitment to the practice. Teachers reported that they did not believe that there were significant benefits of inclusion to students in general and special education. In addition, they cited a number of issues that complicate the implementation of inclusion, including adequate training, ongoing support from administrators and other teachers, and the involvement of educators in planning and implementing an inclusion program. The teachers also
reported that administrative support was necessary for the implementation of an effective inclusion program.

The support and leadership of principals is integral to the effectiveness of inclusion. In essence, the role of the principal in influencing educational reform is seen as a critical factor. Therefore, the attitude of the principal towards inclusion has a strong impact on the policy and practice of inclusion. Garrison-Wade, Sobel and Fulmer (2007) surveyed matriculating and alumni students from a university program for educational administration. They found that the participants, overall, were exposed to the issue of special education and inclusion. Sixty three percent of the practicing administrators, principals and assistant principals, supported inclusion programs. However, they found that the administrators felt unprepared or uncertain in how to implement or support these programs.

The responsibilities placed on principals, over the years, have changed significantly to include leadership responsibilities as a visionary and creative educational leader (Praisner, 2003). The expectation if that the principals will assess, plan, implement and evaluate the effectiveness of programs in meeting the needs of a diverse population of students with varying needs and abilities. In meeting their challenge, teachers and staff, including principals, are concerned about the mandates and standards imposed by State and Federal government, as well as the pressures
surrounding inadequate resources, parent concerns, and the reality of limitations on materials and human resources (Collins & White, 2001).

Greyerbiehl (1993) cites a study in which teachers and administrators were surveyed on their attitudes and perceptions about inclusion programs. This national survey identified five barriers to inclusion: ineffective training program, poor leadership strategies, burdensome beliefs and attitudes, lack of teacher support, and poor communications. In addition, “Evidence suggests that many school administrators are seriously lacking in several critical competencies for effective implementation of inclusion for all categories of students with disabilities, this is especially true for behavior disordered students” (Collins & White, 2001, p. 10). Avissar, Reiter and Leyser (2003) point out that “the school principal, who serves as an educational leader in school life, plays a major function in implementing change” (p. 356).

In a study by Cook, Semmel and Gerber (1999), “Attitudes of Principals and Special Education Teachers Toward the Inclusion of Students with Mild Disabilities,” “significant differences of opinion” was determined between principals and the teachers (p. 203). Whereas teachers felt that the provision of resources to students with special needs was essential, principals expressed a greater concern that the results of achievement, regardless of the resources, were a greater priority.

An increased focus on the inclusion of students with special needs over the past 20 years has brought about many questions regarding the
impact on the academic achievement of students also in general education. Although research by Hoban (1999) aimed at confirming the negative impact of inclusion on students in general education, the findings indicated that students in general education were positively impacted by inclusion. Further research resulted in varied findings regarding the perceptions of students, both with special needs, and those in general education, on the issue of inclusion in a high school setting. Dupuis, Barclay, Holmes, Platt, Shaha and Lewis (2007) found that students with special needs, unanimously, reported a positive attitude and benefits towards an inclusion environment. Students in general education, reportedly, were divided in their perception of inclusion. Students in general education, who were aware that their classroom was an inclusion environment, indicated a more positive attitude towards inclusion than their peers, who were also students in general education, but were unaware of the inclusion environment.

Admittedly, sparse research was found regarding the effects of inclusion on students who are not classified with special needs. However, what is widely referenced is that the availability of resources, a positive attitude, and the support of inclusion practices are viewed as essential to the academic achievement for all students, as well as the effectiveness of inclusion programming. The Center for Education Research and Policy (2009) reported that the added resource of materials, staffing and principal support is critical in creating an environment where all students may
benefit. The study concluded that “attending school with a higher percentage of students with disabilities is found to have only extremely small and statistically insignificant effects on the reading and numeracy achievement of non-disabled students” (p. 1).

Much of the research on attitudes and perceptions used surveys to gather data. Hammond and Ingalls (2003), Taylor, Smiley, and Ramasamy (2003), and Burke and Sutherland (2004) reported that the majority of the teachers indicated that they lacked adequate time, training and resources to effectively implement inclusion. However, Stanovich and Jordan (2002), Scruggs, Mastropieri, and McDuffie (2007), and Ross-Hill (2009) found that teachers had positive attitudes regarding the inclusion of students with special needs. In subsequent studies, there was, however, an increase in the negative attitude of teachers regarding the inclusion of children who demonstrated “behavioral and emotional problems,” as opposed to children with “intellectual disabilities” (Hastings & Oakford, 2003, p. 91).

While the attitude and perception of the teacher are viewed as essential factors, Smith and Leonard (2005) indicate that, “in effect, teamwork, mutual goals, teacher empowerment and principal as facilitator emerges as highly significant for successful inclusion” (p. 269).

Dyal, Flynt and Bennett-Walker (1996) state, “The school principal plays a critical role in shaping an educational climate that provides opportunities for interaction between nondisabled and disabled students” (p. 32). Today’s climate calls for educational leaders to be
accountable for the academic achievement of all students, according to NCLB and other mandates. Today's educational climate calls for educators to be accountable for the academic achievement of all students, according to mandates such as No Child Left Behind, and to utilize targeted strategies for categories of students, according to certain provisions such as the American Recovery and Reenactment Act. Accountability, and funding implications that are tied to results, are the critical issues at the forefront of implementing effective instructional approaches and strategies. Administrators may be skeptical to try new approaches and strategies that may not be data proven, and, or may negatively impact on achievement. However, there is the possibility that the administrator may be faced with a major challenge, that of influencing and promoting an inclusion approach within the school. It is also critical to examine the principal's attitude and perception regarding inclusion (Praisner, 2003). Furthermore, in an effort to promote positive attitudes and feelings of support, Cook, Tankersley, Cook and Landrum (2000) advise that administrators should provide for professional development opportunities for teachers.

Research seems to be limited regarding the attitudes and perceptions of parents on inclusion. However, Ryndak, Storch and Hoppey (2008) reported that parents felt that inclusion was beneficial to students with special needs, but this was also contingent on the attitudes and ability of the teacher. Another study revealed that parents indicated that positive
attitudes and cooperation, from teachers and other staff, help to facilitate the success of inclusion, in addition to recognizing parent engagement as a priority (Fish, 2006). Parents also express many of the same issues concerning the effectiveness of inclusion, as identified by teachers and administrators in other research. Parents, as well as teachers, unanimously identified “good planning and preparation and supportive communications as prerequisites for successful inclusion” (Frederickson, Dunsmuir, Lang & Monsen, 2004, p. 54).

Kluth and Straut (2003) cited a study of parental attitudes on the impact of academic achievement, that parents of students with special needs in inclusion environments had a greater concern regarding the educational program of their child, than parents of children with special needs in non-inclusion classrooms.

Researchers (Baker-Ericzen, Møggenborg & Shea, 2009; Cross, Traub, Huter-Pishgahi & Shelton, 2004) have begun to identify essential components that are deemed to be required for effectiveness in inclusion. Bricker (2000) identifies the three categories of factors evidenced in the research and study; “attitude, professional skills and knowledge, and support systems” (p. 18). The following researches identified various elements, all of which fall under the categories described above. Cross et al. identified four elements; “attitudes, parent-provider relationships, therapeutic interventions and adaptations” (p. 174). Baker-Ericzen et al. (2009) identified essential practices for successful inclusion as “attitudes
and perceived competence toward inclusion..., number of trainings and provider characteristics" (p. 204). The characteristics described in this study, relate to the ethnicity of the provider.

Last, a study of various researches noted that components for effective inclusion identified a strong relationship between positive attitude, effective communication among team members, and consistent parent involvement practices (Wilkins & Nietfeld, 2004).

Salend and Garrick-Duhaney (1999) reported that students with more severe special needs had lower gains than their peers, who also have special needs, whether they were in a general education or special education non-inclusion classrooms. While the effectiveness of inclusion rests on many factors, including parental engagement, there is a limited body of research that provides evidence of this benefit.

**Effects of Inclusion on Mathematics Achievement**

With the advent of the law No Child Left Behind in 2001, there is a heightened focus on the academic proficiency of every student, with concerted focus on testing and results. By the year 2014, it is expected that every student will achieve proficiency or advanced proficiency on standardized, benchmark, assessments at grade 4, grade 8, and grade 11. The emphasis on testing and the results has educators scrambling to find and establish a set of instructional practices aimed at maximizing the remediation and acceleration of concepts and skills for students whose
achievement is below proficiency. Schools that miss their target in mathematics and reading assessments are faced with sanctions by the federal government. These schools are designated as not meeting adequately yearly progress, based on the results of the test scores of students. The suffer increased monitory regulations, with the possibility of losing some state aide, and mandates to offer alternative school and afterschool programs to students and families enrolled in schools that did not achieve “annual yearly progress” status. Intertwined in this process is a further urgency and challenge for educators to provide effective instruction for a host of varying learning styles, skill sets, and special needs of students.

No Child Left Behind and Annual Yearly Progress have caused schools to be more accountable and succinct in selecting and mapping curriculum, in addition to choosing “best practices” in instruction. All of this is done in accordance with the state standards, grade level benchmarks, and standardized testing of grade level assessment. As a result of the NCLB law, the New Jersey Core Curriculum Content Standards, and the benchmark State standardized testing at grades 4, 8, and 11, most of the curriculums have been re-aligned to the New Jersey Core Curriculum Content Standards, and the State tests.

Specifically, the United States has given focus to the issue of mathematics and educational preparedness of students. The Nation’s Report Card, from the National Center for Education Statistics (2009),
details a 10 year analysis of student performance. A reform movement, that was widespread, resulted in goals and objectives being established by national associations, testing organizations, professional development, and curriculum developers. Funding and grant initiatives, both at the local and federal level, have also given priority to these reform efforts. In beginning this task, a reassessment of the mathematics curriculum in alignment with the NJCCCS and the standardized test of grade level assessment need to occur.

The Nation’s Report Card provides testing results from the National Assessment of Educational Programs, which is a project under the U.S. Department of Education. NAEP’s report is based on a “national measure of academic achievement” (National Center of Education Statistics, 2008, p. 1). NAEP gives an overview of the trend in mathematics from 2004. At that time, the No Child Left Behind law was established, and a recommitment to standardized benchmark grade level assessment was made. In addition, in 2004, the NJCCCS were revised to include provisions for students with special needs.

From 2004 to 2008, students in New Jersey, in grade 4, 8, and 11, demonstrated a 4, 2, and 1 point increase, respectively, in mathematics testing scores. It is hoped that the concerted focus on mathematics, and the realignment of the curriculum, will continue to positively impact academic achievement. Almost 40 years since the first mathematics assessment was
administered by NAEP in 1971, there has been an overall academic gain in mathematics testing data.

In addition, in 2004, the focus shifted from an emphasis on language arts, to mathematics. This occurred at all levels including secondary teacher education programs, alternate route teaching training programs, district level curriculum reform initiatives, as well as professional improvement plans, parent education classes, and staff training. In addition, publishers and consultants scrambled to align their products and programs with the New Jersey Core Curriculum Content Standards, specifically in mathematics.

Nationally, research has shown that American students are unprepared in skill sets in mathematics and science, to compete with individuals in high school and graduates from other countries. American students have demonstrated a lack of performance on U.S. based tests, such as the National Assessment of Educational Progress (NAEP), as well as international tests, such as Trends in International Mathematics and Science Study (TIMSS) (Rampey, Dion, & Donahue, 2009).

For this reason, many states are committed to establishing uniformed standards including curriculum, benchmarks, and assessments. However, the concept of national standards in not new, dating back to the era, post 1957, after the Soviet Union’s Sputnik satellite launch (Cavanagh, 2010).
In addition, in 1989, the National Council of Teachers of Mathematics (NCTM) established standards for mathematics which were revised in 2000, and expanded upon in 2006, and again in 2009. NCTM’s standards are now more comprehensive, and include principles and standards, curriculum focal points for prek – grade 8, and high school mathematics (NCTM, 2009). The NCTM standards for teaching and curriculum emphasize a consistent curriculum structure and design for instruction across grade levels. They focus on knowledge and skill sets that are essential to further mathematical application, and future life, practical use. They espouse an organized content that connects with “multiple concepts and processes taught at and across grade levels” (Cavanagh, 2010, p. 5).

The NCTM standards detail the concepts and skill sets that student should be taught, from kindergarten through grade 12. The emphasis focused on thirteen standards, in the categories of process, pedagogy, content and field based experience.

NCTM was encouraged by the 2007 report from the National Assessment of Educational Progress (NAEP) which indicated that the concerted focus on mathematical standards and instruction, and teacher training resulted in positive gains made in students learning and assessments. “Since 1990, NAEP math scores have risen steadily, and the 2007 average scores for grades 4 and 8 are higher than in any previous assessment year” (NCTM, 2007, p. 1).
There has been much discussion regarding the implementation of standards in mathematics, and its application to students with special needs. One area of debate is the lack of specificity given to the accommodations or modifications for students with special needs. There is no evidence of accommodations and modifications incorporated into the provisions for how students will be guided instructionally in meeting these standards. In addition the law regarding No Child Left Behind neglects to describe the provisions made for students with special needs. Testing results show that students most at-risk, and those classified with special needs, were overrepresented in the percentages of students achieving below proficiency on standardized tests such as the NAEP assessment (Swanson, 2010).

**Collaborative-Inclusion Approach**

Traditionally, teachers have worked independently in classrooms until an exodus of students with special needs began to move from self-contained classrooms, entering the general education classrooms around the 1970's. In the 1980's, the term *cooperative teaching* was used to describe teachers of regular and special education working together in a classroom with a group of students, both, with special needs and those receiving general education instruction (Barlow, 2005). Effectively, both teachers teamed to provide instruction geared to the individual needs of the students, including those students classified with special needs.
This change requires redesigning the structure and process for how instruction, based on an inclusion-collaborative approach, takes place in the general education classroom. Components such as “lesson plans, classroom management, student evaluation, professional interactions, and instruction” (Rae & Connell, 2005, p. 37) had to be given renewed consideration.

In addition to the concept of inclusion evolving at a rapid pace, through research it has been shown that the terminology used to describe inclusion practices is also evolving. Terminology such as “collaborative teaching” (Price, Mayfield, McFadden & March, 2001), “team teaching” (Cromwell, 2004), and “co-teaching” (Scruggs, Mastropieri & McDuffie, 2007) have all been used to describe and define inclusive practices.

Price et al. (2001) define collaboration under two categories, in which teachers share resources, knowledge, and strategies in the instruction of students. First, in the consultation model, the two teachers maintain separate classrooms in providing instruction. The teacher of general education provides instruction to students with special needs and students in general education, in the general education classroom. The teacher of special education may provide direct services to the students with special needs in the general education classroom, for specific lessons or periods during the day. The teacher of special education may also provide for accommodations or modification of the lesson plan, for implementation by the general education teacher. There are a variety of
service delivery models that may be employed, in accordance with the effectiveness in relationship to the goals and objectives of the student’s individual education plan.

The second category of collaboration is a team teaching model in which two teachers provide instruction in the same classroom. Although rarely mentioned, the teacher of general education may team with the teacher of special education in a self-contained classroom. In this scenario, the teacher of general education would provide instruction of the general curriculum, solely to students with special needs. However, this would negate the perceived benefits of inclusion. Team teaching under the collaborative model allows for both teachers to provide instruction, through a cooperative approach. “Team teaching requires teachers to share, cooperate, and agree on methods of instruction” (Price et al., 2001, p. 5). Both teachers are responsible for preparing and implementing the materials, lesson, assessments, and all instructional provisions for all of the students. Collaboration is a dynamic process, requiring continual planning and adjustments, in order to achieve effectiveness.

“Teaming” or “Team Teaching”, as defined by Cromwell (2004), is further defined as “a strategy” that varies in the details of the structure of how teachers work together, and build on each other’s skills and abilities. This research highlights essential elements that are necessary for effective collaboration. To achieve effectiveness, the teachers must share a common attitude and goal for instructional practices, and overall attitude.
regarding inclusion. Individually, teachers may have specific ideals and goals on what they view as effective instructional practice. In team teaching, teachers must agree upon what aspects and techniques are of the greatest benefit and most appropriate in meeting the needs of the students. Meshing the teaching styles and different strengths of the teachers is viewed as a benefit of the team teaching approach. Each teacher, therefore, contributes in lending their strengths to the instructional team, thus benefiting the range of needs and abilities of the students.

Likewise, co-teaching (Scruggs et al., 2007) further emphasizes the benefits of two teachers working collaboratively in a general education classroom. Within the co-teaching model, there are various approaches, including a “one teach, one assist,” “station teaching,” “parallel teaching,” “alternative teaching,” and “team teaching” or “interactive teaching.” In the one teach, one assist approach, also referred to as the “drift” approach, normally the teacher of general education provides the overall instruction to the class of students. The teacher of special education will assist individual students, usually the students with special needs, as the need arises.

In the station teaching approach, both teachers share in the responsibility of providing individualized instruction to students. This support is provided throughout the various learning areas that have been established in the classroom.
The parallel teaching approach utilizes a technique whereas the teachers instruct groups of students, separately, according to their skill set, abilities, and needs. The groupings of students vary according to the content and concepts being taught. However, both teachers instruct the students utilizing the same or similar content. The groups of students include students with special needs as well as those receiving general education services.

Alternative teaching appears to be similar to a resource room model of instruction, where students with special needs are instructed separately by a teacher of special education. In this resource room model, students are pulled-out of the general education classroom, in an effort to receive targeted instruction in a particular subject matter, content area or skill set. However, in the alternative teaching model, either teacher may work with a small group of students, separately, for "a limited period of time for specialized instruction" (Scruggs et al., 2007, p. 393). Unlike the resource room model, these may be students who are in general education, receiving instructional support through this alternative teaching approach.

The last of these co-teaching variations is team-teaching or interactive teaching. In this approach, both teachers share, equally, the responsibilities of instructing students within the general education classroom. Gately and Gately (2001) identify important components of a co-teaching relationship, which are beneficial to the establishment of a "collaborative learning environment" (p. 40). They include communications, physical plant design, curriculum, instructional planning and implementation, classroom management, and assessment.
Collaborative teaching is increasingly and widely being used as the instructional model of choice by many teachers of general education and special education. Many school districts, administrators, child study teams, personnel, teachers, and parents support the implementation of the collaborative approach, in moving towards general goal of least restrictive environment.

Damore and Murray (2009) report that during the past 20 years, services to students with special needs in full inclusion environments have increased to 80%, and 30% of students with special needs in self contained classrooms receive a portion of their instruction in general education classrooms.

Although the concept of educating students with special needs together with students in general education, in the general education classroom, is not new, its impact on students, as well as educators, continues to be scrutinized and argued/debated.

Whereas the impact of inclusion on students with special needs has been studied by many researchers, research on the impact of inclusion on students in general education is limited. In sum, teachers should collaboratively engage in lesson planning, including individualized instructional strategies, lesson plan implementation and instruction, classroom management, as well as assessment and evaluations (Murawski & Dieker, 2004). Furthermore, teachers, themselves, must be aware of their own strengths and weaknesses in teaching and instructing, as well as their colleagues, and the abilities of their students (Keefe, Moore, & Duff, 2004).
Salend and Garrick-Duhaney (1999) studied the impact of inclusion on the social and academic achievement of students with and without special needs. The study revealed mixed results regarding the benefits of inclusion to students with special needs, and students in general education.

Some of the same factors examined in the research of related literature, are issues and barriers identified as needing further study. They include qualitative and quantitative research and studies on the attitudes and perceptions of teachers, parents, administrators and all students, as assessment of the skill level and training of teachers, the severity of students' special needs, professional development training and support provisions, and the particular model used for inclusion practices.

While the implementation of inclusion-collaboration practices is an intricate and dynamic process, the goal of the instructional practice is to provide an effective strategy and approach that maximizes the learning opportunities for all students (Price et al., 2001).

**Summary**

The review of related literature provided information about the laws governing special education and previous practices in inclusion education. It outlined the changes that took place in inclusion practices.

There were various interpretations of the Least Restrictive Environment (LRE) and the provisions provided under the law. The discrepancy in the interpretations has led to numerous court cases and
legal rulings. Further focus was also given to defining what is meant by inclusion, and examples of different approaches and strategies that could be implemented in various settings, were provided/included/discussed.

There are numerous aspects that effect inclusion practices, and its impact on academic achievement. While there are many areas to consider in the realm of inclusion education, this study described previous practices in special education.

Last, there are different aspects and factors to consider in providing for effectiveness in inclusion education. There are numerous individuals involved in inclusion, with differing attitudes and perceptions of the interpersonal and practical dynamics. While there were many aspects identified in this research, there are also various implications on inclusion directly related to the effectiveness of the inclusion practice in education, including professional development and training, parent involvement, individual buy-in, and communication, to name a few.
Chapter III
METHODOLOGY

Introduction

This chapter describes the methods and procedures used in the study. The purpose of this study is to investigate the impact of collaborative-inclusion (CI) education on the mathematical achievement of students in a school in northern New Jersey, in grade 2, in general education, as measured by the Everyday Mathematics end-of-year assessment. It is designed to add to the limited body of research in this area and to provide district leaders with the data necessary to make recommendations for policy, practice, and future research.

The chapter is organized into the following subsections: Setting, Design/Data Collections, Data Sources/Instruments, Data Analysis Tools/Method, Research Questions, and Summary.

Setting/Subjects

The school district is located in a suburban township in northern New Jersey, with a community of approximately 39,000 inhabitants. The culture of the community has been enhanced by its racial and socio-economic diversity, as well as its innovative community-based and educational programs, including a partnership with the locally based university. The subjects in this study are students in grade 2, in general
education and special education, enrolled in a public elementary school, kindergarten-grade 2. The school is part of a K-12 suburban district in Essex County, New Jersey. The district is designated as an I District Factor Group (DFG) by the New Jersey Department of Education. In an update of the DFG using the data from the 2000 Census, efforts were made by the State Department of New Jersey to improve the methodology of DFG reporting, while preserving the underlying meaning of the DFG classification system. The DFGs were calculated using the following six variables that have been found to be most closely related to socioeconomic status: percent of adults with no high school diploma, percent of adults with some college education, occupational status, unemployment rate, percent of individuals in poverty, and median family income.

The school district utilizes a magnet program approach for its 7 elementary schools; one k-2, one grade 3-5, five grade K-5, and three middle schools grades 6-8. The district has one high school which includes a ninth grade academy, and a small learning community model. The school district also has an early childhood developmental learning center (DLC) for 3 and 4 year old children with special needs.

During the 2007-2008 school year, district enrollment was reported as 41 for the 3 and 4 year old program (DLC), 3,026 for elementary (kindergarten – grade 5), 1,513 for middle school (grade 6-8), and 1,981 for high school (grades 9-12), totaling 6,561 students.
The mathematics testing data used in this research is drawn from the student population in grade 2 from one of the six elementary schools in the district which houses second grade. This school was selected as it comprises a little over 1/3, approximately 35%, of the grade 2 student population, with an enrollment of 172 of the district’s 491 second grade students.

There were eight second grade classrooms in the school which include one CI classroom, six NCI classrooms, and one self-contained classroom. The CI and all of the NCI classrooms were included in this study. The self-contained was excluded from this study. Therefore, data from the seven second grade classrooms will be gathered for the 172 students, 20 of whom are classified. There are 81 male and 91 female students.

The headings, identifying each of the categories for the classroom and student data are identified in Table 1. The student demographics for each classroom and teacher are detailed in Table 2. All of the classrooms are heterogeneous, with initial placements balancing ±10 percent within the range of academic level, gender and race.
Table 1

**Headings of Categories for Classroom and Student Data**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL</td>
<td>Classroom</td>
</tr>
<tr>
<td>N</td>
<td>Number of students in the class</td>
</tr>
<tr>
<td>F</td>
<td>Students who are female</td>
</tr>
<tr>
<td>M</td>
<td>Students who are male</td>
</tr>
<tr>
<td>Ss</td>
<td>Students with IEPs</td>
</tr>
<tr>
<td>Sg</td>
<td>Students in general education</td>
</tr>
<tr>
<td>A</td>
<td>Students who are Asian</td>
</tr>
<tr>
<td>B</td>
<td>Students who are Black/African American</td>
</tr>
<tr>
<td>C</td>
<td>Students who are Caucasian/White</td>
</tr>
<tr>
<td>L</td>
<td>Students who are Latino</td>
</tr>
</tbody>
</table>
Table 2

*Student Demographics, in Grade 2 – Mathematics Assessment*

<table>
<thead>
<tr>
<th>Class</th>
<th>N</th>
<th>F</th>
<th>M</th>
<th>Sa</th>
<th>Sg</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL1</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>14</td>
<td>1</td>
<td>7</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>CL2</td>
<td>21</td>
<td>11</td>
<td>10</td>
<td>3</td>
<td>18</td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>CL3</td>
<td>21</td>
<td>11</td>
<td>10</td>
<td>2</td>
<td>19</td>
<td>0</td>
<td>9</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>CL4</td>
<td>22</td>
<td>11</td>
<td>11</td>
<td>1</td>
<td>21</td>
<td>2</td>
<td>8</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>CL5</td>
<td>23</td>
<td>12</td>
<td>11</td>
<td>2</td>
<td>21</td>
<td>1</td>
<td>9</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>CL6</td>
<td>21</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>CL7</td>
<td>22</td>
<td>13</td>
<td>10</td>
<td>2</td>
<td>20</td>
<td>0</td>
<td>9</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>CL8</td>
<td>22</td>
<td>12</td>
<td>10</td>
<td>3</td>
<td>19</td>
<td>0</td>
<td>9</td>
<td>11</td>
<td>2</td>
</tr>
</tbody>
</table>
CL 1 is the collaborative-inclusion (CI) classroom. There are two teachers; one teacher of special education and one teacher of general education, a full-time teaching assistant, and a part-time “basic skills” teaching assistant in this classroom. CL 2 – CL 8 are the non-collaborative-inclusion (NCI) classrooms. Each of these classrooms has one teacher of general education and a part-time basic skills teaching assistant. These classrooms may also have an additional full-time personal teaching assistant for a student(s) with special needs, according to their IEPs.

The classifications for each of the students with special needs in each of the classrooms are detailed in Table 3. Table 4 lists the New Jersey state codes for categories of classifications for special education. It should be noted that these codes represent all of the categories of classifications. However, in this study, all of the categories may not be represented in the data from the students classified with special needs, who may be represented in this study.

Students identified with an asterisk notation indicate which students are assigned a full-time personal teaching assistance, according to their individual education plans. A double asterisk notation indicates there are students with special needs in the classroom who are assigned a full-time, shared teaching assistant.
Table 3

Classifications of Students with Special Needs by Classroom, in Grade 2 – Mathematics Assessment

<table>
<thead>
<tr>
<th>Class</th>
<th>AU</th>
<th>CI</th>
<th>MD</th>
<th>OHI</th>
<th>SLD</th>
<th>VI</th>
<th>ESLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CL2</td>
<td></td>
<td></td>
<td></td>
<td>1*</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CL3</td>
<td>1**</td>
<td>1**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL4</td>
<td></td>
<td></td>
<td></td>
<td>1*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL5</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL6</td>
<td></td>
<td></td>
<td></td>
<td>1*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL7</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CL8</td>
<td></td>
<td></td>
<td></td>
<td>3(2**)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The student has a full-time aid in the classroom
**There is a shared full-time aid in the classroom
### Table 4
New Jersey – State Codes for Categories of Classifications for Special Education

<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Auditory Impaired (AI)</td>
</tr>
<tr>
<td>02</td>
<td>Autistic (AU')</td>
</tr>
<tr>
<td>03</td>
<td>Cognitively Impaired-Mild Cognitive Impairment (CI)</td>
</tr>
<tr>
<td>04</td>
<td>Cognitively Impaired-Moderate Cognitive Impairment (CI)</td>
</tr>
<tr>
<td>05</td>
<td>Cognitively Impaired-Severe Cognitive Impairment (CI)</td>
</tr>
<tr>
<td>06</td>
<td>Communication Impaired (CI)</td>
</tr>
<tr>
<td>07</td>
<td>Emotionally Disturbed (ED)</td>
</tr>
<tr>
<td>08</td>
<td>Multiply Disabled (MD)</td>
</tr>
<tr>
<td>09</td>
<td>Deaf-Blindness (DB)</td>
</tr>
<tr>
<td>10</td>
<td>Orthopedically Impaired (OI)</td>
</tr>
<tr>
<td>11</td>
<td>Other Health Impaired (OHI)</td>
</tr>
<tr>
<td>12</td>
<td>Preschool Child with a Disability (PC-D)</td>
</tr>
<tr>
<td>13</td>
<td>Social Maladjustment (SM)</td>
</tr>
<tr>
<td>14</td>
<td>Specific Learning Disability (SLD)</td>
</tr>
<tr>
<td>15</td>
<td>Traumatic Brain Injury (TBI)</td>
</tr>
<tr>
<td>16</td>
<td>Visual Impaired (VI)</td>
</tr>
<tr>
<td>17</td>
<td>Eligible for Speech Language Services (ESLS)</td>
</tr>
</tbody>
</table>
Design/Data Collection

The data from the Everyday Mathematics end-of-year assessment from the students in grade 2 was used to determine the academic effect of CI education on the students receiving general education services in the CI classroom. The researcher used a retrospective data analysis of the end-of-year Everyday Mathematics Assessment by Chicago Math publishing company in comparison to students receiving general education services in the CI classroom with those in the NCI classrooms.

The researcher conducted independent cross-sectional studies of end-of-year results of on the math scores. Independent, single-sample, two-tailed t-tests were used to compare the means of the following groups:

- Students with IEPs (grouped) compared to students in general education (grouped);
- Students in general education and students with IEPs (grouped) in the CI classroom compared to students in general education and students with IEPs (grouped) in the NCI classrooms;
- Students in general education in the CI classroom compared to students in general education in the NCI classrooms;
- Students with IEPs in the CI classroom compared to students with IEPs in the NCI classrooms.
Data Sources/Instruments

In addition to demographic data collected from the local school district and from the New Jersey Department of Education website (http://education.state.nj.us), the majority of the data collection in this study will be derived from the Everyday Mathematics end-of-year assessment for students in grade 2.

All tests were scored by the classroom teacher, prior to the knowledge of this researcher’s data collection. Students were coded by their educational grouping (e1 for students in general education and e2 for students with IEPs), and their inclusion grouping (I1 for the collaborative-inclusion classroom and I2 for non-collaborative-inclusion classrooms).

The assessment measure used in this study consists of the Everyday Mathematics (EM) end-of-year assessment test scores. The EM assessment is a component of the EM curriculum which is aligned with most of the State of New Jersey Core Curriculum Content Standards and the National Council of Teacher of Mathematics (NCTM) standards/recommendations. The EM curriculum is a research based, curriculum developed at the University of Chicago for grades preK-12. The curriculum is “spiraling” which means it employs skills and concepts that are revisited at each grade level, with prerequisite skills that continue utilizing higher level skill sets. There is a wide array of activities based on age, grade, and skill appropriateness. The spiraling curriculum eliminates the need to review and repeat concepts and skills within the specific grade
level, thus dispensing with remediation. The University of Chicago School Mathematics Project (UCSMP), founded in 1983, was instituted to improve upon mathematics education in the United States. Coming in the age of reform initiatives, UCSMP created a curriculum that focuses on literacy, critical thinking skills, and real life application, with the use of technology, including calculators and computers. The EM curriculum endorses the use of an "efficacy" model that employs a small scaled study, with controlled environments, establishing a causal relationship with the assessment and the anticipated outcomes. Other factors were considered in the UCSMP research study, including teacher and staff attitude, student attitudes and special education issues, through the use of surveys. The UCSMP recommends more studies to assure the validity and reliability of the effectiveness of the Everyday Mathematics on student achievement. The Everyday Mathematics Curriculum is research based on a wide range of mathematical studies.

The EM assessment is criterion or standards-based test. The method of assessment compares an individual's score to an established score. The individual's score, unlike a norm referenced test, is not based on a comparison with other individuals' scores.

Data Analysis Tools/Method

This study is a quantitative data analysis which was used to make conclusions regarding the effect of an inclusion model on the academic
achievement of students in mathematics. The analysis was based on a
collection of data as measured by criterion referenced test scores.

The data analysis was conducted using the Statistical Package for
the Social Sciences (SPSS) 10.0 version for Microsoft Windows, and
Microsoft Excel 2007 computer program. The statistical data is an
independent-sample, two-tailed t-test using SPSS.

This test provided the researcher with data to determine if there
was significant deviation between the mean of the end-of-year Everyday
Mathematics Assessment scores of students in general education in the
collaborative-inclusion classroom compared to the mean end-of-year
Everyday Mathematics Assessment scores of students in general education
and in the non-collaborative-inclusion classrooms.

Again, the key hypothesis or null hypothesis of this study is:

H₀: Collaborative-Inclusion, as defined in this study, has no
impact on the academic achievement of students in general education as
measured by the end-of-year mathematics assessment (Criterion
referenced test).

This hypothesis is tested against the alternative:

Hₐ: Collaborative-inclusion, as defined by this study, has an
impact on the academic achievement of students in general education as
measured by the end-of-year mathematics assessment (Criterion
referenced test).
Significance at the .05 level will be used as a determiner of the null hypothesis, or the alternative hypothesis.

In addition to determining the null hypothesis, the following research questions are posed:

1. What are the implications regarding the effects of inclusion practices, in general, on the mathematical achievement of students with IEPs compared to the mathematical achievement of students in general education, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

2. What are the differences in the testing results when the scores of all of the students in the Collaborative-Inclusion classroom are compared to the scores of all of the students in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

3. What does the data from the end-of-year Everyday Mathematics assessment scores indicate about the effectiveness of the Collaborative-Inclusion model on the mathematical achievement of students in general education in the Collaborative-Inclusion classroom compared to the mean end-of-year Everyday Mathematics assessment scores of students in general education in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school?

4. What are the differences in the mean testing results when students with IEPs in a Collaborative-Inclusion classroom are compared to
students with IEPs in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

Summary

This chapter on methodology provides an overview on the purpose of this study, and the organization of this chapter.

The subjects in this study were described regarding their grade level and class placement. The setting details the school's grade level configuration, and the enrollment percentage for the school, based on district grade level statistics.

The demographics included in this research identified students by class placement, gender, programmatic needs, and ethnicity. Further details identified a list of categories of classifications for special education, by the State of New Jersey.

Data from the end of year Everyday Mathematics Assessment for students in grade 2 was collected and analyzed using an independent-sample, two-tailed t test. The test was used to compare the mean scores of various student groupings.

A retrospective analysis of data used quantitative measures to make conclusions regarding the impact of CI education on the mathematics achievement of students in grade 2. The data derived from this retrospective analysis is presented in Chapter IV.
Chapter IV

ANALYSIS OF DATA

Introduction

The purpose of this study is to investigate the impact of collaborative-inclusion (CI) education on the mathematical achievement of students in a school in northern New Jersey, in grade 2, in general education, as measured by the Everyday Mathematics end-of-year assessment. The study was a retrospective data analysis utilizing a criterion referenced assessment for students in grade 2 in a Northern New Jersey, K-2 elementary school in an I District Factor Group. Furthermore, the importance is this study’s implications for subsequent policy, practice and research.

The data analysis compared the mathematics achievement of students receiving general education services in the collaborative-inclusion classroom with those in the non-collaborative-inclusion classroom. The researcher conducted an independent study of the end of year results of the math scores for a single year. Independent-sample, two-tailed t-tests were used to compare the means and results of the following groups:
Students with IEPs (grouped) compared to students in general education (grouped);

- Students in general education and students with IEPs (grouped) in the CI classroom compared to students in general education and students with IEPs (grouped) in the NCI classrooms;
- Students in general education in the CI classroom compared to students in general education in the NCI classrooms;

- Students with IEPs in the CI classroom compared to students with IEPs in the NCI classrooms.

The key hypothesis or null hypothesis for this study was:

H₀: Collaborative-inclusion, as defined in this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

This hypothesis is tested against the alternative:

Hₐ: Collaborative-inclusion, as defined by this study, has an impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

Significance at the .05 level was used as a determiner of the null hypothesis (H₀) or the alternative to the key/null hypothesis (Hₐ).

SPSS 10.0 was used for data analysis of the assessments. This research examines the results from the data and it is scrutinized below.
Data from an independent sample, single year data source, from the Everyday Mathematics end-of-year assessment was collected and analyzed for 172 students in second grade. These independent-sample, two-tailed t-tests were utilized for the comparison of the means of the four student groupings: Group 1 - Students with IEPs (grouped) compared to Students in General Education (grouped); Group 2 - Students in General Education and Students with IEPs (grouped) in the CI Classroom compared to Students in General Education and Students with IEPs (grouped) in the NCI Classrooms; Group 3 - Students in General Education in the CI Classroom compared to Students in General Education in the NCI Classrooms; Group 4 - Students with IEPs in the CI Classroom compared to Students with IEPs in the NCI Classrooms.

All students in the collaborative-inclusion classroom, both general education and those with IEPs, received instruction from two teachers, one teacher has certification in special education and the other has certification for general education. All students in the non-collaborative-inclusion classrooms received instruction from one teacher. The teacher has certification for general education.

Analysis 1

The results from the comparison of students with IEPs, from both the CI classroom and the NCI classrooms, versus students in general education, from both the CI classroom and the NCI classrooms, are
indicated below. A mean score of 58.90 was obtained for the 20 students with IEPs. A mean score of 62.15 was found for the group of 152 students in general education. The mean difference between the groups was -3.25, which is not statistically significant at the level of .308, where p<.05. The results of this comparison are depicted in Table 5.

Table 5

<table>
<thead>
<tr>
<th>Grade 2 – Students with IEPs (grouped) vs. Students in General Education (grouped): (Students with IEPs in the CI Classroom and NCI Classrooms vs. Students in General Education in the CI Classroom and NCI Classrooms)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students</strong></td>
</tr>
<tr>
<td>Students with IEPs: CI Classroom and NCI Classrooms</td>
</tr>
<tr>
<td>Students in General Ed.: CI Classroom and NCI Classrooms</td>
</tr>
</tbody>
</table>

**Analysis 2**

The results from the comparison of students in the CI classroom, in both general education and those with IEPs, versus students in the NCI classrooms, in both general education and those with IEPs, are indicated below. A mean score of 63.60 was obtained for the 20 students from the CI classroom. A mean score of 61.53 was obtained for the 152 students in
the NCI classrooms. The mean difference between the groups was 2.07, which is not statistically significant at the level of .359, where p<.05. The results of this comparison are depicted in Table 6.

Table 6

| Grade 2 – CI Classroom vs. NCI Classrooms; (Students in General Education and Students with IEPs (grouped) in the CI Classroom vs. Students in General Education and Students with IEPs (grouped) in the NCI Classrooms) |
|-----------------|-----------------|-----------------|-----------------|
| Students        | N   | Mean   | t-value | Std. Deviation | Sig. (2-tailed) |
| CI Classroom    | 20  | 63.60  | -1.205  | 6.81           | .237            |
| NCI Classrooms  | 152 | 61.93  | -.919   | 9.74           | .359            |

Analysis 3

The results from the comparison of students in general education in the CI classroom verses students in general education in the NCI classrooms are indicated below. A mean score of 64.29 was obtained for the 14 students in general education in the CI classroom. A mean score of 61.93 was obtained for the 138 students in general education in the NCI classrooms. The mean difference between these groups was 2.36, which is not statistically significant at the level of .300, where p<.05. The results of this comparison are depicted in Table 7.
Table 7

Grade 2: Students in General Education in the CI Classroom vs. Students in General Education in the NCI Classrooms

<table>
<thead>
<tr>
<th>Students</th>
<th>N</th>
<th>Mean</th>
<th>t-value</th>
<th>Std. Deviation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students in General Ed.: CI Classroom</td>
<td>14</td>
<td>64.29</td>
<td>.957</td>
<td>7.73</td>
<td>.340</td>
</tr>
<tr>
<td>Students in General Ed.: NCI Classrooms</td>
<td>138</td>
<td>61.93</td>
<td>1.069</td>
<td>8.85</td>
<td>.300</td>
</tr>
</tbody>
</table>

Analysis 4

The results from the comparison of students with IEPs in the CI classroom versus students with IEPs in the NCI classrooms are indicated below. A mean score of 62.00 was obtained for the 6 students with IEPs in the CI classroom. A mean score of 57.57 was obtained for the 14 students with IEPs in the NCI classrooms. The mean difference between these groups was 4.43, which is not statistically significant at the level of .348, where p<.05. The results of this comparison are depicted in Table 8.
Table 8

Grade 2 – Students with IEPs in the CI Classroom vs. Students with IEPs in the NCI Classrooms

<table>
<thead>
<tr>
<th>Students with IEPs: CI Classroom</th>
<th>N</th>
<th>Mean</th>
<th>t-value</th>
<th>Std. Deviation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students with IEPs: NCI Classrooms</td>
<td>14</td>
<td>57.57</td>
<td>.966</td>
<td>16.00</td>
<td>.348</td>
</tr>
</tbody>
</table>

Summary

This chapter highlighted the analysis of the data that studied the impact of CI education on the academic achievement of students in grade 2 as measured by the end-of-year Everyday Mathematics Assessment.

The key hypothesis was tested under one assessment instrument; Everyday Mathematics Assessment, and two mechanisms for the analysis of data. The researcher utilized the mechanics of an independent-sample, two-tailed t-test to determine if statistical significance existed for the following groups:

- Students with IEPs (grouped) compared to students in general education (grouped);
• Students in general education and students with IEPs (grouped) in the CI classroom compared to students in general education and students with IEPs (grouped) in the NCI classrooms;

• Students in general education in the CI classroom compared to students in general education in the NCI classrooms;

and

• Students with IEPs in the CI classroom compared to students with IEPs in the NCI classrooms.

The analysis of data from all four groupings of the various comparisons depicted that there was not statistical significance in the difference of the means of the students' scores. From this analysis, the key or null hypothesis is retained, and the alternative hypothesis is rejected. Therefore, it is determined that CI model, as defined by this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment. Statistical significance for probability was indicated by using the larger grouping variable number of the independent-sample, two-tailed t tests.

Chapter V, Summary, addresses the research questions and provides an overview and highlight of the findings and conclusions that can be gleaned from the data. Recommendations on policy and practice, and suggestions for further research and study, are also provided.
CHAPTER V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to investigate the impact of collaborative-inclusion (CI) education on the mathematical achievement of students in a school in northern New Jersey, in grade 2, in general education, as measured by the Everyday Mathematics “end-of-year” assessment. Specifically, this study investigated the impact of collaborative-inclusion education on the mathematical achievement of students in grade 2, in general education, as measured by the Everyday Mathematics end-of-year assessment. The study was a retrospective data analysis utilizing a criterion referenced assessment for students in grade 2 in a Northern New Jersey, K-2 elementary school in an I District Factor Group. The data analysis compared the mathematics achievement of students receiving general education services in the collaborative-inclusion classroom with those in the non-collaborative-inclusion classroom. The researcher conducted an independent-sample, single year study of the end of year results of the math scores. Independent-sample, two-tailed t-tests were used to compare the means of the following groups:

- Students with IEPs (grouped) compared to students in general education (grouped);
Summary of the Study

Chapter I provided a historical perspective on the development of inclusion practices and its laws, in special education. Detailed information regarding this study including background of the problem, a problem statement, a purpose statement, research questions, limitations and delimitations, assumptions, the design and methodology, the significance of the study, the organization of the research, and the definition of the terms were outlined for this study. A review of related literature, in Chapter II, provided an introduction, a historical perspective on inclusion practices, a definition and models for inclusion, attitudes and perceptions on inclusion, implications on inclusion, effects of inclusion on mathematics achievement, collaborative-inclusion approach, and a summary of the literature reviewed. Chapter III, Methodology, also included an introduction, and further described the specifics of the study.
including the setting and subjects, design and data collection, data sources and instruments, data analysis tools and methods, and concluded with a summary. Chapter IV, Analysis of Data, highlighted the analysis of the data on the impact of collaborative-inclusion education on the academic achievement of students in grade 2 as measured by the end-of-year Everyday Mathematics Assessment. The key hypothesis was tested under one assessment instrument, and two mechanisms for the analysis of data. The researcher utilized an independent-sample, two-tailed t-test to determine if statistical significance existed for students in a collaborative-inclusion classroom in comparison to students in a non-collaborative inclusion classroom. Last, this chapter, Chapter V, provides a recapitulation of the study, and offers a conclusion to this study. In addition, recommendations for further study, research, or reflections on this study will be offered.

Although Free Appropriate Public Education (FAPE) and the Individuals with Disabilities Education Act (IDEA) establish the law governing free and appropriate public education, there has been a long history of legal challenges and debates involving the dispute of the provisions that are to be included in programming and services for individual children.

However, in spite of the 1970’s FAPE and 2004 IDEA, education quandaries have persisted. There are noted legal cases, such as Mills v. Board of Education of 1972 (as cited in Almazan and Quirk, 2002) in
which a group of parents in the District of Columbia challenged the “separate but equal” schooling of seven children with disabilities. The suit was filed stating that the district was denying the children access to public education. In this case, the court ruled in favor of the plaintiffs. Furthermore, the court ruled that each child was entitled to a free, public education regardless of the extent of the student’s disability.

In the 1980’s and 90’s, the issues surrounding inclusive practices continued to surge, as factors such as accountability, advocacy and standards have been given priority in education (Shade & Stewart, 2001). Those in support and opposition to inclusion, both, tout as their rationale, that there must be a standard for the educational benefit and appropriateness, for including students with special needs into the general education classroom.

On February 17, 2009, President Barack Obama announced in his State of the Union Address his agenda for the renewal and revitalization of the American economy. This plan, involving an array of economic stimulus initiatives, is focused on taxation, employment, health, and education. Now, as law and known as the American Recovery and Reinvestment Act (ARRA), this statute holds accountable the government and education leaders to provide an effective use of funds for the viability of all individuals (American Speech-Language-Hearing Association, 2009).
Under ARRA, leaders in education and governing bodies are challenged to meet the education standards, specifically identified under Title I; for students at-risk, and the Individuals with Disabilities Education Act (IDEA); for 3 to 5 year olds, including those with special needs.

Brehrn (2003) makes clear this debate, reporting that “At this level ‘us’ versus ‘them’ regarding inclusion, the meaning of what we see in any classroom is in danger of becoming more a question of opinion than data-based analysis” (p. 88). Studies, as detailed in Brehrn (2003), report “mixed results,” and “some recent studies have concluded that students with mild learning disabilities in inclusive programs can make achievement gains that are comparable to or greater than gains made by students in traditional special education pull-out programs” (p. 88). She further reports that “other studies have found that included students with learning disabilities make less than anticipated achievement gains, even when the programs offer atypically high levels of support” (p. 88).

In an effort to get at the core of the effectiveness or ineffectiveness of inclusive practices, there have been numerous studies and research that focus on the aspects of inclusion in education and academic achievement. Burstein, Sears, Wilcoxen, Cabello and Spagna (2004) report that “approaches in implementing inclusive practices differed, however, resulting in significant variability among schools in services provided to students with special needs” (p. 104). They further state that “balancing
inclusion with specialized instruction for all students emerges as an
important component of inclusive practices” (p. 104).

Education leaders and policy makers are, thus, exploring
educational approaches and practices which maximize the academic
achievement of all students. They are also looking for the most effective
and efficient use of resources and funding.

This debate continues to be the impetus on which educational
leaders, policy makers, school administrators, parents and students,
themselves, are struggling to determine the most effective and efficient
means for assuring the academic achievement of individuals in the least
restrictive, most inclusive, and appropriate educational environment.

For over 50 years, policy makers and educational leaders have
examined and re-examined, funded and reformulated, standardized and
assessed, reformed and re-authorized, and re-enacted and reinvested in
almost every aspect of education, in an effort to improve the academic
achievement of students. However, there still remains a need to identify a
model and approach for inclusion in which resources and services are
proven to positively impact the academic achievement of all of the students.

In a quest for fair and appropriate education for all children,
governed by the least restrictive environment, educators struggle with
making sure they meet the needs of all students, including those with
special needs. There have been numerous studies and research surrounding
the topic of inclusive educational practices, however, much of this
research is based on qualitative data, including questionnaires, interviews, surveys, observations, and focus groups. Some researchers also argue that educational leaders must look at the identification of successful inclusive service delivery models, as opposed to a blanket policy on inclusion (Fennick & Liddy, 2001; Kavale & Forness, 2000; Pivik, MComas, & LaFlamme, 2002). The current emphasis in education focuses on formative assessments, including standardized tests and standards for academic performance.

This research is further supported with focus on mathematics assessment data. The Teaching At Risk: A Call to Action (The Teaching Commission, 2004) report indicates that American employment opportunities are "scientifically and technologically based" and that the performance of our American students in mathematics and science has a direct impact on their future, the economy and the protection of our nation. Brehm (2003) references the National Center on Educational Restructuring and Inclusion's definition on inclusive education: that of providing all students with effective educational services with the goal of helping to assure that all students are prepared to be contributing and productive citizens in society.

In light of the current focus on data driven instruction, this study utilized a quantitative data analysis, in which there is limited research and study from this perspective on this topic. This researcher gained approval to conduct this study, from the Internal Review Board of Seton Hall
University. In addition, permission was granted by the Superintendent of the district, to conduct the research in the school district.

The Superintendent stated that the “topic of inclusion education and the impact on academic achievement in general education is important to all educators faced with how best to differentiate instruction and positively affect outcomes for all students” (F. R. Alvarez, personal communication, May 5, 2010). He further noted that there is an eagerness to see the findings from the data collection as it relates to the district’s continued efforts of improving academic achievement for all students (See Appendix B).

**Summary of the Hypothesis and Research Questions**

The key hypothesis or null hypothesis for this study, stated as collaborative-inclusion has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment, was accepted through the use of an independent-sample, two-tailed t-test, analyzing the assessment results from the end-of-year Everyday Mathematics Assessment.

The key hypothesis or null hypothesis for this study is:

\[ H_0: \text{Collaborative-inclusion, as defined in this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.} \]

This hypothesis is tested against the alternative:
H₀: Collaborative-inclusion, as defined by this study, has an impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

Statistical significance at \( p < .05 \) was used as a determinant of the key or null hypothesis, or the alternative hypothesis. From the analysis of this data, the key or null hypothesis is retained, and the alternative hypothesis is rejected. Therefore, it is determined that CI model, as defined by this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment. These results were similar to previous research on inclusion practices and assessment (Billingsley, Jackson, & Ryndak, 2000; Brehm, 2003, Praisner, 2003) which revealed that inclusion had no impact on the academic achievement of students in general education. In addition, McCartney (2006), Brevton (2005), and Schlarman (2000) conducted research on elementary, middle, and high school students, respectively, involving inclusion practices and assessment. These studies also revealed no statistically significant difference in the means of the student's scores. Thus, it was determined, from these studies, that inclusion education had no impact on the academic achievement of students. From Chapter II it is known that Salend and Garrick-Duhaney (1999) studied the impact of inclusion on the social and academic achievement of students with and without special needs. The study revealed mixed results regarding the benefits of inclusion to students with special needs, and students in general education. Although the results of the four analysis revealed that there was no statistical significance between the comparisons, there
were variations in the mean score differences and comparisons. Thus, the results of this study were consistent with previous research.

The following research questions are included in this study:

1. What are the implications regarding the effects of inclusion practices, in general, on the mathematical achievement of students with IEPs compared to the mathematical achievement of students in general education in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

2. What are the differences in the testing results when the scores of all of the students in the Collaborative-Inclusion classroom are compared to the scores of all of the students in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

3. What does the data from the end-of-year Everyday Mathematics assessment scores indicate about the effectiveness of the Collaborative-Inclusion model on the mathematical achievement of students in general education in the Collaborative-Inclusion classroom compared to the mean end-of-year Everyday Mathematics assessment scores of students in general education in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school?

4. What are the differences in the mean testing results when students with IEPs in a Collaborative-Inclusion classroom are compared to students with IEPs in the Non-Collaborative-Inclusion classrooms, in
grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

The analysis of data in Table 5 addressed research question 1:

What are the implications regarding the effects of inclusion practices, in general, on the mathematical achievement of students with IEPs compared to the mathematical achievement of students in general education, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

Data on the mathematic scores for 20 students with IEPs from the one CI classroom and the seven NCI classrooms, compared to 152 students from the one CI classroom and the seven NCI classrooms, was obtained. It should be noted, 6 of the students in the CI classroom have IEPs. The mean score for the students with IEPs was 58.90, compared to the mean of 62.15 for the students in general education. The mean difference was -3.25, which was not statistically significant at the level of .308 for the two-tailed t test, where $p < .05$. These findings indicate that inclusion does not have a statistically significant impact on the academic achievement of students. Therefore, the academic achievement of students in general education was comparable to the students with IEPs. It’s noted that the students in general education had a higher mean score than the students with IEPs. Furthermore, the students in general education performed somewhat better than the students with IEPs. Although not statistically significant, overall, the effect on academic achievement was positive.
The analysis of data in Table 6 addressed research question 2: What are the differences in the testing results when the scores of all of the students in the Collaborative-Inclusion classroom are compared to the scores of all of the students in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

Data on the math scores for 20 students in the one CI classroom is compared to 152 students in the seven NCI classrooms. The mean score for the students in the CI classroom was 63.60, compared to the mean of 61.53 for the students in the NCI classrooms. The mean difference was -2.07, which was not statistically significant at the level of .359, for the two-tailed t test, where p<.5. Therefore, the students' performance in the CI classroom was comparable to the students in the NCI classrooms. Similar to research question 1, the results showed that the mean was slightly higher for the students in the CI classroom. Therefore, the students in the CI classroom performed somewhat better than the students in the NCI classrooms, although not statistically significant.

Overall, the results of the data analysis support the acceptance of the key or null hypothesis, and the rejection of the alternative hypothesis. As defined by this study, CI has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.
Although there was no statistically significant difference in the mean scores of the students in the CI classroom in comparison to the students in the NCI classrooms, the purpose of this study was to investigate the impact of collaborative-inclusion (CI) education on the mathematical achievement of students in a school in northern New Jersey, in grade 2, in general education, as measured by the Everyday Mathematics end-of-year assessment. In this study, the researcher used a group of 172 students, and determined that a reliability statement in the calculation for effect size is justified. Therefore, an effect size analysis was used. Slavin (2010) determined that a range of 20 to 80 percent of a standard deviation could be used to effectively determine the influence of the factors on the results of the study. Cohen’s $d$ effect size measure indicated that .2 or 20 percent represents a small effect, .5 or 50 percent represents a medium effect, and .8 or 80 percent represents a large effect size (Cohen, 1992). The formula defines effect size as “the difference between two means divided by the pooled standard deviation for those means” (p. 156). This study used a version of the Cohen’s $d$ formula which is known as Hedges’ $g$. Hedges’ $g$ includes a pooled standard deviation calculation in its formula, to account for differences in the size of the samples, thus providing a more explicit computation of the standard deviation.
In analysis 2, the resulting effect size was \(-.219\), a small effect size. Again, the difference in the means was not statistically significant, and, in addition, the effect size was not significant to the findings in this study, whereas only approximately 22% of the variance in the end of year mathematics scores can be attributed to the students’ enrollment in the CI model. Therefore, the findings of the effect size are consistent with the hypothesis that collaborative inclusion education has no statistically significance on the achievement of students in general education as measured by the end of year Everyday Mathematics assessment.

The analysis of data in Table 7 addressed research question 3, What does the data from the end-of-year Everyday Mathematics assessment scores indicate about the effectiveness of the Collaborative-Inclusion model on the mathematical achievement of students in general education in the Collaborative-Inclusion classroom compared to the mean end-of-year Everyday Mathematics assessment scores of students in general education in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school?

\[
d = \frac{x_1 - x_2}{s},
\]

\[
s^* = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}.
\]
Data on the mathematic scores for fourteen students in general education in the one CI classroom is compared to 138 students in general education in the seven NCI classrooms. The mean for the CI students in general education was 64.29, compared to the mean of 61.93 for the students in general education in the NCI classroom. The mean difference was 2.36, which was not statistically significant at the level of .300 for the two-tailed t test, where p<.05. The students' performance in the NCI classrooms was comparable to the students in the CI classroom. However, the results showed that the mean was slightly higher for the students in the CI classroom. Therefore, the students in the CI classroom performed somewhat better than the students in the NCI classrooms, although not statistically significant.

In analysis of individual classroom data, only one NCI classroom, in comparison to the CI classroom, resulted in a mean of 64.29 compared to the mean of 54.35 for the CI classroom. The mean difference was 9.94, which was statistically significant at the level of .005 for the two-tailed t test, where p<.05. However, none of the other six NCI classrooms showed statistical significance. Overall, the results of the data analysis support the acceptance of the key or null hypothesis, and the rejection of the alternative hypothesis. As defined by this study, the CI model has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.
In analysis 3, the resulting effect size was -0.268, a small effect size. Again, the difference in the means was not statistically significant, and, in addition, the effect size was not significant to the findings in this study, whereas only approximately 27% of the variance in the end of year mathematics scores can be attributed to the students' enrollment in the CI model. Therefore, the findings of the effect size are consistent with the hypothesis that collaborative inclusion education has no statistically significance on the achievement of students in general education as measured by the end of year Everyday Mathematics assessment.

Last, the analysis of data in Table 8 addressed research question 4: What are the differences in the mean testing results when students with IEPs in a Collaborative-Inclusion classroom are compared to students with IEPs in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

Data on the mathematics scores for six students with IEPs in one CI classroom is compared to the 14 students in the seven NCI classrooms. The mean score for the students in the CI classroom was 62.00, compared to the mean of 57.57 for the students with IEPs in the NCI classrooms. The mean difference was 4.43, which was not statistically significant at the level of .058 for the two-tailed t test, where p<.05. The students' performance in the NCI classrooms was comparable to the students in the CI classroom. Similar to research question 2 and 3, these results showed that the mean was slightly higher for the students in the CI
classroom. Although, in analysis 4, the difference between the mean score of the 
students with IEPs in the CI classroom in comparison to the mean score of the 
students with IEPs in the NCI classroom were not statistically significant, the 
mean score of the students with IEPs in the CI classroom was higher than the 
mean score of the students with IEPs in the NCI classroom. Therefore, the 
students in the CI classroom performed somewhat better than the students in the 
NCI classrooms, although not statistically significant. However, the mean score of 
the students with IEPs was lower than the mean score of the students in general 
education, as depicted in analysis 1.

Overall, the results of the data analysis support the acceptance of the key 
or null hypothesis, and the rejection of the alternative hypothesis. As defined by 
this study, the CI model has no statistically significant impact on the 
mathematical achievement of students in general education as measured by the 
end-of-year mathematics assessment.

Conclusion

Data on academic achievement from the Everyday Mathematics 
end-of-year assessment was gathered on students in CI and NCI 
classrooms, in grade 2 from the 2007-2008 school year. The data analysis 
is useful in providing information that impact policy, practices and 
continued research in the field of education.

From the analysis of this data, the key or null hypothesis is 
retained, and the alternative hypothesis is rejected. Therefore, it is
determined that CI education, as defined by this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment. Significance at the .05 level was used to determine the acceptance or rejection of the null hypothesis. The researcher is hopeful that the results of this research will add to the quality of research on the impact of CI education on the academic achievement of students. Additional research would be appropriate for other grades, as well as different models of approaches to inclusion.

**Recommendations for Policy and Practice**

In summarizing the current research, it can be implied that inclusion does not have an impact on the academic achievement of students in general education. From the analysis of this data, the key or null hypothesis is retained, and the alternative hypothesis is rejected. Therefore, it is determined that CI education, as defined by this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment. This study also revealed no statistically significant difference in the mean of the students' scores. Students in general education, as well as students with IEPs, demonstrated comparable achievement on the end of year mathematics assessment. Bradshaw and Mundia (2006) cite that regardless of the model, the philosophy and practice of inclusion is grounded in the
belief that access to quality education provides opportunity and benefit in a larger social scheme. Policy makers should provide a solid infrastructure for educational leaders who are instrumental in guiding policy and practice, as well as those who are intimately engaged in inclusion practices. The policy and practice should support including time and opportunity for teachers and staff to plan and collaborate, training and workshops on effective inclusion practices, as well as sharing of best practices for inclusion instructional practices.

Furthermore, advocates for inclusion should realize that the tenets of successful inclusion are not solely contingent on the teacher, but on the parents, as well as the support and resources garnered from the school administrator.

Policy makers should encourage the educational leaders at institutions of higher education to include courses of study in effective inclusion practices, differentiated instruction, and instructional strategies and techniques. Finally, policy makers should continually seek to maintain quality inclusion programs, at the same time, providing for a variety of approaches to be implemented.

Suggestions for Further Research

This study is based on a data collection from a single, K-2 public school, in a northern New Jersey suburban area. It is noted that the school is located in a district identified as a district of wealth with a high
tax base, as designated by the I district factor grouping. In addition, the data is drawn from the population of students in grade 2 at one of the elementary schools in the district. The data was also specific to an end of year mathematics assessment using a criterion referenced test. The school utilizes various approaches to inclusion, including a CI classroom at each grade level, as well as providing an inclusion education and environment in every classroom in this school. From this research, and similar, but limited, other studies, it is suggested that further research be engaged which may lend itself to the scarce quantitative and qualitative research on inclusion and the achievement of students. Numerous suggestions for further research are being offered.

This researcher recommends that more than one assessment be used in the collection of data for a similar study. In addition, results from standardized tests, required by the State, could be used to determine the impact of the instructional practice in its effect on the curriculum goals and objectives. Furthermore, benchmark assessments at critical grade levels, as determined by the State, can be analyzed in future research. There may also be an opportunity to compare periodic yearly assessments, such as beginning, mid-year, and year end. In addition to the periodic assessments, multi-year assessments can be utilized. Cohort groups, as well as grade level longitudinal study, can be variables in the research.

Further studies may also involve multiple subject matter assessments, as well as surveys and questionnaires which may be provided
to students, parents, administrators, teachers, and other professionals or paraprofessionals in the field of education. Another variable consideration could include identifying the district factor group designation, which may have a direct correlation with the amount of resources available to a district or school in implementing particular inclusion programs. Other factors to consider include sample size and location, such as suburban, urban, rural, reservation, and Department of Defense (DOD) schools or districts.

It may also be beneficial to qualify or describe the particular model of inclusion, with implications on the level of administrative responsibility, budgetary requirements, use and availability of resources, and preparation and training of teachers and administrators at the secondary level. Research may also involve an analysis of the professional development requirements for teachers with a particular focus on inclusion education.

Last, there may be other factors for study, including class size, teacher attitude and preparedness, parental attitude and support, and political “buy in.” In any case, however, there is a strong indication that the dynamics involved in inclusion education is a dynamic process that warrants further study.
Summary

This chapter highlighted an introduction, summary, conclusion, and recommendations and suggestions surrounding the impact of collaborative-inclusion education on the academic achievement of students in grade 2. The key or null, and alternate hypothesis was discussed. An overview of the historical background on inclusion, highlighting the laws and legal ramifications were reviewed, as well as past policies and practices in inclusion education. A summary of the study, as well as the hypothesis and research questions were outlined. It was concluded from the analysis of this data, that the key or null hypothesis would be retained, and that the alternative hypothesis would be rejected. It was further concluded that collaborative-inclusion, as defined by this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment. Therefore, the academic achievement of students in general education in the collaborative-inclusion classroom was comparable to the academic achievement of students in general education in the non-collaborative-inclusion classrooms. Furthermore, the academic achievement of students with IEPs was comparable to students in general education. Finally, it can be concluded that, although not statistically significant, there are positive effects on the academic achievement of students in general education in collaborative-inclusion classrooms and to the students in general education in non-collaborative-inclusion
classrooms, as evidenced by no statistical significance in the difference between mean scores of students in general education in the CI classroom/model in comparison to the students in general education in the NCI classroom/model.
References


Special Education; Definitions, 41 N.J. Admin. Code. 6A: 14-1.3 (2009).


Appendix A
Letter of Approval
Seton Hall University - Institutional Review Board (IRB)
Dear Ms. Harrison,

The Seton Hall University Institutional Review Board has reviewed your research proposal entitled "The Impact of Collaborative-Inclusion Education on the Academic Achievement of Students in General Education as Measured by the End of Year Mathematics Assessment in Grade 2" and has approved it as submitted under exempt status.

Enclosed for your records is the signed Request for Approval form.

Please note that, where applicable subjects must sign and must be given a copy of the Seton Hall University current stamped Letter of Solicitation or Consent Form before the subjects' participation. All data, as well as the investigator's copies of the signed Consent Forms, must be retained by the principal investigator for a period of at least three years following the termination of the project.

Should you wish to make changes to the IRB approved procedures, the following materials must be submitted for IRB review and be approved by the IRB prior to being instituted:

- Description of proposed revisions;
- If applicable, any new or revised materials, such as recruitment flyers, letters to subjects, or consent documents; and
- If applicable, updated letters of approval from cooperating institutions and IRBs.

At the present time, there is no need for further action on your part with the IRB.

In harmony with federal regulations, none of the investigators or research staff involved in the study took part in the final decision.

Sincerely,

Mary F. Ruzeka, Ph.D.
Professor
Director, Institutional Review Board

cc: Dr. Barbara Strobert
Dear Dr. Alvarez:

As you know, I am currently engaged in doctoral study at Seton Hall University working towards an Ed. D. degree in Educational Administration and Supervision. I have finished the required course work for the program, and am ready to delve into my dissertation. The title of my dissertation is: The Impact Of Collaborative-Inclusion Education On The Academic Achievement Of Students In General Education As Measured By The End Of Year Mathematics Assessment In Grade 2.

This study would involve a retrospective data analysis of the Everyday Mathematics End-of-Year data of students who were in grade 2 at Nishuane School, during the 2007-2008 school year. The data would be collected on approximately 172 students. It is hoped that the data collection will begin in May 2010 and conclude in September 2010.

I am requesting your written approval of this research. It is hoped that this topic will be of benefit to the Montclair Public Schools.

If you have any questions regarding this matter please feel free to contact me at (973) 509-4016.

Sincerely,

Felice A. Harrison
Appendix C
Letter from the Superintendent
May 5, 2010
Felice A. Harrison

Dear Ms. Harrison:
This letter is in response to your request to begin a research study and data collection of Grade 2 Nishuane Students for the purpose of fulfilling your doctoral dissertation requirements. I am pleased to give you my permission and approval for this important work.

Your topic of inclusion education and the impact on academic achievement in general education is important to all educators faced with how best to differentiate instruction and positively affect outcomes for all students. I fully support not only this research project but also your ambition to enhance and deepen your professional knowledge.
The district will be eager to see the findings from your data collection as it relates to our continued efforts of improving academic achievement for all students.

Sincerely,
Frank Alvarez
Superintendent

FRAlnad

Telephone: 973.509.4000 ~ Fax: 973.509.0586 ~ Email: falvare@montclair.k12.nj.us
Appendix D
Hypothesis and Research Questions
Hypothesis

H₀: Collaborative-inclusion (CI), as defined in this study, has no impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

This hypothesis is tested against the alternative:

H₁: Collaborative-inclusion (CI), as defined by this study, has an impact on the mathematical achievement of students in general education as measured by the end-of-year mathematics assessment.

Significance at the .05 level will be used as a determiner of the null hypothesis or the hypothesis (or its alternative).

Research Questions

The following research questions are included in this study:

1. What are the implications regarding the effects of inclusion practices, in general, on the mathematical achievement of students with IEPs compared to the mathematical achievement of students in general education, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?

2. What are the differences in the testing results when the scores of all of the students in the Collaborative-Inclusion classroom are compared to the scores of all of the students in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?
3. What does the data from the end-of-year Everyday Mathematics assessment scores indicate about the effectiveness of the Collaborative-Inclusion model on the mathematical achievement of students in general education in the Collaborative-Inclusion classroom compared to the mean end-of-year Everyday Mathematics assessment scores of students in general education in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school?

4. What are the differences in the mean testing results when students with IEPs in a Collaborative-Inclusion classroom are compared to students with IEPs in the Non-Collaborative-Inclusion classrooms, in grade 2, in one school, as measured by the Everyday Mathematics end-of-year assessment?