AN ANALYSIS OF THE EFFECTS OF FULL-TIME INCLUSION ON THE ACADEMIC ACHIEVEMENT OF ELEMENTARY GENERAL EDUCATION STUDENTS

by

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(ABSTRACT)

The purpose of this study was to present issues relating to the achievement of general education students in inclusion settings. Specifically, the study addressed the following question: Does the full-time inclusion of students with disabilities in general education classrooms affect the achievement outcomes of non-disabled general education students in such settings?

The variable under investigation in this study was achievement of general education students in third, fourth, and fifth grade inclusion classes--heterogeneous groupings of students with disabilities and their non-disabled general education peers. The comparison classes were those with only non-disabled general education students--homogeneous groupings. The dependent variables were achievement measures obtained from the Vocabulary, Spelling, Reading Comprehension, Language, Social Studies, and Science subtests of the Iowa Tests of Basic Skills.

The results of this study suggest that there are differences in achievement of non-disabled general education students from inclusion classrooms and those of similar non-disabled general education students on all six subtests. The most notable results were at the fifth grade level.

DEDICATION

I proudly dedicate this project to my parents, Edna and Vernon, who always gave me courage and hope.

ACKNOWLEDGEMENTS

I wish to take this opportunity to express by appreciation to the many people who contributed to the successful completion of this odyssey. I especially want to thank Celia, my wife and best friend, whose faith in me was unfaltering and who was always ready to offer any help that I needed.

I thank my children, Ashley, Amy, and Trey, who thought I would never finish, for their patience. Ashley can finally move the computer to her room.

I thank the members of my committee, Dr. McGrady, Dr. Kaiser, Dr. Parks, Dr. Tuning, and Dr. Earthman for their help and patience. Finally, I offer my sincere appreciation for the guidance of Dr. Jones.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

The term inclusion is now used to describe the provision of special education services within the general education classroom, and the concept is now promoted as an alternative to resource models, or as self-contained programs for students with disabilities, particularly at the elementary school level. There is much debate about inclusion and whether it is an effective practice for all students. Many unanswered questions concern the impact this practice may have on the achievement outcomes of general education students in the inclusion classroom. Inclusion is one of the most controversial issues in education today (e.g., special issues of Elementary School Journal, January 1992; and School Administrator, February, 1992).

This introduction and review of the literature discusses support for the practice of inclusion, clarification of terms associated with inclusion, presents recent court decisions affecting inclusion, highlights research on ability groupings and the implications for inclusion, and analyzes the effects of inclusion on the academic achievement of non-disabled students.

Procedure for Literature Review

Using the descriptors, "special education," "least restrictive environment," "mainstreaming," "integration," "inclusion," "achievement," and "ability groupings," a computer search of articles from January 1982 through December 1994 was conducted on ERIC (Educational Resources Information Center), a database network of 16 clearinghouses specializing in separate subject areas. A manual search of articles published in major education journals in 1995 was also completed. While these searches produced 5,479 article citations related to special education, by coupling "special education" with the above descriptors the new search located the following numbers of articles: "least restrictive environment" (21), "mainstreaming" (888), "integration" (294), "inclusion" (95) "student achievement" (422), and "ability grouping" (233).

Some 250 articles discussed the social benefits of mainstreaming and inclusion programs, but only three articles were directly concerned with the achievement of general education students in an inclusion or mainstreaming setting. Given the dearth of research regarding the effects of inclusion on the academic achievement of non-disabled classmates, this literature review focused on the broader

studies that evaluated the impact of heterogeneous grouping on student achievement. The three studies that related directly to the achievement of general education students in inclusion settings is reviewed in a separate section.

Support for the Practice of Inclusion

There is a growing body of literature challenging the current practice of removing students with disabilities from general education classrooms and placing them in separate facilities to receive special education and related services. The new approach suggests that educators should maintain these hard to teach students within the general education environment (e.g., Skrtic, 1991), and indeed some critics of "pull-out" programs suggest that special education services can be effectively provided in general education settings (e.g., Reynolds, Wang, & Walberg, 1987; Stainback & Stainback, 1984, 1988; Will, 1986). Support for the inclusion of students with disabilities within the general education setting has evolved from dissatisfaction with the present dual educational system -- one system for students without disabilities and a separate system for students with disabilities (e.g., Gartner & Lipsky, 1989; Hallahan, Keller, McKinney, Lloyd, & Bryan, 1988; Reynolds, 1989; Stainback & Stainback, 1984; Wang, Reynolds, &

Walberg, 1987; Wang, Walberg, & Reynolds, 1992). Some educators have expressed dissatisfaction with the present outcome of special education programs because of the limited progress made by these students (Epps & Tindall, 1987; Guetzloe, 1993; Idol-Maestas, 1983; Jenkins, Pious, & Peterson 1988; Polloway, 1984; Wang & Walberg, 1988). Proponents of inclusion have questioned the economic feasibility of simultaneously operating dual categorical programs (Special Education Costs, 1988), while other advocates have suggested that the diagnostic criteria for the placement of students in pull-out special education programs is confusing and should be eliminated altogether (Skrtic, 1991; Ysseldyke & Algozzine, 1983).

Some researchers suggest that there is a fourth source of support for the inclusion of students with disabilities into general education classes. According to Singer and Butler (1987), renewed perspectives on special education generally derived from political, rather than empirical or ethical sources. Kauffman (1989) refers to the current special education reform movement as a Reagan-Bush education policy based on a trickle-down theory of education for hard-to-teach students.

Clarification of Terms

Despite the lack of clear, mutually agreed upon definitions, "least restrictive environment," "mainstreaming," "integration," and "inclusion" are terms that are often used synonymously. There are, nevertheless, subtle distinctions.

Least Restrictive Environment. The Individuals with Disabilities Education Act (IDEA; originally the Education for All Handicapped Children Act, Public Law 94-142, 1975) requires that schools provide a free, appropriate, and public education to all students with disabilities, aged 3 to 21, in the least restrictive environment (LRE). LRE is described by Ruhl (1983) as a program placement. It is not intended to mean that all students with disabilities should be educated in one setting. Rather, LRE mandates that each student should be provided special education and related services in a setting that is as close to normal as possible, while still meeting the unique educational needs of the student. The term "special education," often associated with placement, is an individualized instructional plan and not a placement in a specific classroom (IDEA Regulations, 1992). Although IDEA does not require that every student be educated in a general

education classroom, it does require that placement decisions be made on an individual basis, and that the school district must make various alternative placements available in order to insure that each student with a disability receives an education which is appropriate to his or her individual needs (IDEA Regulations, 1992). The language in IDEA states that the " removal of handicapped children from the regular educational environment occurs only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily" (IDEA, (1990) 20 U.S.C. 1412).

A continuum of alternative educational programs is fundamental to individualized educational plans (Turnbull, 1990). The continuum includes a wide range of options which include but is not limited to general education classes (IDEA Regulations, 1992). While inclusion advocates recommend that all students be educated in general education classes, the U.S. Office of Special Education and Rehabilitative Services has endorsed the availability of a full continuum of alternative placements noting that--

> Public agencies are required to make available . . . a continuum of alternative placements . . . The Department recognizes that some children with disabilities cannot be appropriately placed in general education classrooms . . . inherent in FAPE (free appropriate public education) is a

> continuum of services including separate public and private facilities (Vergason, 1991, p. 471).

Turnbull (1990) notes that these regulations address one of the most potentially troublesome aspects of placement in the LRE. Unless the Individualized Education Plan (IEP) requires special alternative programs, the student with disabilities must receive instruction in the same school he or she would attend if it were not for the disability.

Mainstreaming. Mainstreaming has been defined by Ruhl (1983) as both a process and a goal. As a goal, mainstreaming is composed of several incremental steps with placement in a general education classroom as the final step. As a process, Ruhl defines mainstreaming as the act of combining the skills of regular and special educators to assure that all students receive equal education opportunities, a concept accomplished through the development of alternative strategies that support appropriate services in the least restrictive setting. He describes a setting as one "which meets their unique needs and which is the closest approximation of the placement experienced by non-handicapped students" (pp. 3-4). Epps and Tindal (1987) also make reference to the mainstreaming "multiple service levels" concept.

Mainstreaming refers to the integration of students with disabilities in the general educational process for any part of the school day, whereas, LRE refers to the most appropriate educational placement that is closest to the mainstream.

Integration. Critical questions about the effectiveness of segregated special education placements have led to a search for new solutions and the renewal of the integration movement. According to Winzer (1987), the philosophy of mainstreaming, or inclusion, is manifested in the process of integration. Mainstreaming is basically a social justice issue, supporting the idea that all students, including those with disabilities, have an equal right to participate in the general education programs. Mainstreaming is also an integration issue, promoting the concept that students should not be excluded from general education programs solely on the basis of disability.

The close relationship of terms often leads to interchangeable use, however, as defined in this study, mainstreaming is a goal of partial inclusion, whereas integration refers to the process of accomplishing inclusion.

Inclusion. Reynolds and Birch (1988) have narrowed the definition of inclusion to exclude the "least restrictive" clause and the "range of options," and have defined inclusion as "[p]roviding special education and related services to exceptional children while they attend regular classes and schools" (p. 1). According to Fuchs and Fuchs (1994), "inclusion means different things to people who wish different things from it" (p. 299). For the purpose of this study, inclusion means that students with disabilities are educated in supported, heterogeneous general education classes for most or all of the school day.

Inclusion is a viable alternative to serving students with disabilities, in either self-contained classrooms, or in resource rooms. In this study, the term "inclusion" is consistent with the definition developed by Reynolds and Birch (1988). Inclusion refers to the education of all students with disabilities, and their non-disabled peers, within the general education classroom setting. Inclusion is full-time placement within the general education classroom. This contrasts to the limitations of mainstreaming, which has traditionally placed only students with mild disabilities in general education classrooms on a part-time basis.

Hoben (1980) compared the concepts of mainstreaming and inclusion to desegregation and integration, as developed during the 1960s racial desegregation movement. Like desegregation mainstreaming is a legislated goal, whereas inclusion, like racial integration, is an ongoing process that cannot be mandated. Hoben stated that "educating handicapped students in the mainstream creates opportunity for integration, but it offers little assurance that integration will actually occur" (p. 100).

This study is restricted to an investigation of the full-time integration of students with disabilities into general education classes and focuses on the impact that their presence has on the achievement outcomes of their non-disabled peers. This practice is referred to as "inclusion."

Recent Court Decisions with Emphasis Placed on Inclusion

The abstract mandates set forth in the IDEA and in all subsequent federal laws and regulations do not provide school officials with much assistance in determining which of the myriad inclusion options to consider (e.g., Bartlett, 1992). The courts have only recently begun to understand the sensitivity of placements in general educational

settings when compared to segregated special education placements.

Of all the current legal issues emanating from IDEA, none is more perplexing than the question of what educational placement constitutes LRE for a given student with disabilities (e.g., Turnbull, 1990). The U.S. Supreme Court, in its landmark ruling, Board of Education of Hendrick Hudson Central School District v. Rowley (1982; hereafter Rowley), asserted that to be appropriate, special education and related services were those provided in the least restrictive environment (e.g., Osborne, 1992). Until the Supreme Court hears a case about the concept of LRE and inclusion, school officials must rely on the appellate courts for guidance in balancing the mandate of appropriate education, and IDEA's preference for educating students with disabilities in general education settings, whenever possible.

In recent years, four significant cases have emerged from the federal appellate courts that have influenced the decisions of educators about placement of students with disabilities. Each of the four cases are described in chronological order.

Daniel R. R. v. State Board of Education (1989; hereafter Daniel R. R.). In the past few years the courts have begun to move away from the judicial standards articulated in

Roncker v. Walter (1983; hereafter Roncker), and have begun to embrace the concept of inclusion of all students with disabilities, including those students with severe disabilities, that have been traditionally educated in separate settings. Roncker ruled that courts "should determine whether the services which make a segregated placement superior could be feasibly provided in a non-segregated setting" (Roncker, p. 1063). This position has been called the portability standard (e.g., Huefner, 1994).

The case of Daniel R. R. concerned the placement of a student with Down syndrome in a half-day, general education pre-kindergarten classroom. The Fifth Circuit Court of Appeals (which encompasses the states of Texas, Louisiana and Mississippi) was asked to determine if the student could be appropriately educated in the general education setting.

Drawing from the LRE provision in IDEA, the appellant court established a precedent for states and local school districts within that federal district. In Daniel R. R., the court rejected the portability standards of Rockner and established a new standard that provided a two-part analysis of placement compliance that required district courts to determine the following:

(1) whether special education services, with supplementary aids and services, could be provided satisfactorily within the general education classroom; and,

(2) if special education services could not be satisfactorily provided in the general education classroom, the district courts were instructed to

> determine whether school officials, to the maximum appropriate extent, included the student with disabilities in the general education classroom.

This analysis necessitated a close examination of the nature and severity of a student's disability, as well as an assessment of a student's needs and abilities, along with a school system's endeavors to address the needs (Osborne & Dimattia, 1994). It did not, however, consider the needs of general education students impacted by inclusion.

The Fifth Circuit Court of Appeals provided substantial direction on the LRE issue in establishing parameters to the Act's mandates for a free appropriate education (Osborne & Dimattia, 1994). The court stated, that to the maximum extent appropriate, school officials must provide a free appropriate education within the general education classroom setting. However, when education in the general education classroom cannot meet the unique needs of a student with disabilities, the objectives of inclusion are no longer the most important priority, and school officials do not have to place the student with disabilities in a general education classroom. However, school officials must demonstrate that they have closely followed the LRE mandates.

Greer v. Rome City School District (1992; hereafter Greer). Since 1989 the Fifth Circuit's two-part analysis in Daniel R. R. has been the standard by which inclusion cases have been decided (e.g., Osborne & Dimattia, 1994). Although the

courts have recognized the necessity of a variety of instructional options, the Eleventh Circuit Court of Appeals (which encompasses the states of Georgia, Alabama, and Florida) expanded on Daniel R. R. in a ruling that more emphatically favors inclusion in the general education setting.

The court stressed inclusion over separate special education classes, allowing a 9-year-old student with Down syndrome to be included in a general education kindergarten program. The court stated that before denying inclusion in the general education setting, school officials must "consider the whole range" or "full range" of supplemental aids and services. Among the considerations that the court found relevant in determining the placement of a student with disabilities were the following:

(1) consideration of the academic and social benefits in the inclusion setting and in the separate setting;

(2) the effect of the presence of the student with disabilities on the education of other students in the general education classroom; and,

(3) the cost of supplemental aids and services.

The court emphasized that the cost factor must be considered, asserting that it would be an inappropriate placement if the cost of educating a student with disabilities in the general education classroom was so expensive as to significantly impact the education of other students.

The intention of the Greer decision was to require school officials to consider all reasonable services in the general education setting before placing a student with a disability in a separate special education setting (Huefner, 1994). The court also emphasized that an Individualized Education Plan Committee (IEP) must develop and make decisions regarding the educational placement, and must not be done by school officials prior to the IEP meeting.

Oberti v. Board of Education of the Borough of Clementon School District (1992; hereafter Oberti). In this important case, not only did the Third Circuit Court of Appeals (which encompasses the states of Delaware, Pennsylvania, and New Jersey) use the requirements of the Act to support inclusion, but noted that Section 504 of the Rehabilitation Act of 1973 also requires placement of students with disabilities within a general education classroom. In Oberti, the court affirmed the district court's conclusion that the failure to provide a reasonable range of supplementary aids and services for a mentally retarded and disruptive student placed in an inclusion kindergarten setting, defeated the argument of the school's officials who believed the child could not benefit from placement in a general education classroom. The Court held that a segregated special

education class was not the least restrictive environment for that student.

This controversial decision marked the beginning of a new era of judicial activism in LRE cases (e.g., Osborne & Dimattia, 1994). The Oberti court asserted that school officials have an affirmative obligation to consider placing students with disabilities in general education classrooms, and providing them with the use of supplementary aids and services, before they consider other placement options. The preference for inclusion could only be revoked by school officials who were able to demonstrate:

(1) that a student's disabilities were so severe that he or she would receive little or no benefit from inclusion in the general education classroom,

(2) that he or she was so disruptive that the education of other students was impaired, or

(3) that the cost of providing supplementary services would have a negative effect on other students.

IDEA requires school officials to supplement and realign those resources, structures, and practices that unnecessarily segregate students with disabilities. The court realized that including the student with Down syndrome in a general education classroom would require an adaptation of the general education curriculum, but held that this alone was not an appropriate reason to justify exclusion. The court ruled that students with disabilities may be placed in general education settings and may use curriculum that parallels the general education curriculum. In other

words, the court declared a preference for inclusion, even if several curricula are used simultaneously in the same general education classroom.

Sacramento City Unified School District, Board of Education v. Holland (1994; hereafter Holland). In a case that involved a nine-year-old girl identified as moderately mentally retarded, the Ninth Circuit Court of Appeals (which encompasses the states of California, Nevada, Arizona, Oregon, Idaho, Washington, Montana, and Alaska) employed an inclusion analysis that was similar to the Greer decision. Specifically, in Holland, the court considered:

(1) the educational benefits of full-time placement in general education classes;

(2) the non-academic benefits of such placement;

(3) the effect the student had on the teacher and other students in the class; and,

(4) the cost of inclusion for the student.

While the law does not require that every student be educated in an inclusion setting, the courts have noted that the term "to the maximum extent appropriate" does signify a strong congressional preference for inclusion (McCarthy & Cambron-McCabe, 1992). Referring to the Daniel R. R. and Greer decisions, the Holland decision emphasized that a student with disabilities could be placed in a segregated special education class only if the student could not

receive an appropriate education in the general education classroom with proper support services.

This decision may be an indication that some courts are growing impatient because the LRE mandate has not been fully implemented. These recent appellate court decisions may be the beginning of a trend toward judicially ordered inclusion (e.g., Osborne & Dimattia, 1994).

In contradiction to the objectives of advocates of inclusion (that all students with disabilities be included in the general education setting), the laws and court rulings suggest a more individualized approach to educational placement. The continuum of placement options defined in the regulations of IDEA provide a "cascade system" of placement alternatives that places the general education classroom as the least restrictive placement and the ideal goal. However, the general classroom may not be appropriate for all students with disabilities. The arbitrary placement of all students with disabilities in the same general education setting, or in the same segregated special education setting, appears to be in conflict with the intention of IDEA and the direction of the courts. A student-centered, individualized approach that uses a variety of educational placement options is more consistent with IDEA's intentions.

Although the courts made reference to the effect of the presence of students with disabilities on the education of

other students in the general education classroom, the impact on the academic achievement of all students was not addressed. While it is generally perceived by many educators that general education students benefit from inclusion, there is little empirical data to support this view (e.g., Bear, Clever, & Proctor, 1991; Bear & Proctor, 1990; Hayes, 1989; Wang & Birch, 1984). In a recent study, Sharpe, York and Knight (1994) confronted this issue but reported that "a review of related literature revealed no recently published studies that addressed the effects of inclusion on academic performance of general education classmates" (p. 282).

Research on Ability Grouping and Achievement Outcomes

One body of educational research related to achievement in the inclusion setting concerns the study of ability grouping in the general education classroom. Little attention has been directed in the literature to the relationship between special education and ability grouping, yet some relationships are obvious. For example, placing students with mild intellectual disabilities in self-contained segregated classrooms is equivalent to homogeneous ability grouping. A body of literature exists which questions the effectiveness of this kind of educational programming (e.g., Carlberg & Kavale, 1980; Epps & Tindell, 1987; Madden & Slavin, 1983; Stainback & Stainback, 1984;

Stainback, Stainback, Courtnage, & Jaben, 1985; Truesdell & Abramson, 1992). In contrast, placing students with disabilities in general education classes with their non-disabled peers is an extension of heterogenous ability grouping. Many researchers support the concept of heterogenous grouping (e.g., Oakes, 1985, 1992; Slavin, 1986, 1987, 1990). Ability grouping is one of the most studied and most controversial issues in education today. There are hundreds of studies that have examined the effects of various forms of ability grouping, as well as scores of reviews of ability grouping literature (e.g., Kulik, & Kulik, 1982, 1984, 1988, 1992; Oakes, 1985, 1992; Slavin, 1987, 1990).

The inclusion of students with disabilities in general education settings is an extension of the concept of heterogeneous class composition. Based on the findings of ability grouping research, educators may conjecture that the placement of students with disabilities in general education classes, with their non-disabled peers, should not have a negative impact on the academic achievement of either group. While much of the existing research supports the benefits (or lack of negative impact) of heterogeneous classes (e.g., Oakes, 1985; Slavin, 1987, 1990), little research has been done to confirm that the findings related to ability groups carry over specifically to the inclusion classroom setting.

Rationale for Ability Grouping. The primary rationale for various models of ability grouping has been basically the same since the concepts of grouping were first introduced. Ability grouping exists to accommodate large numbers of students in the public school setting, including students that differ in knowledge, skills, developmental stage, and learning rate. When a classroom teacher presents a lesson to a class, it is reasonable to conjecture that the lesson should be neither too easy nor too difficult for the students. If the class is highly heterogeneous, then one lesson will, of necessity, be easier for some students and more difficult for others. In order to have instructional efficiency, students are often grouped so that they will benefit from one lesson.

Yet most models of ability grouping, or groupings based on achievement levels, have disadvantages that may be serious enough to compensate for any advantages (e.g., Oakes, 1985; Rich, 1993; Slavin, 1987;). Ability grouping models may stigmatize low-achievers, and may place them into classes or groups for which teachers have low expectations. For high-achievers, ability grouping may lead to the establishment of academic elites (e.g., Ben-Ari & Rich, 1992; Epstein, 1985; Oakes, 1992). Ability grouping may compel students who are not in the top tracks to have less than optimal educational and employment opportunities. It may also deny students the positive role models and

stimulation provided by heterogeneous classes. Yet, systems of managing student differences within the classroom, such as multiple reading or math groups, create supervision difficulties for teachers and reduce the amount of direct instruction received by individual students (e.g., Karweit, 1986).

The primary models of ability grouping arrangements that are applicable to the concepts of inclusion are between-class ability grouping and within-class ability-grouping and regrouping for selected subjects. Between-class models are school-wide procedures by which students are assigned to classes based on their ability or their achievement. Within-class grouping arrangements are designed to reduce the heterogeneity of instructional groups within the classroom.

The following section defines the three ability grouping models that are associated with this study and summarizes the research.

Between-Class Ability Grouping Model. Perhaps the most controversial form of grouping is assignment of students to groups according to ability or performance (e.g., Kulik & Kulik, 1988; Oakes, 1985, 1992; Slavin, 1987). Arguments about the desirability of between-class ability grouping continue to be relevant and proponents have argued that this practice lets high-achievers move rapidly and gives low-

achievers attainable goals and additional instructional assistance (e.g., Good & Marshall, 1984; Kulik & Kulik, 1991). Opponents have countered that between-class ability grouping is unfair to low-achievers, citing the difficulties of poor peer models, low teacher expectation, and a slower instructional pace (e.g., Hallinan, 1992; Oakes, 1985, 1992; Rosenbaum, 1984; Slavin, 1987).

In many elementary schools, students are assigned to self-contained classes on the basis of a standardized achievement or ability test. This procedure creates high-achieving classes, average-achieving classes, and low-achieving classes in each grade level. Students are assigned to classes based on a combination of composite achievement test scores, IQ scores, and teacher or principal opinion. Students remain with the same ability-grouped classes for all academic subjects.

There are essentially no achievement advantages to homogeneous ability-grouped class assignment when compared to heterogeneous grouping (e.g., Rich, 1993). Slavin (1987) identified 14 methodologically adequate studies of this practice at the elementary school level and found the median effect size on standardized achievement measures to be near zero. There was some evidence that high-achievers may gain from ability grouping at the expense of low-achievers, but most studies found no such trend. Overall, the effect size

of ability grouping are near zero for students of all achievement levels (Slavin, 1987).

One logical explanation for the fact that ability-grouped class assignment has little effect on student achievement is that typically this model has only a limited impact on the heterogeneity of the class (Slavin, 1987). For example, Goodlad (1960) estimated that dividing a group of elementary students into two ability groups on the basis of IQ reduced total variability in each class by only 7 percent. With three groups, heterogeneity was reduced by 17 percent, still not enough to have a measurable impact (Slavin, 1987). Even though a student's achievement in any one subject is correlated with achievement in other subjects, this correlation is far from perfect. This means, according to Slavin (1987), that grouping students on any one criterion is sure to leave substantial heterogeneity in any specific competence area. On the other hand, assigning students to high- and low-achieving classes may have a stigmatizing effect on low achievers, and may evoke low expectations for student achievement and behavior even if the grouping has a minimal impact on class heterogeneity (Oakes, 1985). Thus, ability-grouped class assignment may be enough to cause psychological problems, but does not do enough to achieve potential educational benefits (Oakes, 1985; Rich, 1993; Slavin, 1987).

Regrouping for Selected Subjects Model. Another commonly used ability grouping arrangement has students remain in heterogeneous classes most of the day but regroup for selected subjects such as reading or mathematics. For example, three 5th grade classes in an elementary school might have reading scheduled at the same time. At the designated reading periods all of the students would leave their heterogeneous homerooms to go to a class organized to their specific reading level.

Slavin (1987) notes that regrouping for selected subjects has three important advantages over ability-grouped class assignment. The advantages are as follows:

(1) Students remain in a heterogeneous setting most of the school day, so they are likely to identify with that group, thereby reducing the labeling effect of all-day grouping;

(2) Students are grouped only on the basis of their achievement or ability level, so a significant reduction in heterogeneity in the skill being taught is possible; and,

(3) Elementary regrouping models tend to be more flexible in implementation than ability grouped class assignments, because changing students between reading or mathematics classes is less disruptive than changing basic class assignments.

For this reason, any mistakes in assignment can be easily corrected, and any changes in student performance level can be accommodated with a change in grouping.

According to Slavin (1987), research on the regrouping models suggest that regrouping is instructionally effective when:

(1) the instructional level and the pace are adapted to student performance levels; and,

(2) the regrouping is done for only one or two subjects so that students stay in heterogeneous placements most of the school day.

Slavin further notes that studies conducted at the elementary level that met these conditions reported the effects to be positive on student achievement in reading, in mathematics, and in reading and mathematics taken together. In contrast, when regrouping was done in elementary schools without adapting the pace or level of instruction, or in more than two different subjects, no benefits were found.

Within-Class Ability Grouping Model. Within-ability grouping is the procedure of assigning students to homogeneous sub-groups for instruction within the classroom. This practice is routinely used in inclusion classrooms. In general, each sub-group receives instruction at its own level and progresses at its own rate. Within-class ability grouping is a widespread practice in elementary reading instruction, and is also common in elementary mathematics (Barr & Dreeben, 1983; Hallinan & Sorensen, 1983).

Within-class grouping models generally involve only reading and/or mathematics, leaving students in relatively heterogeneous classes the rest of the school day. This approach groups students by specific rather than general skills, and within-class groupings are relatively easy to change since most teachers adapt their level and pace of

instruction to meet student needs (Barr & Dreeben, 1983). However, within-class ability grouping introduces a problem not characteristic of between-class grouping models. Within-class ability grouping requires management of multiple groups. When the teacher is instructing one reading group, for example, the remaining students must work independently on activities, that may be of questionable value (e.g., Anderson, Brubaker, Alleman-Brooks, & Duffy, 1985). Supervising multiple groups and the transitions between groups are significant classroom management problems (Anderson, et al., 1985).

Research on within-class ability grouping has generally been limited to the study of mathematics grouping, a practice that has been clearly supported by these studies. The eight mathematics with-in class ability grouping studies that Slavin (1987) conducted favored the within-class grouped treatment (median effect size = +.34). Effects of within-class grouping were higher for low-achievers (median effect size = +.65) than for average- or high-achievers (Slavin, 1987). There was some trend for effects to be more positive when the number of ability groups was two or three rather than four.

While we have learned a great deal from research on ability grouping, there is still much more that we can study. For example, basic questions concerning the effects of within-class ability grouping on reading, and such other

subjects as social studies or science, remain unanswered. The ways by which various grouping models may effect achievement is also not particularly clear. We do know that the effects of within-class grouping on mathematics achievement is not the same for reading. One reason for the difference is that in mathematics students need to work problems independently, so there is an appropriate place for independent practice. With teacher monitoring and feedback, students progress independently at their own learning pace. The corresponding need for independent practice in reading is not as obvious.

We do know enough, however, to dismiss the assumption that simply grouping students by ability will in itself accelerate their achievement. Certain models of grouping may be effective as part of a consistent school-wide strategy for adapting curriculum and instruction to meet individual needs, but the sacrifices and benefits of each model of ability grouping must be carefully evaluated.

Evidence from studies of various models of ability grouping in elementary schools suggests that achievement effects depend on the types of programs evaluated. In general, ability grouping models tend to enhance student achievement when they include the following characteristics (Slavin, 1987):

(1) Students remain in heterogeneous classes most of the day but are re-grouped by performance level for such subjects as reading and mathematics, where reducing heterogeneity is important;

(2) The grouping model reduces heterogeneity in the specific skill being taught;

(3) Group assignments are flexible and are frequently evaluated; and,

(4) Teachers adapt their level and pace of instruction in re-grouped classes to accommodate student levels of readiness and learning rates.

In contrast, ability-grouped class assignments, special programs for the gifted, and special education for students with disabilities do not generally meet the four criteria. Typically, they segregate students all or most of the day, are based on general ability or achievement rather than skill in a specific subject, and assignments tend to be inflexible. Evidence shows no benefits for ability grouped class assignments (e.g., Rich, 1993; Slaven, 1987) or special education assignments (e.g., Lipsky & Gardner, 1989; Sailor, 1991; Stainback & Stainback, 1984, Wang, 1981) and only inconsistent evidence in favor of special programs for the gifted (Kulik & Kulik, 1984, 1992).

Three studies that are directly related to the impact of the inclusion of students with disabilities on the achievement of their general education peers are reviewed in chrological order in the following section.

Empirical Support for Inclusion and Achievement

In response to continuing critiques regarding the efficacy of separate instruction for special education students (Dunn, 1968; Reynolds, Wang, & Walberg, 1987),

there has been increasing interest in assessing whether the general educational environment is, or can become, sufficiently responsive to the instructional needs of a wide range of students, including special education students (Howe & Miramontes, 1992; Jenkins, Jewell, Leicester, Jenkins, & Troutner, 1991; Kauffman, 1993, Madden & Slavin, 1983; Scruggs, 1993; Skrtic, 1991).

While debating the concept of inclusion is popular with many educators, there remains, nevertheless, a relative paucity of research on academic achievement in inclusion classes, especially as it relates to the achievement of general education students (Fiedler, Lange, & Winebrenner, 1993). To date, only a few studies have been conducted which directly measure the effects of inclusion on general education students. Of the 95 articles in the computerized ERIC search on the topic "inclusion," only four were studies that discussed the achievement of general education students in the inclusion setting. (No articles were located in the manual search of literature published in 1995.) One of the four studies concerning student achievement is not included in this review because it did not investigate academic achievement, but rather examined the developmental effects of placing general education students in preschool classes primarily comprised of students with disabilities (Odom, Deklyen & Jenkins, 1984). The three remaining studies investigate the academic achievement of general education

students in inclusion classrooms, and are reviewed in the following sections.

Adaptive Learning Environment Model (1984). The Adaptive Learning Environment Model (ALEM) was an outgrowth of an instructional model developed during the 1960s by Glaser (1972). The model was developed with the basic assumptions that:

(1) students demonstrate a wide range of individual differences in their learning rate and abilities, and in the ways in which they develop academic competencies; and,

(2) educational experiences can be adapted to address the individual differences by modifying learning situations.

The ALEM, developed by Margaret Wang and many of her associates, is an individualized curriculum-based educational alternative designed to facilitate instructional strategies that adequately serve students with diverse learning characteristics and needs (Wang, 1980, 1981). The ALEM is a model that allows general education to successfully take the lead in educating all students, including those with disabilities, in general education classrooms, without impacting upon the academic achievement of non-disabled students (Wang & Birch, 1984; Wang, Perverly, & Randolph, 1984).

The ALEM is an instructional model that has demonstrated effective teaching strategies for average-achieving students in general education classrooms

(Anderegg & Vergason, 1988), and many of these strategies, as demonstrated in the literature, are consistent with the performance of average students (Rosenshine, 1986). Despite frequent expressions of support for the effectiveness of the ALEM with certain student populations, its effectiveness as a model for inclusion remains unclear. Many reviewers have reported the methodological limitations of ALEM investigations (e.g., Anderegg & Vergason, 1988; Fuchs & Fuchs, 1988), while others have noted that even if the results were accepted at face value, they were far from supportive of ALEM as an instructional model for all students (Hallahan, Keller, McKinney, Lloyd, & Bryan, 1988).

Critics have charged that the ALEM researchers provided limited details about program and subject characteristics, and they did not approximate conventional definitions of "research synthesis" (e.g., Fuchs & Fuchs, 1988). The ALEM researchers have also been criticized for not using collected data in a way consistent with the traditional use and practice of statistical data analysis (Anderegg & Vergason, 1988; Fuchs & Fuchs, 1988; Hallahan, et al., 1988). ALEM critics believe that the studies were often inflated, the results clouded, and therefore, of little value or use (Anderegg & Vergason, 1988; Fuchs & Fuchs, 1988; Hallahan et al., 1988; Kauffman, Gerber, & Semmel, 1988).

Wang has retreated from her original claim that previous studies provided empirical support for the ALEM as a definitive model of successful integration (e.g., Wang & Birch 1984). Wang and Walberg (1988) now characterize their ALEM research as "descriptive," rather than as experimental (p. 134).

Based on the results of a few seriously flawed field-based research projects, many proponents of the practice of inclusion are holding the ALEM as the prototypical model of how to integrate students with disabilities into the general education setting (e.g., Will, 1986). However, research results demonstrating the effectiveness of ALEM for a diverse student population is tenuous, at best.

The Team Approach to Mastery Model (1990). Bear and Proctor (1990) examined the achievement gains of mildly disabled students and non-disabled general education students in full-time inclusion Team Approach to Mastery Model (TAM) classes. This appears to be the first published study that actually investigates the impact of the presence of students with disabilities on the academic achievement of their non-disabled peers in inclusion classrooms. The researchers reported that within the limited focus of their investigation, general education students made substantially greater academic gains in inclusion classes than similar students in non-inclusion general education classes. The

study sample included 78 mildly disabled students, and 463 non-disabled students in four neighboring school districts. The study was limited to students in the third grade (Bear & Proctor, 1990).

The practice of using daily report cards in the TAM model may have significantly confounded the results, making it difficult to draw any reliable conclusions. In the inclusion classes, all students kept daily report cards on their desks, which were used by teachers to monitor and reinforce academic behavior. Teachers used points earned by students to determine rewards and privileges. Report cards were also used to inform the parents of their child's behavior (Bear & Proctor, 1990). The comparison non-inclusion classes did not use points or daily report cards.

The behavioral component of the TAM model may explain why non-disabled students in the inclusion classes consistently out-performed comparison students in the non-inclusion classes. Use of the daily report card was based on the principles of generalized reinforcers. A generalized reinforcer, according to Algozzine (1982), was the most effective type of reinforcer because it was associated with many other reinforcers (e.g., recess, free-time, or special activities). Another advantage to having the daily report cards on the student's desk was that the cards provided stimuli that effectively influenced the teacher's behavior. The presence of the cards, for example, served as a reminder

to the teacher to reinforce appropriate student behavior. In addition to the reinforcement (check-marks on the daily report card), praise was frequently associated with the reinforcement. Researchers have well documented the motivational power of praise when used in association with a generalized reinforcer (e.g., Algozzine, 1982; Martin & Pear, 1978).

The presence of two teachers in the TAM model, one certified in special education and the other in general education, provided for a low teacher-student ratio (about 1:14). It also facilitated greater opportunities for small-group and individualized instruction, especially in reading and language arts, as well as more frequent monitoring of each student's academic performance (Bear & Proctor, 1990). The comparison group had only one general education teacher in the classroom with a teacher-student ratio of 1:28 (Bear & Proctor, 1990).

The results of the TAM study did not effectively isolate the cause for the impressive performance of non-disabled general education students in inclusion classrooms. For example, the comparison group did not use daily report cards and had only one teacher in the classroom. It is not surprising that general education students in the TAM group, using powerful generalized reinforcers and low teacher-student ratios consistently out-performed similar students in the comparison group, which apparently relied on the more

traditional motivational practices normally associated with learning.

Institute on Community Integration Project (1994). In a more recent study, Sharpe, et., (1994) conducted a preliminary study to investigate the impact of inclusion on the academic performance of general education students in a rural elementary school in the midwest. The results of the study revealed no significant differences between the general education students in inclusion settings and similar students in non-inclusion settings.

The pilot study had a limited sample size. The study involved the integration of five primary-age students, with moderate to severe disabilities, into four different classrooms--one classroom had two of the five disabled students. The number of students with disabilities and the severity of their disabilities are important factors to consider when integrating such students into general education classes. For example, a high ratio of students with severe disabilities in a general education classroom is more likely to have a negative impact on achievement when compared to a similar class with a few students with relatively mild disabilities. Likewise, general education classes with students with severe disabilities, such as serious emotional disturbances, are more likely to decline

academically when compared to similar classes that have only mildly disabled students.

Sharpe et al., (1994) indicated that the overall findings of this study had "no adverse effect" on the academic achievement of non-disabled students in inclusion classrooms (p. 286). However, there appears to be some limitations to this study. For example, it included only five students with disabilities, integrated into four general education classes. It also did not include the broad range of students with significant learning and behavioral challenges that eventually (as the inclusion movement continues to build momentum) will be found in most inclusion general education classrooms. The value of these findings may be limited to general education students in small, rural, elementary schools that have small populations of students with disabilities.

Statement of Problem

Although there are many studies documenting the academic and social achievements of students with disabilities in part-time mainstreaming settings, there remains a relative paucity of research on their performance in the emerging practice of full-time inclusion education. Research on the academic achievement of non-disabled general education students in such settings is practically nonexistent.

The three studies reviewed in the previous section, are, to the best of this writer's knowledge, all that is currently published on the impact of inclusion on the academic achievement of non-disabled peers. They also fail to adequately address the issue. The methodological limitations of the ALEM are well documented (e.g., Fuchs & Fuchs, 1988), the Bear and Proctor (1990) results are difficult to interpret because the researchers introduced a behavioral reinforcement variable that may have influenced student achievement in the inclusion classes, and Sharpe, et al., (1994) integrated only one student (in one case two students) with disabilities into the general education class. These results may not be a realistic evaluation of the impact of a school-wide inclusion program that integrates substantial numbers of students with diverse disabilities into a variety of general education classrooms.

Promoting further research on inclusion is necessary. The enactment of inclusion education may be premature without adequately ascertaining the impact of such practice on all students.

Purpose of Study

The purpose of this study is to investigate the effects of inclusion on the achievement of general education students. Specifically, the study answers the following question: Does the full-time inclusion of students with

disabilities in elementary general education classrooms affect the academic achievement of non-disabled general education students in that setting?

Significance of Study

Many educators believe the decision to include special education students on a full-time basis in the general education classroom is a moral or ethical decision based on societal values (e.g,. Biklen, 1985; Sarason, 1982; Stainback & Stainback, 1984). While the decision for inclusion may be based on values, research does have a critical part to play in achieving excellence in the education of all students. Quality instruction in schools usually occurs when there are well conceived research models and scientific inquiry.

Addressing the issue of academic achievement of general education students in inclusion settings is important. For example, some critics of inclusion assert that general education students may get bogged down by slower students (e.g., Feldhusen, & Moon, 1992; Goldring, 1990; Roberts, Ingram, & Harris, 1992). There is also concern that teachers may devote considerably more time to the management of inappropriate behavior, which may contribute to ineffective instruction and an unfavorable classroom climate (Brophy & Good, 1986). The results of this study may challenge these arguments, but regardless of the findings of

this study, the results can be valuable information for decision makers in the field of education.

Chapter Summary

The last decade has been a period of reexamination of the special education delivery system. The call for reform of conventional special education services has facilitated the emerging practice of full-time inclusion of students with disabilities into general education classrooms.

In chapter 1, support for the practice of inclusion was discussed, several important terms were clarified and defined, and the related research literature on academic achievement and heterogenous grouping, as well as inclusion, was reviewed. In chapter 2 the hypotheses, participants, analysis plan, instrument, and data collection and analysis study are described. The results of the study are presented in chapter 3, and a discussion of the study findings and conclusions are outlined in chapter 4.

Chapter 2

DESIGN AND METHODOLOGY

The purpose of this study was to investigate the effects of the practice of inclusion on the achievement levels of elementary general education students. Inclusion classes are defined as those classes where students with identified disabilities are grouped with their non-disabled peers for most of the school day. This chapter describes the hypotheses, participants, analysis plan, instrument, data collection and analysis used in this study.

Hypothesis

The following research hypothesis was used to guide this study:

There are no differences in the achievement scores of general education students in inclusion classrooms, as measured by the Iowa Test of Basic Skills (ITBS), when compared to similar general education students in non-inclusion classrooms.

The hypothesis was used to guide the investigation of the effects of inclusion on the achievement of students

defined as low-, average-, and high-achievers.

Ex post facto, or causal-comparative study, was used to examine the academic achievement differences between non-disabled general education students in inclusion classes and similar non-disabled general education students in non-inclusion classes. Archival data was collected from the 1993 achievement testing records of the Montgomery County Public Schools.

Participants

ITBS scores used in this study were selected from general education students (Grades 3-5) from a school district of 8,500 students located in rural southwestern Virginia. The study compared ITBS achievement scores of 1,154 general education students in 11 elementary schools. Of the 1,154 test records selected, 577 records represented students in the inclusion classes, and 577 records represented students in the comparison non-inclusion classes. The number of inclusion and non-inclusion classes and the mean number of students in each class is shown in Table 1.

Test records were selected from a total student population of 1,622 elementary students (Grades 3-5) who took the ITBS in March, 1993. The sequential procedures

Table 1

Number of Classes In Each School (Mean Number of Students Per Class Shown in Parenthesis).

School	Classes	Grade Level 3rd	4th	5th
1	Inclusion	1 (16.0)	1 (18.0)	1 (19.0)
	Non-Inclusion	1 (24.0)	1 (23.0)	1 (21.0)
2	Inclusion	1 (16.0)	*	*
	Non-Inclusion	1 (23.0)	*	*
3	Inclusion	2 (17.0)	2 (16.0)	2 (17.5)
	Non-Inclusion	4 (24.5)	3 (28.0)	4 (27.0)
4	Inclusion	1 (16.0)	*	1 (19.0)
	Non-Inclusion	1 (24.0)	*	1 (20.0)
5	Inclusion	1 (22.0)	1 (19.0)	1 (23.0)
	Non-Inclusion	2 (25.0)	2 (22.5)	2 (25.5)
6	Inclusion	1 (18.0)	2 (20.0)	2 (21.0)
	Non-Inclusion	3 (24.0)	2 (29.0)	2 (27.5)
7	Inclusion	1 (21.0)	1 (21.0)	*
	Non-Inclusion	2 (21.5)	2 (21.5)	*
8	Inclusion	1 (18.0)	1 (22.0)	2 (18.0)
	Non-Inclusion	3 (28.0)	2 (28.0)	2 (24.0)
9	Inclusion	1 (22.0)	1 (14.0)	1 (18.0)
	Non-Inclusion	1 (32.0)	1 (29.0)	1 (28.0)
10	Inclusion	1 (23.0)	1 (24.0)	1 (22.0)
	Non-Inclusion	1 (22.0)	1 (28.0)	1 (28.0)
11	Inclusion	1 (19.0)	1 (19.0)	1 (22.0)
	Non-Inclusion	2 (20.0)	1 (20.0)	1 (24.0)
Grade Totals	Inclusion	12 (18.9)	11 (19.2)	12 (19.9)
	Non-Inclusion	21 (24.4)	15 (25.4)	15 (25.0)

* No comparison classes (ITBS scores were not used)

used to select the sample of 1,154 records are as follows:

(1) A data disk, obtained from the school district's testing office, contained the 1993 ITBS results for grades 3 through 5. The information was organized by classroom, grade level, and school.

(2) The focus of the investigation was on the academic achievement of 3rd, 4th, and 5th, grade general education students during the 1992-93 school year.

(3) Those 3rd, 4th, and 5th grade students receiving special education services, with the exception of those only receiving speech services, were identified by class rosters and were excluded from the study.

(4) Only 3rd, 4th, and 5th grade general education students enrolled in the sample classrooms at the end of the first grading period in the 1992-93 school year, when the ITBS was taken, were included in the study. All other students were identified by classroom rosters and their scores were removed from the study data.

(5) Students with incomplete or missing scores for the 1993 ITBS were not included.

(6) Using the special education roster and comparing it with classroom rosters, 39 classrooms had students receiving special education services. Of these 39 inclusion classrooms only 35 were used for this study.

(7) Four inclusion classes were excluded from this study. Three of the classes were in small rural schools, with only one classroom at the grade level. The final school grouped all of the fifth grade scores into one class of sixty-one students. It was impossible to determine which students were in the inclusion classes.

(8) 51 classes that did not have students receiving special education services were designated as the comparison non-inclusion classes.

(9) From the 35 inclusion classes, 577 general education students met the above criteria for participation in the study.

(10) From the 51 non-inclusion classes, 577 general education students were randomly selected from a pool of 1,222 general education students who met the above criteria for participation in the study.

In order to achieve a suitable representative sample, a stratified random sampling was used to select comparison group students for each of the three achievement level sub-groups. Proportional allocation procedures ensured that each achievement stratum level supplied a proportional number of students to the sample. Approximately 16% of the scores selected were from the low-achieving group, 55% were from the average-achieving group, and 29% were from the high-achieving group. The number of students from each subgroup is shown in Table 2. ITBS scores were placed in one of three achievement sub-groups (low-achieving, average-achieving, and high-achieving). Achievement sub-groups were based on the ITBS Basic Total NCE's for 1993.

Both inclusion and non-inclusion classes were taught by general education teachers. However, in contrast to the non-inclusion classes, inclusion classes had students with an additional part-time teacher certified in special

Table 2

Number of General Education Students' ITBS Scores Randomly Selected for Study.

Grade & Achievement	Type of Class: Inclusion	Type of Class: Non-Inclusion
3rd Grade		
Low-	31	31
Average-	123	123
High-	61	61
Total	215	215
4th Grade		
Low-	31	31
Average-	89	89
High-	40	40
Total	160	160
5th Grade		
Low-	35	35
Average-	103	103
High-	64	64
Total	202	202
Grand Total		
Low-	97	97
Average-	315	315
High-	165	165
TOTAL	577	577

education, and a part-time paraprofessional who assisted the teachers and students. The primary responsibility of the special education teacher was providing instructional support for special education students, but there were also times when both teachers instructed all students in whole-group classroom instruction. With the exception of an orientation to the inclusion concept, neither general education teachers nor special education teachers received special training. General education teachers generally volunteered to teach in inclusion classes, while special education teachers were assigned a supportive role in these classes.

All students in both inclusion and non-inclusion classes received most of their academic instruction in one classroom. Both types of classes used the same district-adopted curriculum and materials, but students with disabilities were further supported with specialized instruction including modifications of the curriculum and materials.

The average class size of inclusion classes was 19 students. 57% (10.83) were general education students while the remaining 43% (8.17) were students with identified disabilities who received special education services. The average amount of time given to special education services

for students with disabilities was 2.16 hours (amount defined in IEP). Half the students with disabilities received more than three hours of special education services each day. Three hours (50% of instructional time in elementary schools) is considered the minimum level of services required for referral to a self-contained program.

Of the students with disabilities assigned to inclusion classes, 52.6% were identified as Learning Disabled (LD), 26.3% as Mentally Handicapped (MH), 10.2% as Seriously Emotionally Disturbed (SED), 5.6% as Other Health Impaired (OHI), and 5.3% as other low incidence disabilities. The average class size of non-inclusion classes was 24.93 general education students. No students receiving special education services (with the exception of speech) were assigned to non-inclusion classes.

While whole-group instruction occurred in the teaching of most subjects, in both inclusion and non-inclusion classes, math was taught in separate settings. Between-class ability grouping was used to assign students to math classes. Since students were assigned to math classes on the basis of ability or achievement, integrating students from both inclusion classes and non-inclusion classes, math achievement scores were not included in this study.

Analysis Plan

Ex post facto, or causal-comparative research was used in this study because the independent variables, or attribute variables, had already been manipulated prior to the study. The researcher had no direct control over the independent variables, nor could the variables be directly manipulated. Consequently, random assignment of individual students to either inclusion classes or the comparison non-inclusion classes was not possible because class assignments had been made prior to the study, and the groups had already received the independent variables. The intact classes from which the participants in the study were randomly selected were representative of the school population. Students were assigned heterogeneously to their classes in accordance with the school district's placement guidelines, which took into consideration such factors as enrollment, student ability, classroom composition, and teacher experience.

This study evaluated the impact of inclusion during the second year in which the school district implemented a full-inclusion strategy for the delivery of special education services. Students assigned to inclusion classes during the first year of the practice were assigned to non-inclusion classes the second year. Since there were more non-inclusion classes (51) than inclusion classes (35), not all

general education students had an opportunity to be assigned to an inclusion class. In other words, general education students in inclusion classes during the 1992-93 school year had not been previously assigned to inclusion classes, although some students in the non-inclusion classes had been assigned to inclusion classes the previous year. Because of the small number of inclusion classes, some general education students were never assigned to inclusion classes during the first two years of implementation.

The independent variable under investigation in this study was the academic achievement of general education students in inclusion classes. In both the inclusion classes and the comparison non-inclusion classes, general education students participated in the school district's regular prescribed curriculum. The only difference between the two classes was the presence of students with disabilities and their supporting staff in the inclusion classes. Students from both the inclusion and the non-inclusion classes were further divided into three different subgroups within each of the two original groups for further analyses. This procedure allowed the researcher to evaluate the effects of the independent variable at differing levels of student achievement.

Using the Basic Total Normal Curve Equivalent (NCE) scores of the ITBS, participants at each grade level were divided into three achievement subgroups. The Basic Total score is a measurement of overall academic achievement, while the NCE is a standard score based on the normal curve. The mean NCE score is 50 with a standard deviation of 10. Since both classes (inclusion and non-inclusion) were divided into achievement levels by using the same standards and procedures, using Total Basic achievement scores as a reference should have no impact on the study outcomes. Although there is variation among subtests scores, students tend to score with relative consistencies across most subtests.

The following categorization of scores used one and a half standard deviations from the mean, or about one grade level, for defining achievement levels. Students with NCE's below 34 were identified as the low-achieving subgroup. NCE's between 34 and 66 were identified as the average-achieving subgroup. NCE's above 66 were identified as the high-achieving subgroup. The comparable subgroups within each of the larger groups (inclusion vs. non-inclusion) could be evaluated. For example, achievement of high-achieving general education students in inclusion classes

can be compared with the achievement of high-achieving general education students in non-inclusion classes.

The study design adapted from Gay (1987) is shown in Table 3. The two groups that were investigated were the inclusion and non-inclusion classes. The independent variable was the presence of students with disabilities in the classes. The three different achievement level subgroups were included within each of the two larger groups (inclusion classes vs. non-inclusion classes).

Instrument

The Iowa Tests of Basic Skills (ITBS) is a standardized achievement test that provides information about the skills development of individual students, and highlights relative strengths and weaknesses in distinct instructional programs (Hambleton, 1989). For these reasons, the ITBS was used as the measure of the dependent variables for this study. The ITBS was first designed and constructed at the University of Iowa (Hieronymus, Hoover, & Lindquist, 1935), and over the years hundreds of studies have examined issues related to to the achievement test. The ITBS is regarded as among the best educational achievement tests in the country (Hambleton, 1989). The six subtests used in this study are described below:

TABLE 3

Causal-Comparative Research Design.

Group	Independent Variable	Dependent Variable
(Inclusion Students)	(Inclusion Classes)	ITBS Subtests
(Non-Inclusion Students)		ITBS Subtests

( ) indicates no manipulation

(1) Vocabulary. The Vocabulary test measures both the breadth of students' vocabulary as well as their ability to recognize fine distinctions in word meaning.

(2) Spelling. Spelling measures knowledge of the conventional spelling guidelines.

(3) Reading Comprehension. The Reading Comprehension test consists of varying length selections--a single paragraph to a full page. The passages represent the wide variety of topics and types of materials students encounter in everyday life.

(4) Language. Language measures knowledge of conventional written English--spelling, capitalization, punctuation, usage, and expression.

(5) Social Studies. The objectives of social studies programs are measured throughout the batteries. The purpose of the Social Studies subtest is to measure achievement not covered elsewhere in the ITBS.

(6) Science. The objectives of science programs are measured throughout the batteries. The purpose of the Science subtest is to measure achievement not covered elsewhere in the ITBS.

School systems use standardized achievement testing for various purposes. According to Hieronymus and Hoover

(1990), major authors of the ITBS, the batteries were designed to address nine uses, of which at least three are germane to this study. They are as follows:

> (1) to provide information that is useful in making administrative decisions regarding better grouping or programming for individual differences;
>
> (2) to diagnose strengths and weaknesses in group performance (class, building, or system) that have implications for changes in curriculum, or instructional procedures; and,
>
> (3) to determine the relative effectiveness of alternative methods of instruction and the conditions that determine the effectiveness of the various procedures. (p. 1)

The Manual for School Administrators (Riverside, 1990) provides technical evidence about the development steps for each subtest, test and subtest reliability, item statistics, item bias results, and correlations among test scores and various criterion measurements, such as academic grades. Split-half reliability coefficients on each of the subtests were .90 or over at grade 6 (Riverside, 1990). For grades 3-5, test reliability for the subtests range from .85 to .95. (Hambleton, 1989; Mehrens & Lehman, 1987). Test-retest alternate form reliability coefficients were within the same range. As reported by Riverside (1990) construct validity supported the relationships among similar and dissimilar measurement tasks that had been hypothesized by the tests' authors. Hambleton, in writing a review of the ITBS, noted

that "[s]ufficient information about test reliability has been reported to keep even the severest critic happy" (p. 200).

Data Collection

Scores collected from the computerized ITBS test reports provided four individual student scores for each of the subtests--developmental standard score, percentile ranking, grade equivalent, and normal curve equivalent. Developmental standard scores were used for the purpose of discussion and statistical analyses. The procedure for collecting data was as follows:

(1) 1993 ITBS standard scores were collected for each general education student enrolled in grades 3 through 5 and who met the selection criteria as outlined earlier in this chapter. This data provided scores for the dependent variable.

(2) Each participant had complete 1993 ITBS scores in each of the subtests of Vocabulary, Reading Comprehension, Spelling, Language, Social Studies, and Science.

Math scores were not used in this study. Students in the district's elementary schools were re-grouped for math instruction. The between-class, grade-level groupings were based on the students' previous achievements in math, and on their teachers' recommendations. It was impossible to

determine from ITBS test results what the setting was for math instruction, but it was known that it generally did not take place in the students' "homerooms." An inclusion teacher for example, may have taught a "high level" math group as a "reward," or as a "change of pace" from the challenges of teaching diverse classes for most of the day, while a non-inclusion teacher may have been required to teach a "lower-level" math group. During the school year, only the inclusion group was exposed to the independent variable (the presence of students with disabilities in the classroom). The comparison non-inclusion group was not exposed to the independent variable. All other conditions remained the same for the two groups. At no time were teachers or students aware that the present study was being developed.

Data Analysis

Analysis of data involved a variety of descriptive and inferential statistics. Descriptive statistics, used to determine the spread of a set of scores, included the mean achievement scores of each large group and sub-group on the ITBS subtests, as well as standard deviations. Inferential statistics were used to determine the significant differences among the means of the groups. The primary

strategy for data analysis, based on an analysis for each of the six ITBS subtests, was a series of three-way ANOVAs (Class x Grade Level x Achievement Level) and two-way ANOVAs by grade level (Class x Achievement Level). All analyses were tested at the probability level of $p < .05$.

The standard scores on the Vocabulary, Reading Comprehension, Spelling, Language, Social Studies and Science subtests for each subject were collected and entered in the Number Cruncher Statistical System (NCSS) for analyses. Achievement of general education students in inclusion classes was compared against the achievement of general education students in non-inclusion classes. Descriptive statistics for the 1993 scores on each of the six ITBS subtests were collected for each group. The ITBS was administered during March of 1993. Students had been in their respective comparison groups for seven months.

Using the NCSS general linear models program (GLM), a 2 x 3 x 3 factorial ANOVA was used to test the effect of inclusion on academic achievement of low- average-, and high-achieving general education students in the third, fourth, and fifth grades. By investigating combinations of two types of classes,three achievement levels, and three grade levels, the study considered 18 different groups.

Chapter Summary

ITBS scores of 1,154 general education students in grade 3 through 5 were used in this study. Scores were selected from students in all 11 elementary schools in the district. The students were equally divided between the inclusion groups and the comparison non-inclusion groups.

This chapter described the hypotheses, participants, analysis plan, instrument, data collection, and analyses. chapter 3 delineates the results of this study.

Chapter 3

PRESENTATION OF THE DATA

This study examines the impact of inclusion on the academic achievement of the following subgroups of general education students:

1. low-achieving students (n = 194);
2. average-achieving students (n = 630);
3. high-achieving students (n = 330).

The data for this study are presented in the form of a response to the research question first proposed in chapter 2 for each of the six ITBS subtest. The subtest headings are used to introduce the six sections of this chapter. These sections include a review of the data sources and the research methods used to answer the research question. There is also a presentation of various tables, figures, and statistical computations.

Vocabulary

The mean and standard deviations of the ITBS Vocabulary subtest scores for inclusion (N = 577) and non-inclusion (N = 577) students are shown in Table 4.

TABLE 4

Means and Standard Deviations of ITBS Vocabulary Subtest Scores for Third- (N = 430), Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level		
	Third	Fourth	Fifth
Inclusion Classes (N = 577)			
Low-Achieving			
Mean	92.23	100.26	108.94
SD	1.90	1.90	1.79
N	31	31	35
Average-Achieving			
Mean	105.54	117.64	129.08
SD	0.96	1.12	1.04
N	123	89	103
High-Achieving			
Mean	118.95	137.83	149.08
SD	1.36	1.68	1.32
N	61	40	64
Non-Inclusion Classes (N = 577)			
Low-Achieving			
Mean	92.90	107.06	115.54
SD	1.90	1.90	1.79
N	31	31	35
Average-Achieving			
Mean	107.10	121.13	135.81
SD	0.96	1.12	1.04
N	123	89	103
High-Achieving			
Mean	123.66	135.55	148.45
SD	1.36	1.68	1.32
N	61	40	64

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Vocabulary subtest. The mean score for inclusion students was 117.73 compared to 120.80 for non-inclusion students.

To determine whether there were statistical differences between the achievement scores of students in inclusion classes and the scores of students in non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Vocabulary subtest scores was used. The ANOVA, which is presented in Table 5, revealed statistically significant interaction among class type, achievement level, and grade level (A x B x C); $F = 3.51$, $p < .01$. Graphic representation of the interaction is shown in Figure 1.

Because of significant interactions, simple effects on ITBS Vocabulary subtest scores were conducted at each grade level.

Third Grade Results.

The results, as shown in Table 6, revealed no significant differences between the scores of third grade students in inclusion classes (Mean = 105.57) and scores of students in non-inclusion classes (Mean = 107.89).

TABLE 5

Analysis of Variance on ITBS Vocabulary Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd, 4th, and 5th) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	2135.57	1	2135.57	19.03**
Achievement (B)	132658.40	2	66329.20	590.94**
Grade Level (C)	97060.62	2	48530.31	432.37**
A x B	720.71	2	360.35	3.20*
A x C	168.44	2	84.22	0.75
B x C	1529.71	4	382.43	3.41**
A x B x C	1584.12	4	396.03	3.51**
Error	127509.00	1136	112.24	
Total	405745.50	1153		

* $p < .05$

** $p < .01$

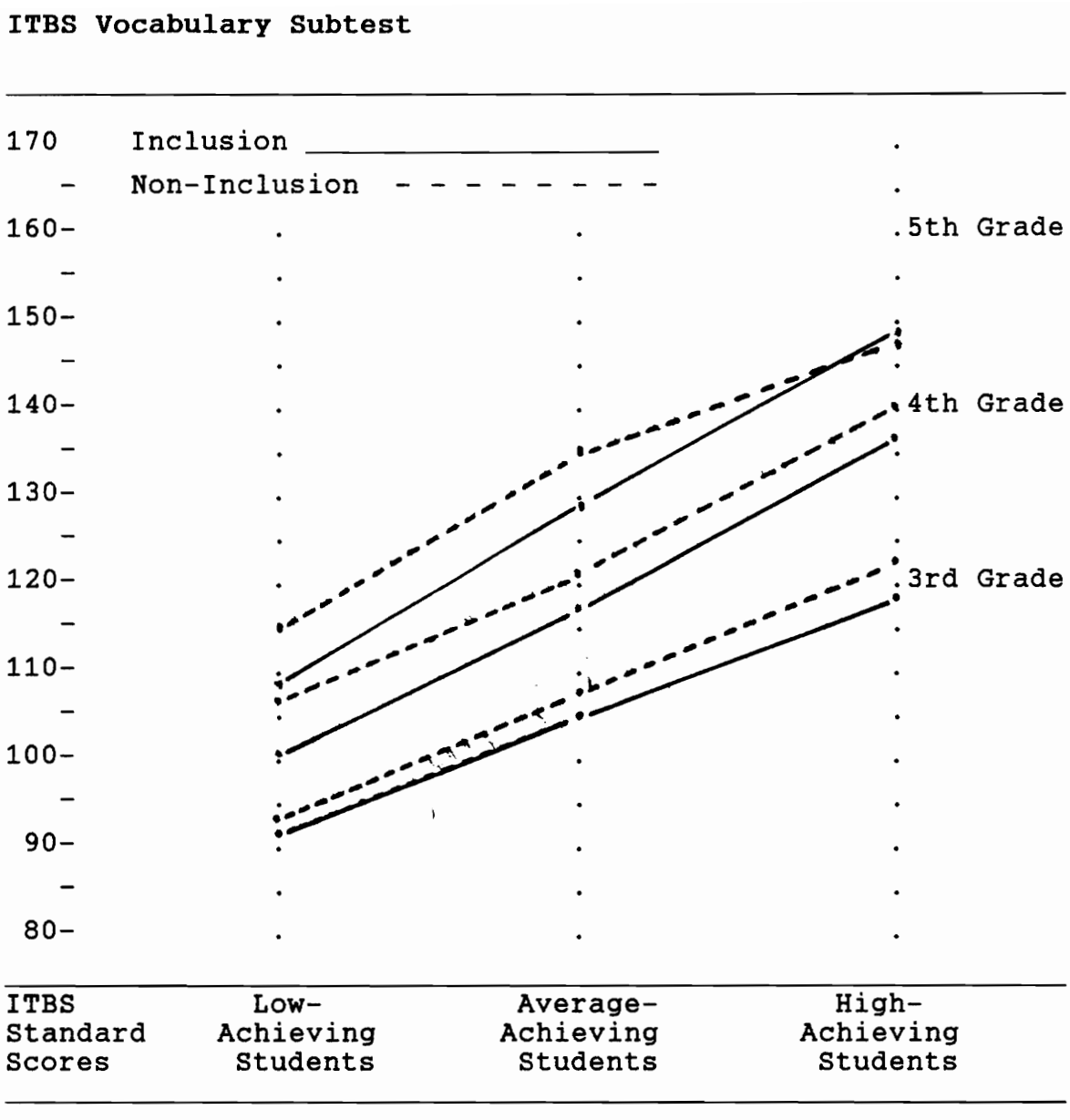

FIGURE 1

Interactions of Mean Standard Scores on the ITBS Vocabulary Subtest of General Education Students in Inclusion and Non-Inclusion Classes.

TABLE 6

Simple Effects on Third Grade ITBS Vocabulary Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	423.52	1	423.52	3.77
Achievement (B)	36907.49	2	18453.75	164.16**
A x B	251.49	2	125.75	1.12
Error	127509.00	1136	112.41	
Total	165091.50	1141		

** $p < .01$

Although third grade achievement level was significant ($p < .01$), this finding was expected because achievement levels were deliberately created to reflect previously existing achievement differences among students. The interaction between class type and achievement level was, however, not significant ($p > .05$), suggesting that the findings of no differences in Vocabulary subtest scores between third grade inclusion and non-inclusion classes is consistent across all achievement levels.

Fourth Grade Results.

At the fourth grade level, class type and achievement level had significant interaction ($F = 3.49$, $p < .05$), as shown in Table 7. Graphic representation of the interactions between class type and achievement level is shown in Figure 2. The follow-up of this significant interaction revealed that differences in the Vocabulary subtest scores between fourth grade inclusion and non-inclusion classes were not the same at each achievement level. Low-achieving students in inclusion classes scored lower (Mean = 100.26) than those in non-inclusion classes (Mean = 107.06; $F = 6.40$, $p < .05$). Average-achieving students in inclusion classes also scored lower (Mean = 117.64) than those in non-inclusion classes (Mean = 121.13; $F = 4.84$, $p < .05$). No such differences were found for

TABLE 7

Simple Effects on Fourth Grade ITBS Vocabulary Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	470.22	1	470.22	4.19*
Achievement (B)	38753.90	2	19376.95	172.63**
A x B	784.47	2	392.23	3.49*
Error	127509.00	1136	112.24	
Total	166733.20	1141		

* $p < .05$

** $p < .01$

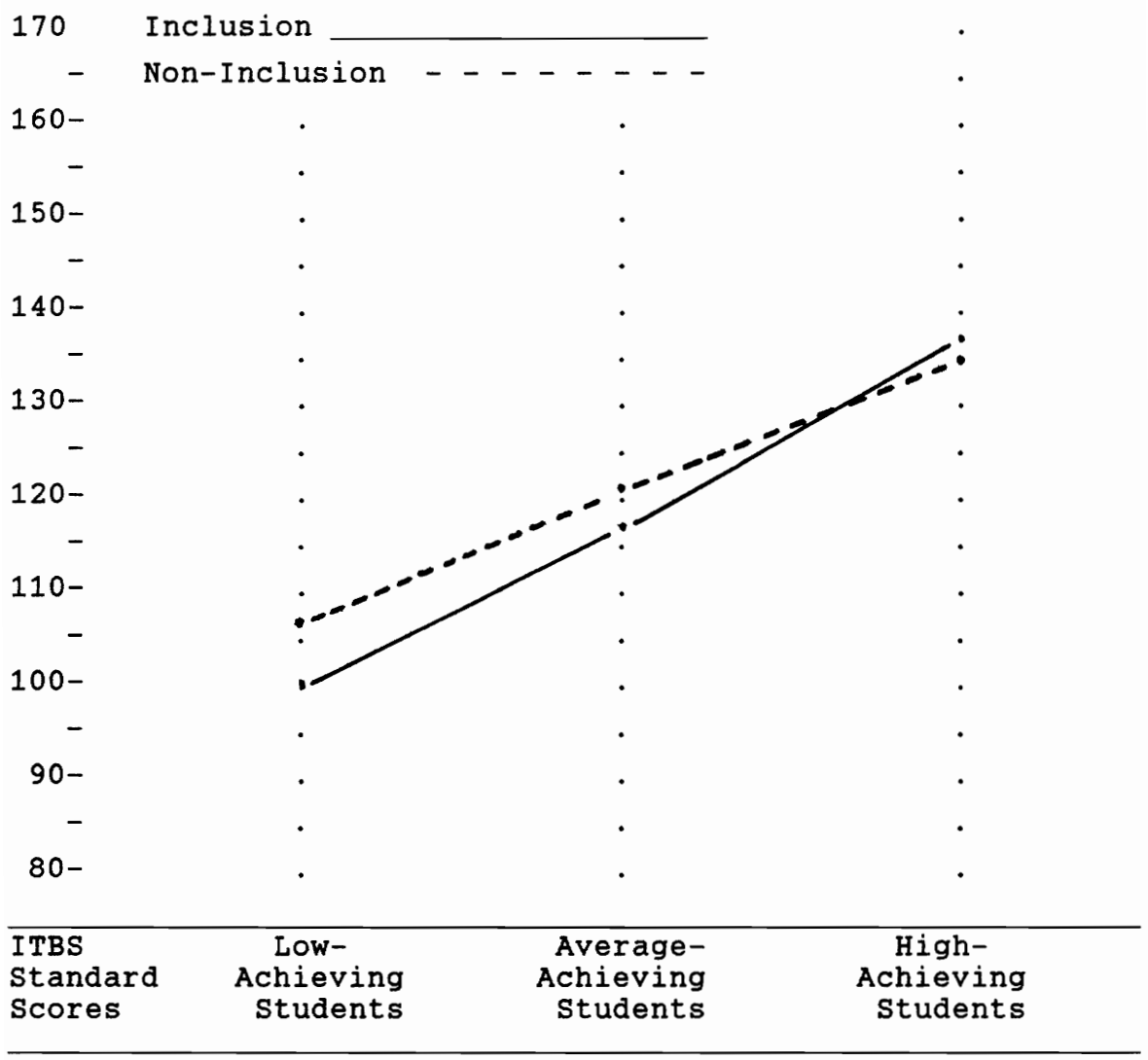

FIGURE 2

Interaction of Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) for the ITBS Vocabulary Scores of Fourth Graders.

high-achievers; $F = 0.04$, $p > .05$. The results of the follow-up analysis of the significant interactions at the fourth grade level are reported in Table 8.

Fifth Grade Results.

For the fifth graders, class type and achievement level had significant interaction ($F = 5.22$, $p < .05$), as shown in Table 9. Graphic representation of the interaction between class type and achievement level is shown in Figure 3. The follow-up of this significant interaction revealed that differences in the Vocabulary subtest scores between fifth grade inclusion and non-inclusion classes were not the same at each achievement level. Low-achievers in inclusion classes scored lower (Mean = 108.94) than those in non-inclusion classes (Mean = 115.54); $F = 6.79$, $p < .01$. Average-achievers in inclusion classes also scored lower (Mean = 129.08) than those in non-inclusion classes (Mean = 135.81); $F = 20.77$, $p < .01$. No such differences were found for high-achievers; $F = 0.11$, $p > .05$. The results of the follow-up analysis of the significant interactions at the fifth grade level are reported in Table 10.

Vocabulary Summary.

On the ITBS Vocabulary subtest, low-achieving students in inclusion classrooms scored significantly lower than comparison students at the fourth and fifth grade level.

TABLE 8

Follow-Up of Significant Interactions of Vocabulary Subtest Achievement Levels for Fourth Grade Students Using Class Type (Inclusion vs. Non-Inclusion) as the Independent Variable.

Source	SS	df	MS	F
Low-Achieving	718.08	1	718.08	6.40*
Average-Achieving	543.38	1	542.38	4.84*
High-Achieving	4.51	1	4.51	0.04
Error	127509.00	1136	112.24	
Total	128774.97	1139		

* $p < .05$

TABLE 9

Simple Effects on Fifth Grade ITBS Vocabulary Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	1496.80	1	1496.80	13.32**
Achievement (B)	61538.12	2	30769.06	273.72**
A x B	1171.81	2	585.90	5.22*
Error	127509.00	1136	112.41	
Total	191265.73	1141		

* $p < .05$

** $p < .01$

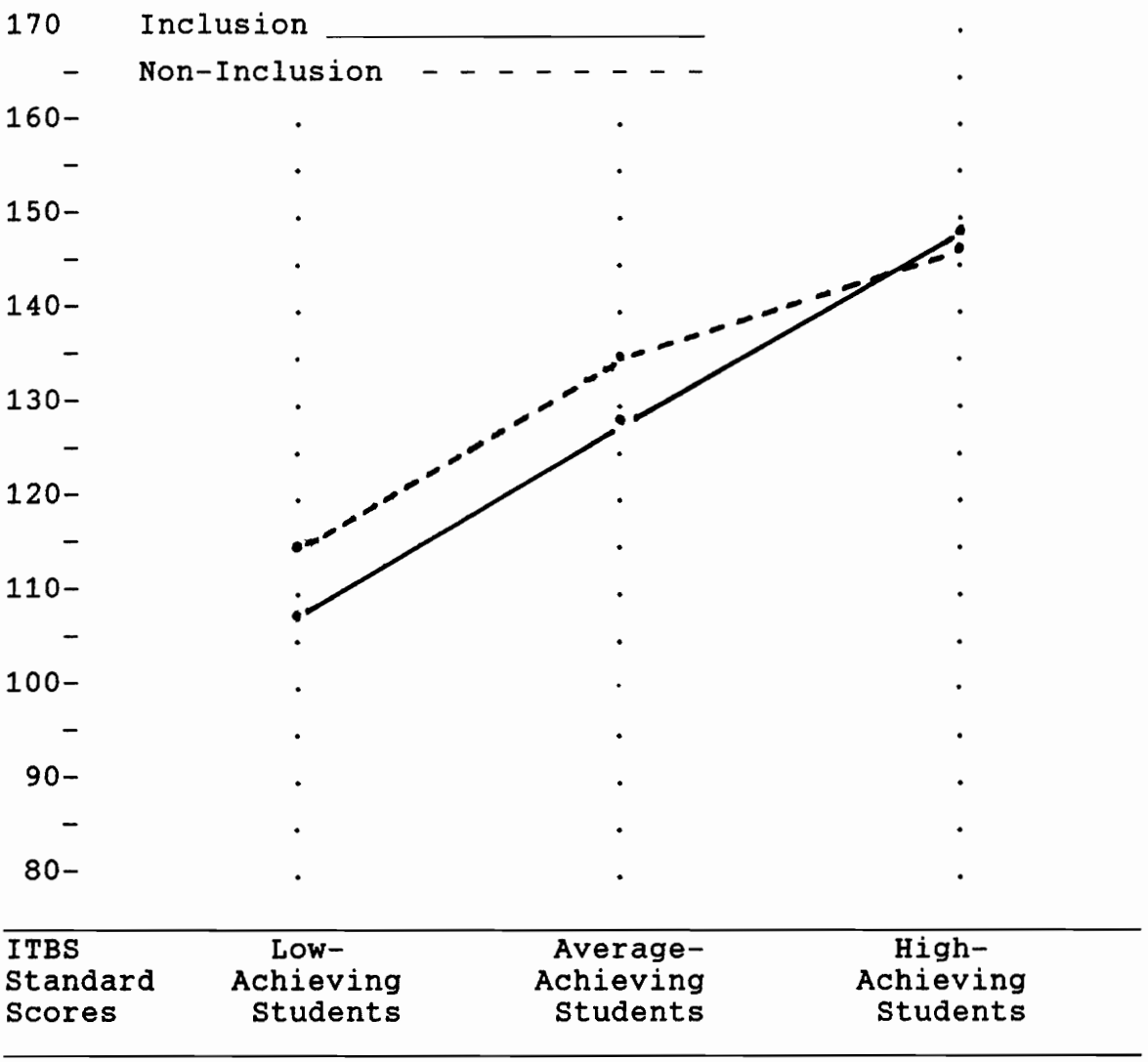

FIGURE 3

Interaction of Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) for the ITBS Vocabulary Scores of Fifth Graders.

TABLE 10

Follow-Up of Significant Interactions of Achievement Level (Low, Average, and High) on ITBS Vocabulary Subtest for Fifth Grade Students Using Class Type (Inclusion vs. Non-Inclusion) as the Independent Variable.

Source	SS	df	MS	F
Low-Achieving	762.30	1	762.30	6.79**
Average-Achieving	2331.31	1	2331.31	20.77**
High-Achieving	12.50	1	12.50	0.11
Error	127509.00	1136	112.24	
Total	130615.11	1139		

** $p < .01$

However, there were no significant differences at the third grade level.

Average-achieving students in inclusion classrooms also scored lower than comparison students at the fourth and fifth grade level, with no significant differences at the third grade level.

There were no significant differences between high-achieving students at any grade level.

Reading Comprehension

The means and standard deviations of the ITBS Reading Comprehension subtest scores for inclusion (N = 577) and non-inclusion (N = 577) students are shown in Table 11.

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Reading Comprehension subtest. The mean score for inclusion students was 118.67 compared to 121.87 for non-inclusion students.

To determine whether there were statistical differences between the achievement scores of students in inclusion classes and the scores of students in non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Reading

TABLE 11

Means and Standard Deviations of ITBS Reading Comprehension Subtest Scores for Third- (N = 430), Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level		
	Third	Fourth	Fifth
Inclusion Classes (N = 577)			
Low-Achieving			
Mean	86.06	101.16	112.31
SD	2.37	2.37	2.23
N	31	31	35
Average-Achieving			
Mean	103.52	118.37	129.88
SD	1.19	1.40	1.30
N	123	89	103
High-Achieving			
Mean	120.41	141.13	155.16
SD	1.69	2.09	1.65
N	61	40	64
Non-Inclusion Classes (N = 577)			
Low-Achieving			
Mean	87.58	108.29	118.26
SD	2.37	2.37	2.23
N	31	31	35
Average-Achieving			
Mean	104.38	120.90	138.22
SD	1.19	1.40	1.30
N	123	89	103
High-Achieving			
Mean	125.82	140.58	152.78
SD	1.69	2.09	1.65
N	61	40	64

Comprehension subtest scores was used. The ANOVA, which is presented in Table 12, revealed significant interaction among class type, achievement level, and grade level (A x B x C); $F = 3.75$, $p < .01$. Graphic representation of the interaction is shown in Figure 4. Because of significant interactions, simple effects on ITBS Reading Comprehension subtest scores were conducted at each grade level.

Third Grade Results.

The results, shown in Table 13, revealed no significant differences between the scores of third grade students in inclusion classes (Mean = 103.33) and scores of students in non-inclusion classes (Mean = 105.93); $p > .05$.

Although third grade achievement level was significant ($p < .01$), this finding was expected because achievement levels were deliberately created to reflect previously existing achievement differences among students. The interaction between class type and achievement level was, however, not significant ($p > .05$), suggesting that the findings of no differences in Reading Comprehension subtest scores between third grade inclusion and non-inclusion classes is consistent across all achievement levels.

Fourth Grade Results.

There were no significant differences between fourth grade non-inclusion students (Mean = 123.25) and inclusion

TABLE 12

Analysis of Variance on ITBS Reading Comprehension Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd, 4th, and 5th) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	2314.94	1	2314.94	13.29**
Achievement (B)	174618.40	2	87309.22	501.20**
Grade Level (C)	145094.40	2	72547.20	416.46**
A x B	655.54	2	327.77	1.88
A x C	79.95	2	39.98	0.23
B x C	461.14	4	115.29	0.66
A x B x C	2610.90	4	652.73	3.75**
Error	197890.60	1136	174.20	
Total	573041.20	1153		

* $p < .05$

** $p < .01$

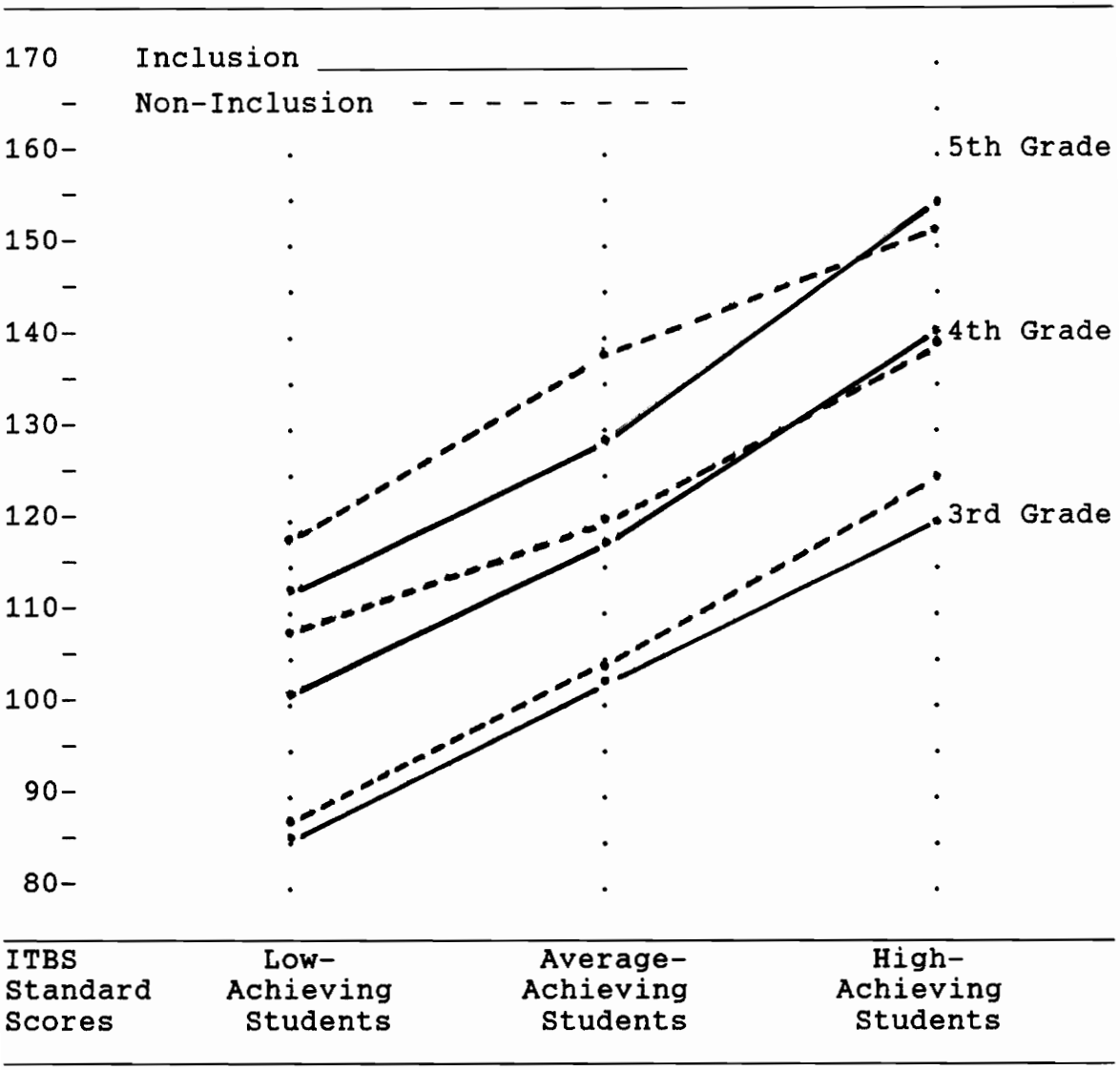

FIGURE 4

Interaction of the ITBS Reading Comprehension Subtest Scores of General Education Students in Inclusion and Non-Inclusion Classes.

TABLE 13

Simple Effects on Third Grade ITBS Reading Comprehension Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	534.06	1	534.06	3.07
Achievement (B)	59209.29	2	29603.65	169.94**
A x B	431.39	2	215.70	1.24
Error	197890.60	1136	174.20	
Total	258063.34	1141		

** $p < .01$

students (Mean = 120.22); $p > .05$. The interaction between class type and achievement level was also not significant ($p > .05$). The results are shown in Table 14. Although fourth grade achievement level was significant ($p < .01$), this finding was expected because achievement levels were deliberately created to reflect previously existing achievement differences among students. The interaction between class type and achievement level was not significant ($p > .05$), suggesting that the findings of no differences in the Reading Comprehension subtest scores between fourth grade inclusion and non-inclusion classes were consistent across all the achievement levels.

Fifth Grade Results.

At the fifth grade level, class type and achievement level had significant interaction ($F = 6.63$, $p < .01$), as shown in Table 15. Graphic representation of the interaction between class type and achievement level is shown in Figure 5. The follow-up of this significant interaction revealed that differences in the Reading Comprehension subtest scores between fifth grade inclusion and non-inclusion classes were not the same at each achievement level. Low-achievers in inclusion classes scored significantly lower (Mean = 112.31) than those in

TABLE 14

Simple Effects on Fourth Grade ITBS Reading Comprehension Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	605.45	1	605.45	3.48
Achievement (B)	47921.40	2	23960.74	137.55**
A x B	516.42	2	258.21	1.48
Error	197890.60	1136	174.20	
Total	246.933.87	1141		

** $p < .01$

TABLE 15

Simple Effects on Fifth Grade ITBS Reading Comprehension Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source		SS	df	MS	F
Inclusion vs. Non-Inclusion Classes	(A)	1315.20	1	1315.20	7.55**
Achievement	(B)	71645.41	2	35822.71	205.64**
A x B		2308.17	2	1154.08	6.63**
Error		127509.00	1136	112.41	
Total		191265.73	1141		

** $p < .01$

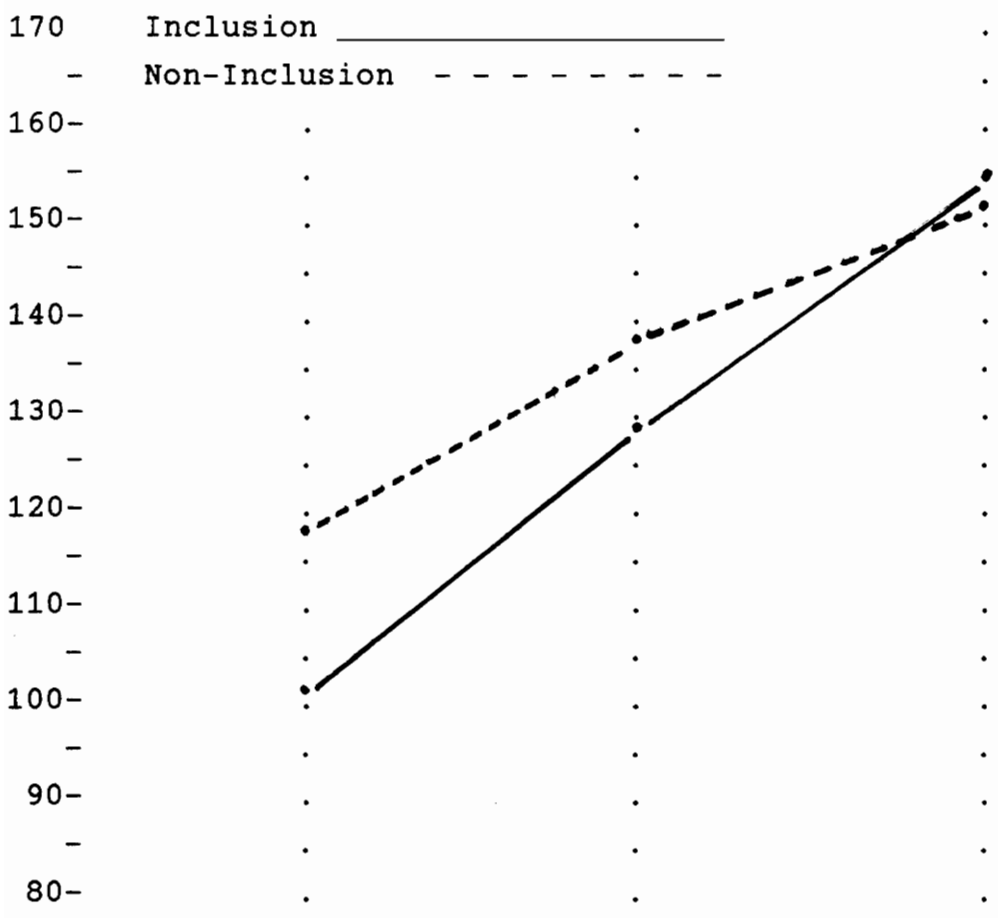

FIGURE 5

Interaction of Class Type (Inclusion vs. Non-Inclusion) With Achievement Level (Low, Average, and High) for the ITBS Reading Comprehension Scores of Fifth Graders.

non-inclusion classes (Mean = 118.26; $F = 119.47$, $p < .01$). Average-achievers in inclusion classes also scored significantly lower (Mean = 129.88) than those in non-inclusion classes (Mean = 138.22); $F = 20.56$, $p < .01$). No such differences were found for high-achievers; $F = 1.05$, $p > .05$. The results of the follow-up analysis of the significant interactions at the fifth grade level are reported in Table 16.

Reading Comprehension Summary.

On the ITBS Reading Comprehension subtest, low-achieving students in inclusion classrooms scored significantly lower than comparison students at the fifth grade level. However, there were no significant differences at the third and fourth grade levels.

Average-achieving students in inclusion classrooms scored significantly lower than non-inclusion students at the fifth grade level. There were no significant differences at the third and fourth grade levels.

There were no significant differences between high-achieving students in inclusion classrooms and those in non-inclusion classes at any grade level.

TABLE 16

Follow-up of Significant Interactions of Achievement Level (Low, Average, and High) on Reading Comprehension Subtest Scores for Fifth Grade Students Using Class Type (Inclusion vs. Non-Inclusion) as the Independent Variable.

Source	SS	df	MS	F
Low-Achieving	20812.13	1	20812.13	119.47**
Average-Achieving	3581.95	1	3581.95	20.56**
High-Achieving	180.50	1	180.50	1.05
Error	197890.50	1136	174.20	
Total	222467.08	1139		

** $p < .01$

Spelling

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Spelling subtest. The mean score for inclusion students was 114.34 compared to 118.59 for non-inclusion students. The means and standard deviations of the ITBS Spelling subtest scores for inclusion (N = 577) and non-inclusion (N = 577) students are shown in Table 17.

To determine whether there were statistical differences between the achievement scores of students in inclusion classes and the scores of students in non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Spelling subtest scores were used. The ANOVA, which is presented in Table 18, revealed significant differences between inclusion and non-inclusion classes; $F = 20.86$, $p < .01$. In addition, achievement level ($p < .01$), grade level ($p < .01$), and their interaction (B x C) were also significant; $F = 2.67$, $p < .05$. However, this later finding was expected because achievement levels were deliberately created to reflect previously existing achievement differences among students and grade levels are expected to be different. However, further examination of significant

TABLE 17

Means and Standard Deviations of ITBS Spelling Subtest Scores for Third- (N = 430), Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level		
	Third	Fourth	Fifth
Inclusion Classes (N = 577)			
Low-Achieving			
Mean	87.39	98.94	105.97
SD	2.52	2.51	2.37
N	31	31	35
Average-Achieving			
Mean	102.09	114.04	127.82
SD	1.26	1.48	1.38
N	123	89	103
High-Achieving			
Mean	118.69	127.45	146.64
SD	1.79	2.21	2.52
N	61	40	64
Non-Inclusion Classes (N = 577)			
Low-Achieving			
Mean	89.97	105.87	115.09
SD	2.52	2.51	2.37
N	31	31	35
Average-Achieving			
Mean	104.78	116.42	133.82
SD	1.26	1.48	1.38
N	123	89	103
High-Achieving			
Mean	123.10	131.53	146.75
SD	1.79	2.21	1.75
N	61	40	64

TABLE 18

Analysis of Variance on ITBS Spelling Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd, 4th, and 5th) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	4090.43	1	4090.43	20.86**
Achievement (B)	125419.40	2	62709.68	319.74**
Grade Level (C)	102127.70	2	51063.84	260.36**
A x B	349.54	2	174.77	0.89
A x C	142.56	2	71.28	0.36
B x C	2096.46	4	524.11	2.67*
A x B x C	994.58	4	248.65	1.27
Error	222800.00	1136	196.13	
Total	505202.00	1153		

* $p < .05$

** $p < .01$

differences between inclusion and non-inclusion classes revealed the following. Graphic representation of the interactions is shown in Figure 6.

Third Grade Results.

Students in third grade inclusion classes scored lower than those in third grade non-inclusion classes at all achievement levels. Low-achievers scored 87.39 compared to 89.97; average-achievers scored 102.09 compared to 104.78; and, high-achievers scored 118.69 compared to 123.10.

Fourth Grade Results.

Students in fourth grade inclusion classes scored lower than those in fourth grade non-inclusion classes at all achievement levels. Low-achievers scored 98.94 compared to 105.87; average-achievers scored 114.04 compared to 116.42, and high-achievers scored 127.45 compared to 131.53.

Fifth Grade Results.

Students in fifth grade inclusion classes also scored lower than those in fifth grade non-inclusion classes at all achievement levels. Low-achievers scored 105.97 compared to 115.09; average-achievers scored 127.82 compared to 133.82, and high-achievers scored 146.64 compared to 146.75.

Spelling Summary.

Students in inclusion classes scored lower than those in non-inclusion classes on the ITBS Spelling subtest at all achievement levels and across all grade levels. The greatest difference was between the scores of low-achieving

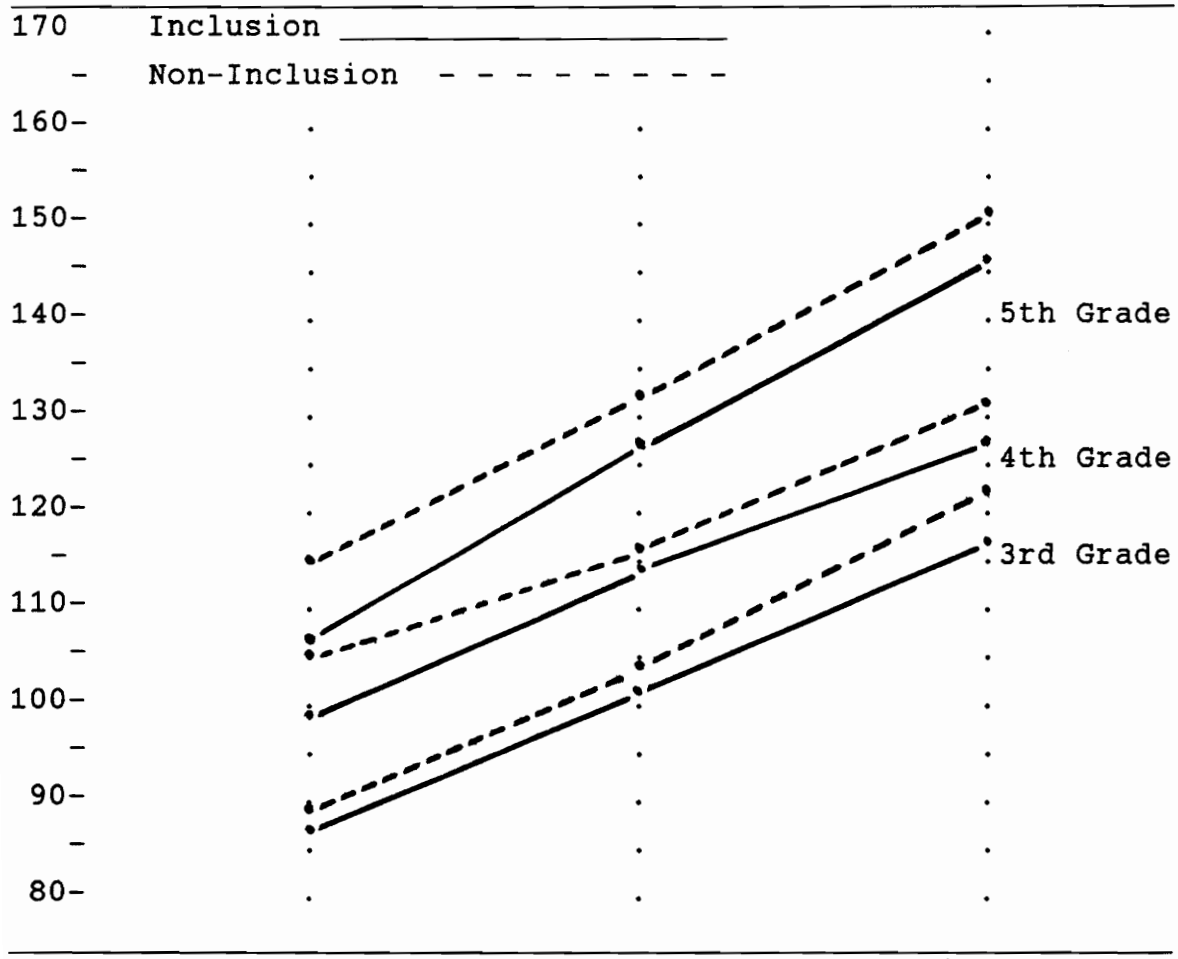

FIGURE 6

Interaction of Mean Standard Scores on the ITBS Spelling Subtest of General Education Students in Inclusion and Non-Inclusion Classes.

students in fifth grade inclusion classes and those of their peers in non-inclusion classes.

Language

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Language subtest. The mean score for inclusion students was 119.78 compared to 124.51 for non-inclusion students. The means and standard deviations for inclusion (N = 577) and non-inclusion (N = 577) students are shown in Table 19.

To determine whether there was a statistical difference between the achievement scores of students in inclusion classes and the scores of students in non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Language scores was used. The ANOVA, which is presented in Table 20, revealed significant interaction between achievement level and grade level (B x C) on the ITBS Language subtest scores; $F = 5.37$, $p < .01$. However, these findings were anticipated because achievement levels were deliberately created to reflect previously existing achievement differences among students, and grade levels are expected to be different from one another.

TABLE 19

Means and Standard Deviations of ITBS Language Subtest Scores for Third- (N = 430), Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level		
	Third	Fourth	Fifth
Inclusion Classes (N = 577)			
Low-Achieving			
Mean	90.87	102.81	106.83
SD	2.20	2.20	2.07
N	31	31	35
Average-Achieving			
Mean	107.45	120.53	133.42
SD	1.10	1.30	1.30
N	123	89	103
High-Achieving			
Mean	125.08	138.38	152.70
SD	1.57	1.94	1.53
N	61	40	64
Non-Inclusion Classes (N = 577)			
Low-Achieving			
Mean	93.65	112.39	116.63
SD	2.19	2.19	2.07
N	31	31	35
Average-Achieving			
Mean	111.12	124.24	140.39
SD	1.10	1.30	1.21
N	123	89	103
High-Achieving			
Mean	130.00	139.43	152.75
SD	1.57	1.94	1.94
N	61	40	64

TABLE 20

Analysis of Variance on ITBS Language Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd, 4th, and 5th) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	5039.89	1	5039.89	33.60**
Achievement (B)	157114.80	2	78557.38	523.80**
Grade Level (C)	94537.56	2	47268.78	315.17**
A x B	908.76	2	454.38	3.03*
A x C	134.33	2	67.16	0.45
B x C	3223.92	4	805.98	5.37**
A x B x C	1158.08	4	289.52	1.93
Error	170374.20	1136	149.98	
Total	480875.20	1153		

* $p < .05$

** $p < .01$

Because of significant Class Type and Achievement Level interactions; $F = 3.03$, $p < .05$, simple effects on ITBS Language subtest scores were conducted at each achievement level. Graphic representation of the interactions between Class Type and Achievement Level is shown in Figure 7. Because of significant interactions, simple effects on the ITBS Language scores was conducted at each achievement level. The results are shown in Table 21.

Low-Achievers.

The results revealed that there are significant differences between the scores of low-achieving students in inclusion classes and those in non-inclusion classes. Low-achieving students in inclusion classes (Mean = 100.17) scored lower than those in non-inclusion classes (Mean = 107.55); $F = 17.58$, $p < .01$. Although Grade Level score was also significant, this finding is meaningless because scores are expected to be different at each grade level. The interaction between Class Type and Grade Level for scores of low-achieving students was, however, not significant ($p > .05$), suggesting that the findings of differences in Language scores between low-achieving students in inclusion and non-inclusion classes is consistent across all grade levels.

Average-Achievers.

Average-achieving students in inclusion classes (Mean = 120.46) also scored lower than those in non-inclusion

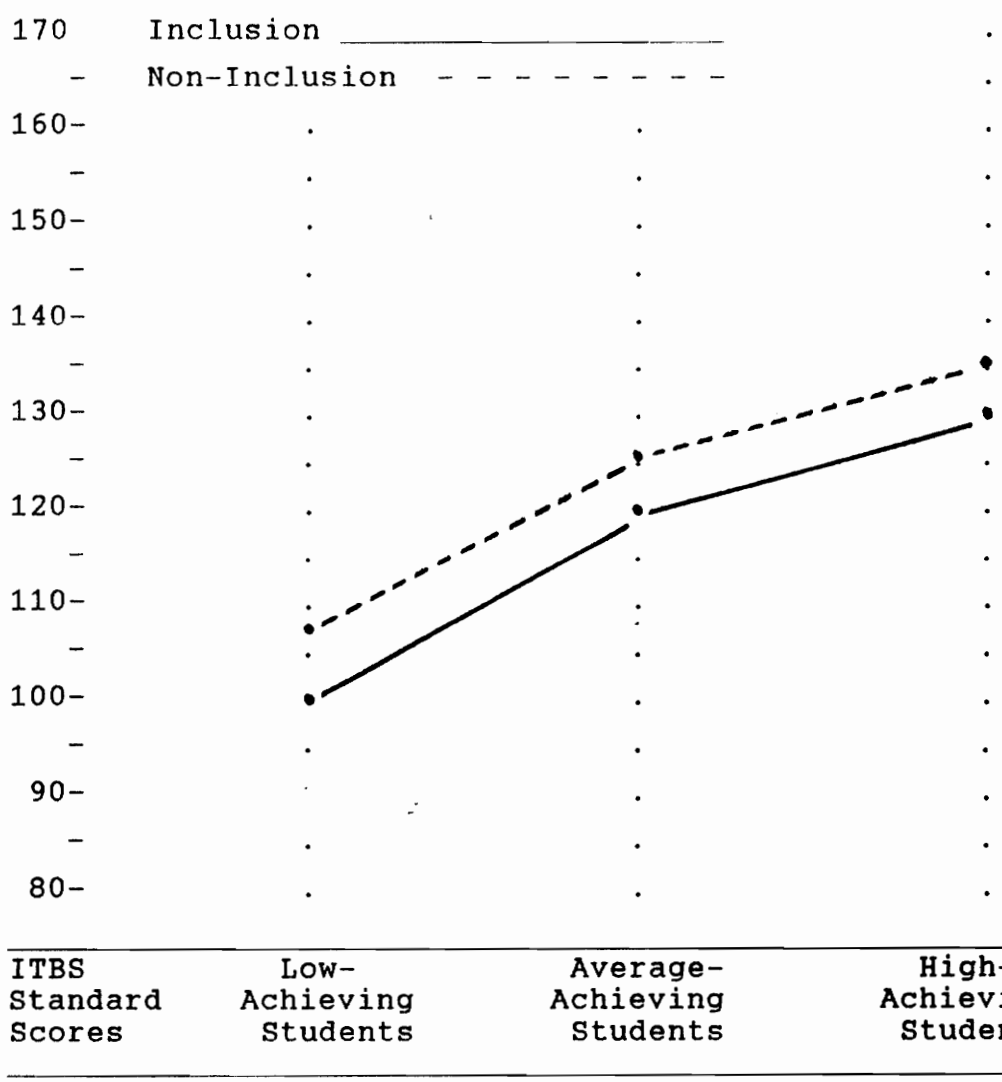

FIGURE 7

Interaction of Mean Standard Scores on the ITBS Language Subtest of General Education Students in Inclusion and Non-Inclusion Classes Across All Grade Levels.

TABLE 21

Simple Effects on Low-Achieving ITBS Language Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Grade Level as Independent Variables.

Source		SS	df	MS	F
Inclusion vs. Non-Inclusion Classes	(A)	2636.43	1	2636.43	17.58**
Grade	(B)	13524.69	2	13524.691	45.09**
A x B		505.83	2	252.91	1.69
Error		170374.20	1136	149.98	
Total		187041.15	1141		

** $p < .01$

classes (Mean = 125.25); $F = 23.62$, $p < .01$. Although Grade Level score was also significant, this finding was anticipated because scores are expected to be different at each grade level. The interaction between Class Type and Grade Level for scores of average-achieving students was, however, not significant ($p > .05$), suggesting that the findings of differences in Language scores between average-achieving students in inclusion and non-inclusion classes is consistent across all grade levels. The results are shown in Table 22.

High-Achievers.

There were no significant differences between the scores of high-achieving students in inclusion classes when compared to those in non-inclusion classes ($p > .05$). Although Grade Level scores were significant ($p < .01$), this finding was expected because scores are expected to be different at each grade level. The results are shown in Table 23.

Language Summary.

On the ITBS Language subtest, low-achieving students in inclusion classes scored significantly lower than comparison students in non-inclusion classes at all grade levels.

Average-achieving students in inclusion classes also scored significantly lower than comparison students in non-inclusion classes at all grade levels.

TABLE 22

Simple Effects on Average-Achieving ITBS Language Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Grade Level as Independent Variables.

Source		SS	df	MS	F
Inclusion vs. Non-Inclusion Classes	(A)	3543.00	1	3543.00	23.62**
Grade	(B)	85551.68	2	42775.84	258.22**
A x B		373.42	2	186.71	1.24
Error		170374.20	1136	149.98	
Total		259842.30	1141		

** $p < .01$

TABLE 23

Simple Effects on High-Achieving ITBS Language Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Grade Level as Independent Variables.

Source		SS	df	MS	F
Inclusion vs. Non-Inclusion Classes	(A)	375.06	1	375.06	2.50
Grade	(B)	39767.07	2	19883.54	132.58**
A x B		381.46	2	190.73	1.28
Error		170374.20	1136	149.98	
Total		210897.79	1141		

** $p < .01$

There were no significant differences between high-achieving students at any grade level.

Social Studies

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Social Studies subtest. The mean score for inclusion students was 130.26 compared to 137.08 for non-inclusion students. The means and standard deviations for inclusion (N = 362) and non-inclusion (N = 362) students are shown in Table 24. The Social Studies subtest was not administered at the third grade.

To determine whether there was a statistical difference between the achievement scores of students in inclusion classes and the scores of students in non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Social Studies scores was conducted. The results, as shown in Table 25, revealed significant interactions of Class Type by Achievement Level ($p < .01$), Class Type by Grade Level ($p < .05$), and Grade Level by Achievement Level ($p < .01$), suggesting that main effects should not be interpreted. Since Class Type significantly interacted with the Achievement Level and Grade Level, it is logical to investigate the effect of Class Type at various

TABLE 24

Means and Standard Deviations of ITBS Social Studies Subtest Scores for Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level	
	Fourth	Fifth
Inclusion Classes (N = 362)		
Low-Achieving		
Mean	99.35	106.89
SD	2.13	2.00
N	31	35
Average-Achieving		
Mean	126.49	138.20
SD	1.26	1.17
N	89	103
High-Achieving		
Mean	147.88	162.77
SD	1.87	1.48
N	40	64
Non-Inclusion Classes (N = 362)		
Low-Achieving		
Mean	115.32	114.09
SD	2.13	2.00
N	31	35
Average-Achieving		
Mean	133.92	139.52
SD	1.26	1.17
N	89	103
High-Achieving		
Mean	151.63	168.00
SD	1.87	1.48
N	40	64

TABLE 25

Analysis of Variance on ITBS Social Studies Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd and 4th Grades only) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	6833.24	1	6833.24	48.62**
Achievement (B)	188886.50	2	94443.23	672.45**
Grade Level (C)	12299.69	1	12299.69	87.51**
A x B	1377.76	2	688.88	4.90**
A x C	732.40	1	732.40	5.21*
B x C	3245.75	2	1622.88	11.55**
A x B x C	652.10	2	326.05	2.32
Error	100072.50	712	140.55	
Total	337414.60	723		

* $p < .05$

** $p < .01$

achievement levels for each grade level. Graphic representation of the interaction is shown in Figure 8.

Fourth Grade Results.

The results, as shown in Table 26, revealed that the differences between the scores of low-achieving students in fourth grade inclusion classes and those in non-inclusion classes were statistically significant. Low-achieving students in inclusion classes (Mean = 99.35) scored lower than those in non-inclusion classes (Mean = 115.32); $F = 28.12$, $p < .01$. Average-achieving students in inclusion classes (Mean = 126.49) also scored lower than their peers in non-inclusion classes (Mean = 133.71); $F = 16.47$, $p < .01$. There were no differences between the scores of high-achieving students in the two classes ($p > .05$).

Fifth Grade Results.

The results, as shown in Table 27 revealed that there are significant differences between the scores of fifth grade students in inclusion classes (Mean = 135.95) and those in non-inclusion classes (Mean = 140.54).

Low-achieving students in inclusion classes (Mean = 106.89) scored lower than those in non-inclusion classes (Mean = 114.09); $F = 6.45$, $p < .05$. However, there were no differences between the scores of average-achieving students in inclusion and non-inclusion classes ($p > .05$). High-achieving students in inclusion classes (Mean = 162.77)

ITBS Social Studies Subtest

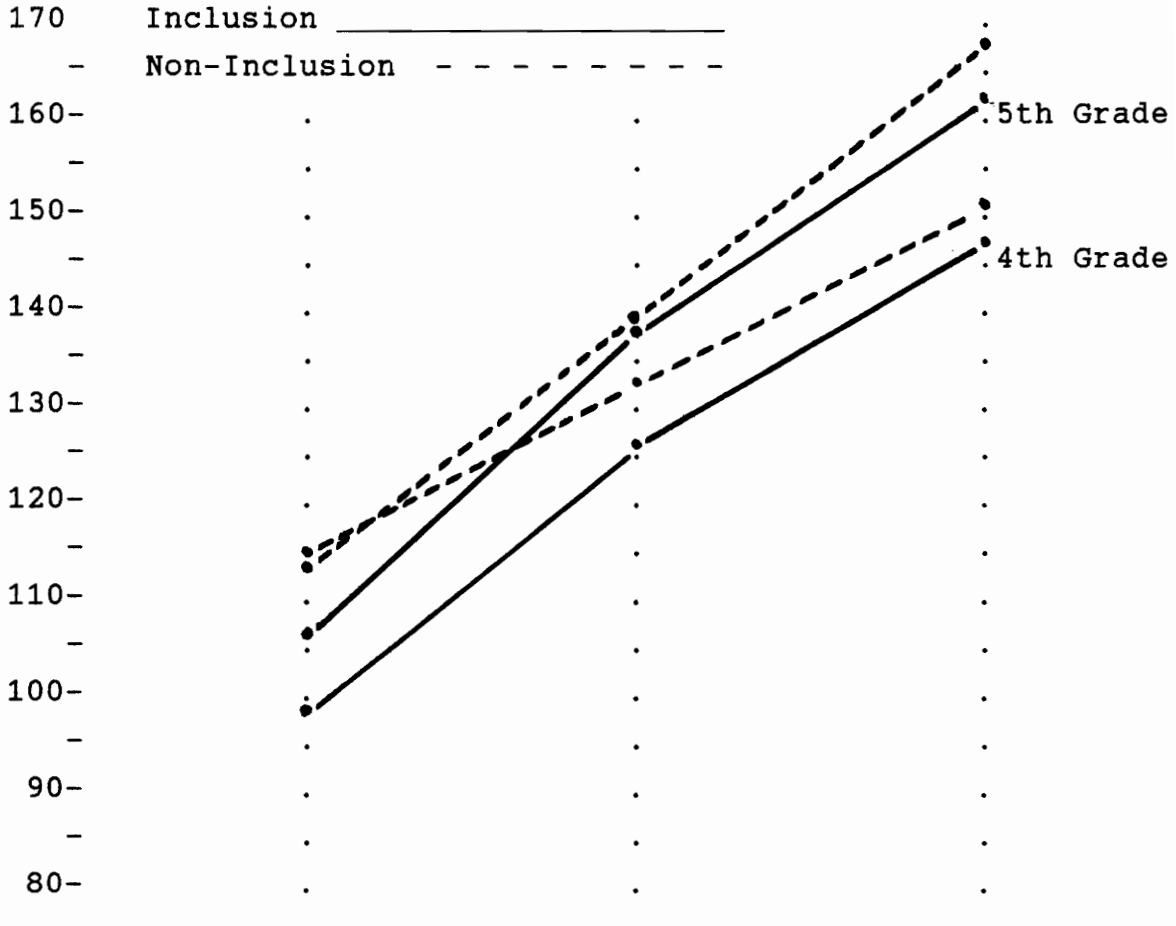

FIGURE 8

Interaction of ITBS Social Studies Mean Scores of General Education Students in Inclusion and Non-Inclusion Classes.

TABLE 26

Simple Effects on Fourth Grade ITBS Social Studies Subtest Scores at Each Achievement Level (Low, Average, and High) Using Class Type (Inclusion vs. Non-Inclusion)as the Independent Variables.

Source	SS	df	MS	F
Low-Achieving	3952.02	1	3952.02	28.12**
Average-Achieving	2315.53	1	2315.53	16.47**
High-Achieving	281.25	1	281.25	1.55
Error	100072.50	712	140.55	
Total	106621.30	715		

** $p < .01$

TABLE 27

Simple Effects on Fifth Grade ITBS Social Studies Subtest Scores at Each Achievement Level (Low, Average, and High) Using Class Type (Inclusion vs. Non-Inclusion)as the Independent Variables.

Source	SS	df	MS	F
Low-Achieving	907.20	1	907.20	6.45*
Average-Achieving	85.87	1	85.87	0.65
High-Achieving	861.13	1	861.13	6.53*
Error	100072.50	712	140.55	
Total	101926.50	715		

* $p < .05$

scored lower than those in non-inclusion classes (Mean = 167.95); $F = 6.53$, $p < .05$.

Social Studies Summary.

Low-achieving students in inclusion classes scored significantly lower than those in non-inclusion classes at both the fourth and fifth grades.

Average-achieving students in inclusion classes scored lower than their peers in non-inclusion classes at the fourth grade. However, there was no differences at the fifth grade.

There were no differences between the scores of high-achieving students in fourth grade inclusion classes and those in fourth grade non-inclusion classes. At the fifth grade, high-achievers in inclusion classes scored lower than their peers in non-inclusion classes.

Science

The results of this study suggest that when compared to similar general education students in non-inclusion classrooms, general education students in inclusion classrooms scored lower on the ITBS Science subtest.The mean score for inclusion students was 135.48 compared to 140.72 for students in non-inclusion classrooms. The mean and standard deviations for inclusion (N = 362) and non-

inclusion (N = 362) classes are shown in Table 28. The Science subtest was not given to third grade students.

To determine whether there were statistical differences in the achievement scores of students in inclusion classes and non-inclusion classes, a three-way analysis of variance (ANOVA) on the ITBS Science subtest scores was used. The ANOVA, which is presented in Table 29, revealed statistically significant interaction among class type, achievement level, and grade level (A x B x C); $F = 8.54$, $p < .01$. Graphic representation of the interaction is shown in Figure 9.

Because of significant interactions, simple effects on ITBS Science subtest scores were conducted at each grade level. The results are shown in Table 30.

Fourth Grade Results.

The results revealed significant differences between the scores of fourth grade students in inclusion classes (Mean = 129.56) and scores of students in non-inclusion classes (Mean = 135.96).

Although independent variable, achievement, for the fourth grade was significant ($p < .01$), this finding is meaningless because achievement levels were deliberately created to reflect previously existing achievement differences among students. The interaction between class type and achievement level was, however, not significant

TABLE 28

Means and Standard Deviations of ITBS Science Subtest Scores for Fourth-, (N = 320), and Fifth-Grade (N = 404) Students in Inclusion and Non-Inclusion Classes For Each Achievement Level.

	Grade Level	
	Fourth	Fifth
Inclusion Classes (N = 362)		
Low-Achieving		
Mean	109.35	114.37
SD	2.09	1.97
N	31	35
Average-Achieving		
Mean	130.44	139.77
SD	1.24	1.15
N	89	103
High-Achieving		
Mean	148.90	170.05
SD	1.84	1.46
N	40	64
Non-Inclusion Classes (N = 362)		
Low-Achieving		
Mean	120.19	117.34
SD	2.09	1.97
N	31	35
Average-Achieving		
Mean	135.73	152.50
SD	1.24	1.15
N	89	103
High-Achieving		
Mean	151.95	166.58
SD	1.84	1.84
N	40	64

TABLE 29

Analysis of Variance on ITBS Science Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion), Achievement Level (Low, Average, and High), and Grade Level (3rd and 4th Grades only) as Independent Variables.

Source	SS	df	MS	F
Class Type (A)	4028.15	1	4028.15	29.61**
Achievement (B)	153820.80	2	76910.41	565.34**
Grade Level (C)	16755.26	1	16755.26	123.16**
A x B	2786.85	2	1393.42	10.24**
A x C	197.87	1	197.87	1.45
B x C	5725.11	2	2862.56	21.04**
A x B x C	2324.70	2	1162.35	8.54**
Error	96863.01	712	136.04	
Total	314695.50	723		

** $p < .01$

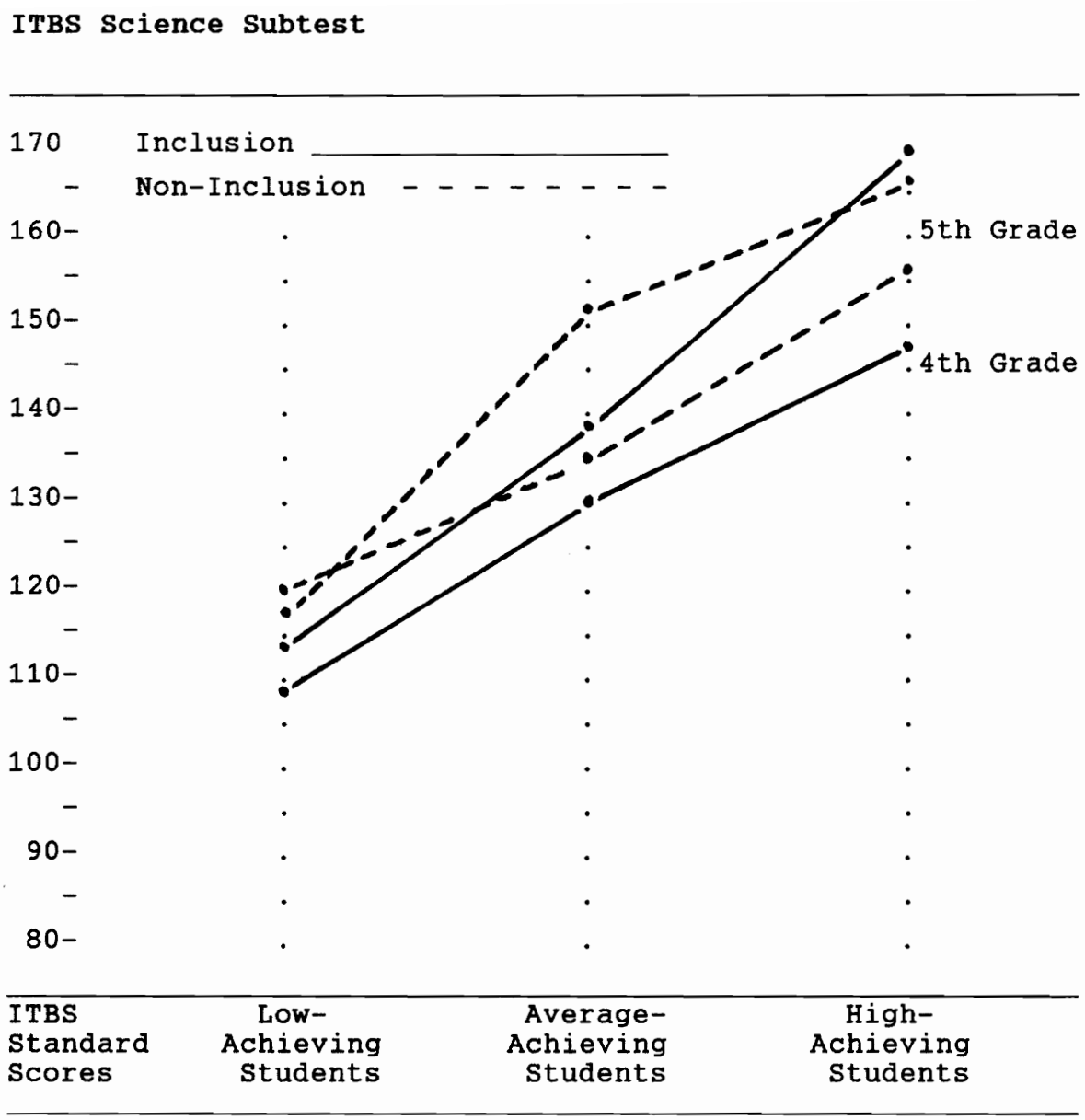

FIGURE 9

Interaction of Mean Standard Scores on the ITBS Science Subtest of General Education Students in Inclusion and Non-Inclusion Classes.

TABLE 30

Simple Effects on Fourth Grade ITBS Science Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source	SS	df	MS	F
Inclusion vs. Non-Inclusion Classes (A)	2827.51	1	2827.51	20.78**
Achievement (B)	44643.62	2	22321.81	164.08**
A x B	504.87	2	252.44	1.86
Error	96863.01	712	136.04	
Total	144839.02	717		

** $p < .01$

($p > .05$), suggesting that the findings of significant differences in Science subtest scores between fourth grade inclusion and non-inclusion classes are consistent across all achievement levels.

Fifth Grade Results.

At the fifth grade level, class type and achievement level had significant interaction ($F = 17.84$, $p < .01$), as shown in Table 31. Graphic representation of this interaction is shown in Figure 10. The follow-up of this significant interaction, as reported in Table 32, revealed that average achievers in inclusion classrooms scored lower (Mean = 152.20; $F = 61.23$, $p < .01$). No such differences were found for low- and high-achievers.

Science Summary.

On the ITBS Science subtest, low-achieving students in inclusion classrooms scored significantly lower than comparison students at the fourth grade level. However, there were no significant differences at the fifth grade level.

Average-achieving students in inclusion classrooms scored significantly lower than non-inclusion students at the fourth and fifth grade levels.

High-achieving students in inclusion classrooms scored significantly lower than non-inclusion students at the fourth grade level. There were no significant differences at the fifth grade level.

TABLE 31

Simple Effects on Fifth Grade ITBS Science Subtest Scores Using Class Type (Inclusion vs. Non-Inclusion) and Achievement Level (Low, Average, and High) as Independent Variables.

Source		SS	df	MS	F
Inclusion vs. Non-Inclusion Classes	(A)	1606.06	1	1606.06	11.81**
Achievement	(B)	128313.70	2	64156.84	471.59**
A x B		4810.17	2	2405.08	17.84**
Error		96863.01	712	136.04	
Total		231592.93	717		

** $p < .01$

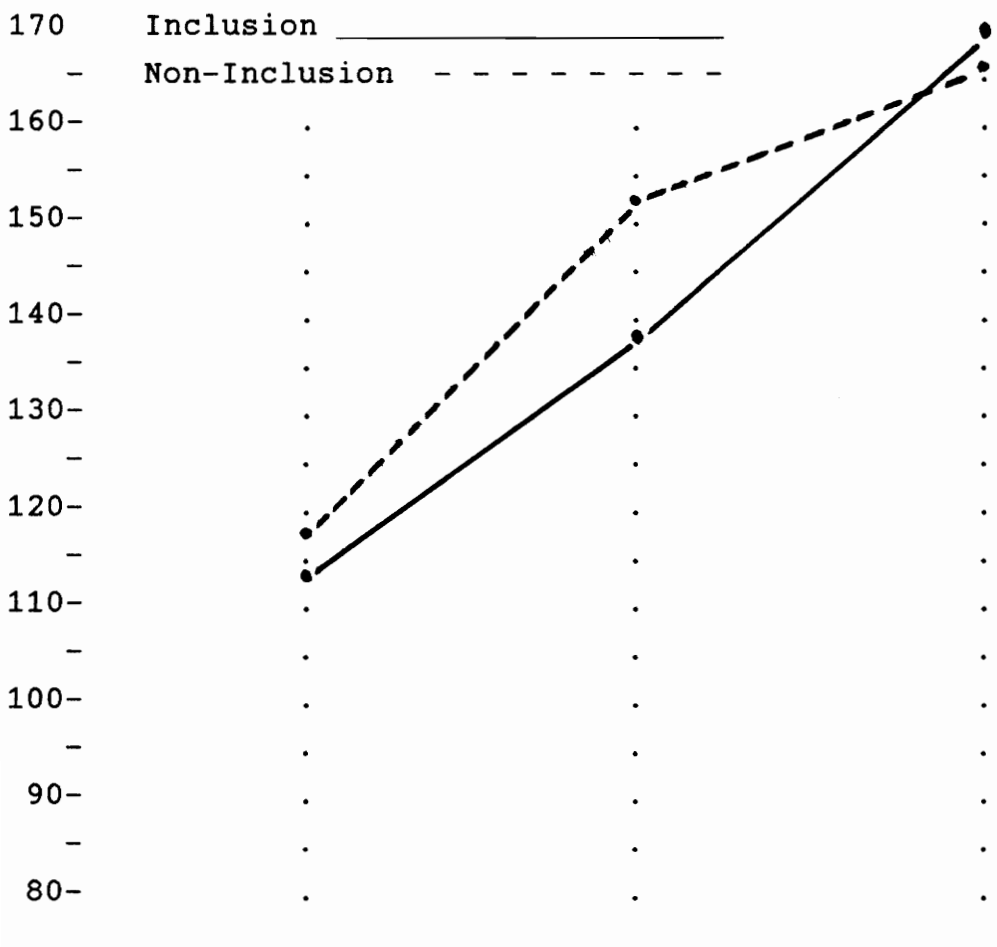

FIGURE 10

Interaction of Mean Standard Scores on the ITBS Science Subtest of Fifth Grade General Education Students in Inclusion and Non-Inclusion Classes.

TABLE 32

Follow-Up of Significant Interactions of Achievement Level (Low, Average, and High) on Science Subtest Scores for Fifth Grade Students Using Class Type (Inclusion vs. Non-Inclusion) as the Independent Variable.

Source	SS	df	MS	F
Low-Achieving	154.51	1	154.51	1.14
Average-Achieving	8330.58	1	8330.58	61.23**
High-Achieving	205.03	1	205.03	1.51
Error	96863.01	712	136.04	
Total	105553.13	715		

** $p < .01$

Chapter Summary

This study compared the scores of general education students in inclusion classes and those in non-inclusion classes. The dependent variables were six subtests of the ITBS (Vocabulary, Reading Comprehension, Spelling, Language, Social Studies, and Science). Scores were investigated at three separate achievement levels (low, average, and high), and at three different grade levels (third, fourth, and fifth). There was a total of 48 different measures investigated; 12 at the third grade level (Social Studies and Science subtests were not administered at this level); and, 18 measures each at the fourth and fifth grade level.

Low-achieving students in inclusion classes scored lower than their peers in non-inclusion classes on 12 of the 16 ITBS achievement tests investigated in this study. Average-achieving students in inclusion classes scored lower on 10 of 16 tests investigated in this study. High-achieving students scored lower on 4 of 16 tests investigated in this study.

Chapter 4 discusses the findings and conclusions of this study.

CHAPTER 4

SUMMARY, RESULTS, AND DISCUSSION

Summary

In 1986, Madeleine C. Will, who was then the Assistant Secretary for Special Education and Rehabilitative Services, U.S. Department of Education, delivered a paper that addressed the limitations of the present dual educational system, citing the need for "partnerships" between special and regular education. She suggested pooling resources and coordinating educational services for most students in regular school settings (Will, 1986). Not since Lloyd M. Dunn (1968) argued against educating "mildly handicapped" students in separate settings has such a fervor of reform rhetoric swept through the special education community. Yet despite the interest to implement inclusion models, there is little empirical evidence to support such sweeping changes. Researchers have not yet adequately investigated the impact of inclusion on the achievement outcomes of general education students.

This study has addressed the issue, comparing the academic achievement of 577 general education elementary students assigned to inclusion classrooms and the academic achievement of 577 similar general education elementary

students assigned to non-inclusion classrooms. This study used a three-way ANOVA to compare class scores on six ITBS subtests (Vocabulary, Reading Comprehension, Spelling, Language, Social Studies, and Science). The independent variable was the type of class (inclusion vs. non-inclusion). Results were investigated at three different achievement levels (low, average, and high) and at three separate grade levels (third, fourth, and fifth).

Results

The results of this study indicate that there are significant differences between scores of students in inclusion classes and of those in non-inclusion classes. The difference between the scores of low-achieving students were significantly greater than those of average-, or high-achieving students. Low-achievers in inclusion classes scored an average of 6.94 lower than their peers in non-inclusion classes. This compared to a difference of 4.95 for average-achievers and only 1.83 for high-achievers. The results of each achievement level at various grade levels are discussed below.

Low-Achieving Students.

The present findings show that low-achieving general education students in inclusion classes scored lower on the ITBS than low-achieving general education students in non-inclusion classes. The average difference across all

subtests was 6.94. The greatest difference between the two classes was 11.58 on the Social Studies subtest, while the most similar results were on the Vocabulary subtest where the difference was 4.69.

Although there was little overall difference between the scores of low-achievers in inclusion classes and of those in non-inclusion classes at the third grade level, non-inclusion scores were significantly higher on the Spelling and Language subtests. By the fourth grade, the differences had become noteworthy. Significant differences were noted on four of the six subtests, ranging from 6.80 on the Vocabulary subtest to 15.97 on Social Studies. There was no difference on the Reading Comprehension subtest. The differences at the fifth grade ranged from 2.97 on Science to 9.80 on Language. Like the fourth grade results, non-inclusion scores were significantly higher on five of the six subtests. There was no difference on the Science subtest. The discrepancies between the scores in inclusion and non-inclusion classes became more evident as academic demands increased at the higher elementary grade levels.

At the fourth grade level, direct instruction and basal-related activities were being augmented with integrated language arts and more emphasis on writing organization, content, and language usage. In addition, content subjects such as Social Studies and Science skills were measured for the first time. Both subjects

traditionally require students to not only learn significant amounts of new information, but to also apply their emerging study skills such as independent reading, organization, and note taking.

In theory, it is reasonable to expect that low-achievers should benefit from the inclusion setting because they receive additional assistance from both the general education teacher and the special education teacher. The slower pace of instruction with modified study and test materials, explicit instruction, and additional feedback and guidance made available to students with disabilities, should also benefit low-achievers in the inclusion classroom setting (Vaugh, Schumm, Niarhus, & Gordon, 1993). These findings, however, do not support the assumptions that low-achieving students benefit in inclusion classes and obtain achievement scores that are comparable to those of similar students in non-inclusion classes.

Support systems in classrooms for students identified as low-achievers appeared to have been effective at the third grade level. However, at the fourth grade level, low-achieving students in inclusion classes fell behind their peers in non-inclusion classes. Not only were low-achievers falling behind, but they were losing ground at a rate that was much higher than either the average-, or high-achievers. For example, at the fourth grade level, low-achievers scored at a rate of only 91.4% of their peers, while at the same

grade level, average-achievers scored at a rate of 96.7% of their peers, and high-achievers scored at a rate of 98.9%.

It is also possible that the relative poor performance of low-achievers may have been similar to the performance of students with disabilities in inclusion classrooms. It appears that it may have been difficult for general education teachers, even with the assistance of special education teachers in the classrooms, to effectively differentiate instruction for academically heterogeneous students such as low-achievers. Prior studies have documented the inability of general education teachers to accommodate individual differences (e.g., Baker, & Zigmond, 1990; O'Sullivan, Ysseldyke, Christenson, & Thurlow, 1990). Likewise, these implications may suggest that if similar instructional accommodations for low-achievers were not effective, similar accommodations for students with disabilities may have also been insufficient to adequately support students with disabilities in inclusion classrooms (e.g., Baker & Zigmond, 1995). Investigation of the performance of students with disabilities, however, was beyond the scope of this study.

Average-Achieving Students.

Findings further revealed that average-achieving general education students in inclusion classes also scored lower on the ITBS than average-achieving general education students in non-inclusion classes. The average difference

across all subtest was 4.95. The greatest difference between the two classes was 9.00 on the Science subtest, while the most similar result was on the Spelling subtest where the difference was 3.69.

Like low-achievers, there was little overall difference between the scores of average-achievers in inclusion classes and of those in non-inclusion classes at the third grade level, however, non-inclusion scores were significantly higher on the Spelling and Language subtests. At the fourth grade level, the differences had become more conspicuous. Average-achieving students in non-inclusion classes scored an average of 4.14 higher than those in inclusion classes. Non-inclusion scores were significantly higher on five of the six subtests. There was no difference on the Reading Comprehension subtest. The greatest difference (7.43) was on the Social Studies subtest. Average-achieving students followed a pattern of achievement that was similar to that of low-achievers. Both low- and average-achievers in inclusion classes fell behind their peers in non-inclusion classes in content-intense areas, such as social studies and science, at the time when increasing academic demands were being placed on students.

At the fifth grade level, the difference between average-achievers had increased to an overall average of 7.01. Non-inclusion students scored significantly higher than those in inclusion classes on five of the six subtests.

However, unlike the results at the fourth grade level, for both low-, and average-achievers, there was no difference on fifth grade Social Studies scores. The largest difference (12.72) was, however, on the Science subtest. This outcome is surprising because the Science subtest measures the type of skills that are similar to the Social Studies subtest. The dissimilarity between scores of tests that measure similar competencies is confounding and deserves further investigation.

The similarities between the results of low- and average-achieving students in inclusion classes is of interest because both groups performed relatively similar to their peers at the third grade level, but fell behind at a significant rate at the fourth grade level. Average-achieving third graders in inclusion classes scored at a rate of 97.9% of their peers in non-inclusion classes across all subtests of the ITBS. At the fourth grade level, the rate of achievement decreased to 96.7% of their peers, and by the fifth grade, average-achievers dropped to only 95.0% of their peers. The possible cumulative effect of continuing and widening disparities between the scores of students in inclusion and non-inclusion classes is an important concern that must be addressed by further longitudinal studies.

High-Achieving Student Results.

The results of this study suggest that high-achieving general education students in inclusion classes achieve relative similar scores on the ITBS when compared to high-achieving general education students in non-inclusion classes. The average difference across all subtests and grade levels was only 1.83. On three subtests (Vocabulary, Reading Comprehension, and Science), the difference between inclusion and non-inclusion scores was less than one point.

Although there were general similarities between high-achievers in inclusion and non-inclusion classes, there were notable differences between the two classes when grade level analysis was conducted.

At the third grade level, non-inclusion classes scored significantly higher on the Spelling subtest. The were no differences on the Vocabulary, Reading Comprehension, or Language subtest. Social Studies and Science subtests were not given in the third grade.

At the fourth grade level, there were no statistically significant differences between the scores of the two classes on four of the six subtests. Non-inclusion high-achievers did, however, score significantly higher on the Spelling and Science subtests. The differences were 4.08 and 3.05

respectfully. Fourth grade students in inclusion classes scored at a rate of 98.9% of their peers in non-inclusion classes. The average difference across all subtests was only 2.46.

At the fifth grade level, there were no differences between the two groups on four of the six subtests. Non-inclusion students scored higher on the Spelling and Social Studies subtests. Across all subtests, inclusion students actually scored slightly higher than their peers in non-inclusion classes. This is the only occasion where students in inclusion classes achieved higher scores than their counterparts. The difference was, however, not statistically significant.

Despite these results, high-achievers in inclusion classes probably learned less than any other group of students in that setting. In inclusion classes, with a wide range of student achievement and abilities, the teacher often focuses first on the group in the middle of this broad range of abilities, the average-achievers. After that, the teacher can pay attention to the group that has fallen behind, the low-achievers. Finally, the teacher may direct his or her attention to the high-achievers who have already mastered the assignment and are waiting for something useful to do with their time. So much of what high-achievers are

asked to learn they likely have already mastered. When the teacher recognizes this, high-achievers are often asked to work as teaching assistants and classroom helpers. This practice, of course, denies high-achievers of consistent opportunities to learn challenging new material. It also denies low- and average-achievers the opportunity to receive quality instruction from the teacher, the trained and competent professional.

The present results illuminate the significant function of content-specific subjects, such as Social Studies and Science, in evaluating the impact of the practice of inclusion on the accomplishment of students at all achievement levels. For example, the difference between the aggregated Social Studies and Science scores accounted for 43.9% of the overall variance across all grade levels and achievement levels. The expected variance for the two combined subtests was 25.0%. The variance at the fourth grade level was 50.8% and at the fifth grade level, it dropped to 31.4%. By achievement level, the variance was 44.4% for low-achievers, 45.0% for average achievers, and 42.7% for high-achievers. Relatively little is currently known about how content-specific instruction promotes achievement in inclusion general education classes. Future research must explore methods of

maximizing the quality of content-specific instruction for academically diverse classes.

Discussion

To date, only a limited number of studies have investigated the achievement levels of general education students in inclusion classroom settings. Most have focused instead on the achievements of students with disabilities. The Bear and Proctor (1990) study is one of the few to compare the achievement gains of students receiving both special and general education in a full-time inclusion program with the achievement gains of similar students in non-inclusion general education classrooms. The overall result of their study, which analyzed a full-time inclusion program that used the Team Approach to Mastery (TAM), was that inclusion was effective. Both groups, students receiving special education services and their general education peers, experienced greater gains than similar students in the comparison groups.

The findings of this study are not consistent with the Bear and Proctor (1990) results. Whereas Bear and Proctor (1990) reported that general education students made substantially greater academic gains in inclusion classes than similar students in non-inclusion general education classes, this study finds that students in

inclusion classes did not always achieve at the same level as comparison students. However, there are notable differences in the two studies that may account for the conflicting findings. For example, the TAM appears to be a highly structured model for inclusion, with clearly defined roles, expectations, and support, while the Montgomery County school district classes evaluated for this study did not have a clearly delineated inclusion implementation model. Such differences could account for the present contradictory results. The TAM study was also limited to the evaluation of third grade students, and included classes with only mildly disabled students, most of whom were learning disabled. In contrast, this study evaluated scores of general education students in inclusion classes that included all students with disabilities, regardless of severity, and considered the achievements of students at three different grade levels. There were no self-contained or resource programs in the elementary schools. Students with disabilities were assigned to full-time placement in general education classrooms. Disabilities ranged from mild learning disabilities that required only minor instructional interventions to severe behavioral problems that demanded intensive staff support and interventions.

In a recent study, Sharpe, York, & Knight (1994) reported no significant differences between the academic achievement of general education students in an inclusion setting compared to a similar group in a non-inclusion setting. A quasi-experimental, pretest-posttest design was used to investigate the academic achievement between the two groups. The major limitation of this study is the small number of participants. Thirty-five general education students in an inclusion setting of one elementary school were compared to 108 similar participants who were not in inclusion classrooms. Five students with moderate to severe disabilities were integrated, with special education support, into the inclusion classrooms. The five special education students were assigned to four different classrooms. The average general education class size was about 30 general education students with only one student with disabilities. One class had two students with disabilities, or a ratio of about 15 to 1. In contrast, the present study had a high concentration of students with disabilities in a limited number of general education classrooms. This placement practice, used by Montgomery County Schools at the time of this study, violated the principle of natural proportions and significantly confounded the results.

Implications.

The result of this study illustrates that achievement is a multivariate enigma, and that the pervasiveness of the present outcomes carry important implications for the general education instruction of academically heterogeneous students. Statistically significant and practically important effects of inclusion on the academic achievement of general education students suggest that decision makers should avoid rigid and uncompromising implementation of the practice. Inclusion is merely one more educational option in a cascade of programming alternatives; one that apparently works when it is used for the particular purposes for which it was designed.

As indicated in this study, general education students in inclusion classes did not perform as well as students in non-inclusion classes on most subtests. Clearly, discrepancies identified at all grade levels should be addressed by building onto existing practices. For example, restructuring classrooms with a balanced ratio of students that reflects the natural proportion of student abilities that exist in the general population of the community may facilitate achievement. The diverse needs of all students can be more effectively accommodated when there is balanced utilization of available, but limited, resources. At

the time this study was conducted, students with disabilities were assigned to a limited number of general education classrooms. For example, at one school there were two inclusion classes and four non-inclusion fifth grade classes. All students with disabilities were assigned to the two inclusion classes. The four non-inclusion classes had no students with disabilities. This created a preponderance of students with disabilities in just a few general education inclusion classes, leaving the majority of general education non-inclusion classes with no students with disabilities. In some inclusion classes, students with disabilities nearly outnumbered students without disabilities. A more balanced class would be one in which low-achieving students (both disabled and non-disabled) make up less than a third of the class population (e.g., Beckerman & Good, 1981).

These results may have significant implications for future staff development programs as well. Significant school improvement efforts, like other organizations, are often closely linked to quality staff development programs. Competent staff development, when related to student achievement, can have a profound impact on the attitudes and instructional practices in elementary schools. These pre-service and in-service programs can, for example,

provide decision makers and educators with additional skills that facilitate the effective educate of students with diverse needs. Staff development programs can assist in:
(1) developing competencies in managing classrooms to maximize instructional time for students; (2) solving instructional and behavioral problems; (3) developing strategies for appropriately delivering special education and related services designed to meet the unique needs of students with disabilities within general education classes; (4) providing appropriate instructional and learning opportunities for students of different achievement levels with heterogeneous instructional and curricular needs; and, (5) consistently monitoring the progress of students and adjusting instruction based on the results of the monitoring.

While the focus of inclusion education is often on appropriate education of students with disabilities, the educational needs of general education students must not be overlooked. The consequences of not meeting the educational needs of all students are illustrated in the results of this study. There are many educators and parents who believe that all students can be appropriately educated in general education inclusion classes. Others, however, believe

that, without challenge and stimulation, general education students, especially higher-achieving students, may accomplish less than optimal levels of performance and capability (e.g., Roberts, Ingram, & Harris, 1992).

The results of this study add credence to the need for further investigation of classroom practices that will benefit students at all ability levels.

Limitations.

Although this study offers descriptive information about the practice of inclusion, several limitations are noted. In the school district where this study was conducted, between-class ability grouping was used for math instruction. This practice caused students from inclusion and non-inclusion classes to be grouped together. Consequently, the present analysis was limited to the six ITBS subtests measuring reading and language arts skills. This study offers little explanation on what factors, besides setting, have contributed to the results. It is essential, therefore, to examine a variety of classroom factors that may contribute to such variability. Many questions remain regarding the proper mix of student characteristics, teacher behaviors and attitudes, and program models that would lead to optimal achievement levels.

Analyses were based on scores from the six ITBS subtests, administered near the end of the school year, after each group of students had settled into the inclusion or non-inclusion classes. The group comparisons were based on these posttest scores and presumed group equivalence at the outset.

Students were not randomly assigned to the two comparison groups. A stratified sampling of scores were selected from students who had already been assigned to intact classrooms. Class memberships were formed by building principals prior to the beginning of the school year. The researcher had no control over assignment of students to specific classes. From these intact classes, student scores were selected. For example, for each general education student in inclusion classes, a similar non-inclusion general education student in the same achievement level, same grade level, and from the same school was randomly selected. Classroom assignments were made by the principals prior to the beginning of this study.

Slavin (1986) noted that elements of classroom organization are "multiplicatively" related to student achievement. This study does little to increase our understanding of the process of grouping students, of making instructional modifications and of designing

individualized support for diverse students in general education classes.

Future Research.

Despite acknowledgment that research on the relative efficacy of inclusion is scarce, methodologically flawed, and inconclusive, advocates continue to promote the practice of inclusion for the education of all students (e.g., Zigmond, Jenkins, Fuchs, Deno, Fuchs, Baker, Jenkins, & Couthiono, 1995). However, more research is needed to study the impact of inclusion on the achievement levels of general education students. Few studies to date have addressed this issue, and there are still many questions concerning academic achievement in the inclusion setting. For example, at what point are there too many special education students in an inclusion class? How can teachers meet the individual needs of all students when the needs of students in an inclusion class are so diverse? How are high-achievers challenged in this setting? These are just a few of the important issues to be resolved.

The literature search conducted as background for this study revealed a dearth of information about inclusion programs and their effects upon academic achievement. Educators need more information about inclusion as it affects the academic growth of both general and special education students in a variety of conditions; inclusion model used, type of special education students included,

size of classes, and type of teaching strategies employed. More research into how inclusion impacts males and females is also needed.

A series of experimental or quasi-experimental studies comparing academic outcomes in inclusion classes are needed. Such investigations should not only examine achievement but also address such administrative issues as staff development and training, implementation problems, and cost factors.

This study does not endeavor to evaluate the myriad factors that contribute to a student's overall academic achievement. However, the evidence generated in this study clearly illustrates that not all general education students in inclusion classes achieved as well on the ITBS achievement tests as general education students in non-inclusion classes. If achievement discrepancies are to be addressed, fundamental changes in student grouping in inclusion classes must be investigated. Cooperative or cluster groupings in heterogeneous classes are only two examples to consider. Because of the lack of longitudinal studies, long-term impact on achievement is unknown. It is possible that the effects of inclusion may accrue gradually over the length of a student's school career.

Until there is considerably more reliable evidence to the contrary, the most reasonable and ethical approach to the delivery of special education services should allow for a variety of instructional options for all students, but

especially for students with disabilities. Placement decisions must be based on the student's IEP in which appropriate educational and supportive services are delineated.

One of the features of IDEA is the concept of educating students with disabilities along with their non-disabled peers. The IDEA regulations provide for a "continuum of alternate placements" (IDEA Regs. 45 C.F.R. Sec. 300.551). Within most school districts a "cascade system" of placement alternatives has been developed. Placement in the general education classroom is considered the least restrictive placement, and the ideal goal (Rothstein, 1990). The guiding principle of least restrictive environment is to place the student in a setting that is the least restrictive placement appropriate to the special education student's needs, and that does not cause undue disruption to other students (IDEA Regs. 45 C.F.R. Sec. 300.551 and 300.552).

At present, there are only a few studies examining the academic impact of "inclusion" on general education students (e.g., Bear & Proctor, 1990; Sharp, et al.,1994; Wang, et al., 1984). Although these studies provide important descriptive information, they do not answer the question of whether the effects of inclusion on the academic achievement of general education students is positive. This kind of information can be provided only through experiments that compare academic achievement in inclusion and non-inclusion

classes, in which teachers and students are randomly assigned to treatments.

Every school district makes decisions on how to provide special education services to students with disabilities, and such decisions should be based on reliable evidence. We have much to learn about the practice of inclusion, but the potential for effective grouping practices that facilitate meaningful improvement in the achievement of all elementary students is promising, and certainly worthy of further study.

Conclusion.

The difficulty in interpreting a study of a complex program, like inclusion, is that any number of factors could account for program effect. However, based on present results and repeated observations during the year in which this study took place, this writer saw very little differentiated instruction that was uniquely designed to enrich or accelerate. There was also little evidence of specific, directed, individualized, and intensive instruction for students who were struggling with school.

It has been said that high-achievers will learn in spite of their teachers or program design. The same cannot, however, be said for students who struggle. As educators, we need to differentiate curricular and instructional techniques to meet the needs of each student. Its not

physical placement of students that really matters, its differentiated instruction for each student that counts.

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B.A.	University of North Carolina at Wilmington, N.C. Major--Psychology President of Psychology Club
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PROFESSIONAL EXPERIENCE

SPECIAL EDUCATION TEACHER: Montgomery County Public Schools, Christiansburg, Virginia. Special education teacher of students identified with learning difficulties. Duties include the development, implementation, and evaluation of individualized educational plans; coordinating such programs with the parents and the school personnel; and consulting with general education teachers regarding the academic and social development of these students. (1987-present)

COORDINATOR: Counseling & Life Skills Center, Mental Health Services of Roanoke Valley, Roanoke, Virginia. Supervised administrative and clinical services of community-based, out-patient center. Served as Community Discharge Planning Coordinator for state operated training facilities. Provided individual and program consultation for community residential programs, vocational training programs, primary

service providers, and volunteer staff. Conducted community education and training seminars, as well as staff development workshops. (1980-1984)

Mental Retardation Program Director: Blue Ridge Community Mental Health Center, Asheville, North Carolina. Developed and coordinated clinical and supportive services for mentally retarded clients and their families; provided program consultation and staff development seminars; and monitored contracted training programs to insure compliance with federal and state regulations. (1975-1980)

Special Education Coordinator: The Caswell Center, Kinston, North Carolina. Promoted to position from teacher of adolescents identified as emotionally disturbed and mentally retarded. Coordinated specialized instructional program for regional residential training facility serving 1,500 residents. Provided technical assistance for program staff in the development and evaluation of individualized educational and behavioral programs. Interviewed, selected, supervised, and evaluated special education teachers and support staff. Served on the Center's Management Team. (1973-1975)

PROFESSIONAL CREDENTIALS

Virginia Postgraduate Professional Certificate with endorsements in:

Elementary Principal

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PROFESSIONAL AFFILIATIONS

* National Education Association
* Council for Exceptional Children
* Board of Directors, North Carolina Association for Retarded Citizens, Raleigh, NC (1979-1980)
* Board of Directors, Chair, Planning Committee, Buncombe County Association for Retarded Citizens, Asheville, NC (1975-1980)
* Board of Directors, Chair, Buncombe County Group Homes, Inc., Asheville, NC (1976-1978)
* Board of Directors, Treasurer, North Carolina Association for Community Living for Developmentally Disabled, Inc., Chapel Hill, NC (1978-1979)
* Advisory Board, Western Carolina Center, Morganton, NC (1976-1978)
* Special Education Advisory Council, Roanoke VA City Schools (1981-1983)
* Special Education Advisory Council, Roanoke VA County Schools (1981-1982)
* Prescription Team, Roanoke VA County Department of Social Services (1981-1983)
* Prescription Team, Roanoke VA City Welfare Department (1982-1983)
* Professional Advisory Committee, Tinker Mountain Workshop, Troutville, VA (1983)
* Planning Advisory Council, Fifth Planning District Employment Training Consortium, Roanoke, VA (1982-1983)

WALTER V. DENNING, JR.

SPECIAL PROJECTS

* Virginia Department of Education Special Education Standards Study Project (1992)

* Regional Facilities Planning Committee, Virginia Department of Mental Health, Mental Retardation, and Substance Abuse, Harrisonburg, VA (1982)

* Committee to develop state standards for adult developmental programs, North Carolina State Department of Mental Health, Raleigh, NC (1978-1979)

* Consultant, Asheville Public Schools, Asheville, NC (1979-1980)

* Developed community residential program for adults identified as developmentally disabled--Funded by HUD Asheville, N C (1978)

* Developed Respite Care Program for Association for Retarded Citizens (1977)

* Developed a proposal for the development of a multi-media resource training facility at The Caswell Center--Accepted and funded by NC State Grant (1974)