

THE EFFECTIVENESS OF A TRANSITION PROGRAM  
ON ACADEMIC ACHIEVEMENT OF FOURTH GRADE STUDENTS

by

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(Under the direction of Jo Blasé)

ABSTRACT

This study was designed to investigate the impact of merging factors associated with student productivity on fourth grade students' academic achievement in reading and mathematics. The study sought to determine if students achieved higher achievement scores when placed in homogeneous, small class size groups. Additionally, the classroom teacher received specialized training in differentiating instruction for students who have difficulty obtaining basic skills. Data in this study were collected from a southeastern suburban elementary school that had 207 students enrolled in fourth grade. Fifty-one of these students were identified for this study.

The findings indicated no significant difference in reading achievement at the .05 level of significance. Significance did exist in mathematics suggested students may be better served in heterogeneously grouped classes for math instruction.

Based on conclusions of this study, it is recommended further research be conducted in the area of student productivity, specifically assessing merging factors associated with student learning. Larger samples should be used and should include data from various school levels and should include historical data.

INDEX WORDS: Student Productivity, Homogeneous grouping, Heterogeneous grouping, Student Achievement, Transition Program, Ability Grouping

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## CHAPTER I

### INTRODUCTION

Throughout the history of formal education, improving students' ability to function as active learners who assume responsibility for the acquisition of knowledge and skills ...has been prominently and consistently identified as a major objective of schooling. (Wang, 1993, p. 607)

Many educators are frustrated with the lack of conclusive evidence as to the most effective method(s) for addressing student learning needs as individuals with a diversity of learning needs and characteristics are taught. Factors affecting student achievement have been researched and debated for many years as educators continue to seek the most effective teaching and learning strategies to implement in the classroom. The difficulty in making direct cause-and-effect interpretations of the numerous factors associated with student learning is suggestive of the need for further investigation. Providing children with effective opportunities to learn is one of multiple organizational goals and should be carefully analyzed to ensure success (Townsend, 1994).

Our local school administrative team focused on ways to improve learning and achievement for students. As classroom innovations were sought to aid in improving student achievement and performance, it was the responsibility of local school administrators to evaluate the effectiveness of instructional methods and programs as they related to the improvement of student achievement. It was important for school administrators to understand the scope of problems related to learning and to address them through providing effective programs. It was important to directly analyze programs and to equip teachers to self-evaluate and review the effectiveness of teaching practices. Bossert (1988) declared, "public demand for improving

student achievement is making school administrators more accountable for the ‘products’ of schools” (p. 341). Glickman (1993) declared it would be irresponsible for a school to initiate and implement a program without determining whether the program provided success to students.

Chall (2000) noted that in discussing the merits of new programs, success is rarely related to improving students’ academic success. Programs were typically related to the degree students and teachers liked the programs. To determine the effects of educational initiatives, programs should be measured as to whether contributions are made to improve student learning. Importance should be placed on identifying specific factors contributing to program success. Walberg and Haertel (1997) noted that programs should be analyzed to provide information for effective decision making. Data collected should be specific to the school and classroom learning environments and should provide outcomes by informing about student achievement. Information such as classroom performance, achievement test scores, and information related to effective instructional services could better inform decision-makers who determine the allocation of funds.

In 1986, Edmonds articulated five correlates which he believed strongly impact student achievement. The correlates suggest there must be strong leadership from school administrators, there must be a high level of expectation in improving student achievement, classrooms must be orderly and conducive to learning, there must be an emphasis on the acquisition of basic skills, and student achievement should be frequently monitored.

These became the framework by which educators and researchers began to think about effective schools and programs. This study helped to ensure these correlates were used to establish expectations for student success and monitor the extent to which the success happened.

### Statement of the Problem

The purpose of this study was to evaluate the effectiveness of student placement in a transition class as measured by the academic achievement of students who experienced difficulty mastering basic skills. More specifically, this research sought to determine whether a statistically significant difference existed in language arts and mathematics achievement means for low performing fourth graders placed in a transition class as compared to students not placed in a transition class.

### Research Question

What would be the effect on student achievement if students are placed in a transition class whereby the student/teacher ratio is reduced, the students are homogeneously grouped, and the classroom teacher receives specialized training in differentiating instruction for low-performing students?

### Significance of the Study

In a continued effort to improve student achievement, a decision was made in a Georgia suburban elementary school to implement a program whereby one classroom would be reduced in class size, homogeneously grouped, and would more strongly focus on assisting students in attaining basic skills. The population of the fourth grade class included 207 students. Of the 207 students, 51 were identified by the students' previous teacher and the students' parents as having great difficulty mastering basic skills. The parents of the 51 students were given an option of the child being placed in the transition class or in a regular-non-transition class. There were 17 students ultimately placed in the transition class for their fourth grade school year. The transition teacher implemented strategies learned during staff development classes aimed at improving skills in differentiating instruction for students who exhibited difficulty learning basic skills.

There was also an intense focus to provide students with one-on-one assistance, small group instruction, manipulative use, and intense work with an intervention teacher using different learning strategies to improve learning. The students in the class were identified using various factors (previous work habits, standardized test scores, and class-work grades). The students were identified with greater need for academic support as compared to other students as they worked to attain basic skills. The classroom setting where the students were placed was assessed to evaluate whether student achievement increased when placed in this learning environment.

Although a cost analysis was not conducted specifically for this study, consideration was given to this factor to ensure school funds were being allocated wisely. The transition class affected the remaining classrooms as student numbers were larger in the non-transition classes. Additionally, an intervention teacher trained in differentiating instructional techniques spent time assisting in the transition class. This study provides grounds for recommending other grade levels and/or schools implement this type of program. The study also expands the body of knowledge regarding the effects on improving student achievement when the three components (student grouping, reduced class size, and improved instructional strategies) are implemented simultaneously and adds value to the body of research on student productivity.

#### Limitations

1. It cannot be assured the students groups were equivalent at the beginning of the study as there was no pretest data.
2. The research was limited to a small, convenience sample of fifty-one students limiting its generalizability..
3. The limited number of teachers in the research sample may not have been large enough to represent differences in teachers' skills and methods of teaching.

4. The study was limited to an elementary school limiting the generalizability to middle and high schools.
5. Data were collected for a one-year period only.
6. Academic achievement was the sole outcome measured.

#### Definition of Terms

For the purpose of this study, the following terms were identified:

1. Control Group: The group of students who received no treatment. The measure of student achievement of students who received regular education instruction was compared with those who received instruction in the transition class.
2. Experimental Group: The group of students who received instruction in the reduced class size, homogeneously grouped setting. Students received additional support in the acquisition of basic skills.
3. Transition Class: A fourth grade class with a reduced class size and homogeneously grouped student population. Students in this class were specifically selected as previous performance has indicated they had additional need for instructional support to acquire basic knowledge and skills. The transition classroom teacher and the intervention teacher participated in staff development to learn additional strategies for differentiating instruction.

#### Organization of the Remainder of the Study

Chapter II presents a detailed overview of literature related to class size reduction, homogeneous grouping of students, as well as student productivity, or aspects of the students' life which could affect learning. Chapter III also includes a description of the research design, sampling procedures, data collection procedures, statistical analysis method, and the null

hypothesis. Chapter IV examines the data and findings. In Chapter V, the summary, conclusion, discussion, and recommendations for further research are suggested.



## CHAPTER II

### REVIEW OF RELATED LITERATURE

This review examines several aspects for consideration as student placement for at-risk students was explored. Topics include ability grouping of students, reduced class size models of grouping, and student productivity. Student performance has been the subject of numerous studies conducted over the years and has tested the belief student achievement would improve if the range of ability levels were identified and addressed specific to the need of the student. Various aspects of student learning have been analyzed, ranging from factors of grouping patterns used for instruction, effective sizes for classes in which to group students for learning, and productivity.

#### Ability Grouping

There are many types of ability grouping used today; tracking, inclusion, homogeneous and heterogeneous, and within-class groupings. All of these strategies sort students into different learning environments based upon evidence or assumptions about student academic performance (Harding, 1994). Grouping students is a process used to reduce the heterogeneity of students grouped for instruction. Selection for grouping students could be based on ability levels, performance levels, gender, or any number of variables. Slavin (1986) theorized if a grouping plan is to work, it must satisfy at least three criteria: (1) the grouping plan must measurably reduce the student heterogeneity in the specific skill being taught; (2) the plan must be flexible enough to allow teachers to respond to mis-assignments and change in student performance level after initial placement; and (3) teachers must actually vary their pace and level of instruction to correspond to students' levels of readiness and learning rate.

Slavin (1993) identified key advantages for consideration when ability grouping. The advantages include:

- (1) permitting students to make progress commensurate with their abilities;
- (2) make possible an adaptation of technique of instruction to the needs of the group;
- (3) students who work at a lower pace need the presence of the more able students to stimulate and encourage them;
- (4) teachers do not have time to differentiate the work for many different levels of ability.

Methods used for grouping students for instructional purposes have been studied and present contrasting findings. Wheelock (1995) reported during a study he conducted that 60 percent of elementary schools used some type of ability grouping. Homogeneous grouping was one standard strategy used during the 1960s and 1970s (Tjosvold & Santamaria, 1978). During the 1980s, research emerged which was critical of homogeneous, or ability grouping (Johnson, Johnson, & Holubec, 1986). Research presented during the 1990s indicated positive qualities exist for homogeneous grouping (Baron, 1997; Gamoran, 1993; King, 1993; Mason & Good, 1993). Groups formed on the basis of a student's academic ability are often called homogeneous groups.

A study conducted in 1990 by Slavin on cooperative learning theory and research reported findings which indicated positive results when students were grouped based on ability level in the subject areas of language arts and math. By using methods to regroup entire grade levels into ability groups, status differences and tracking were reduced. When ability grouping was used there was opportunity to provide more challenging instruction in a more active learning environment.

In a study performed by Hooper (1992), the effects of ability grouping on achievement, instructional efficiency, and discourse during computer-based math instruction were investigated. The sample included 115 fifth and sixth graders from a suburban, predominantly white middle class school. The students were classified as high or average ability according to their performance on a standardized test (The California Achievement Test). The students were randomly assigned to heterogeneous or homogeneous dyads, according to ability level. Two data analyses were completed which looked at group and individual performance; inter-group performance was compared as well. In the analysis of group versus individual performance, a 2 X 2 factorial design was used. To compare the inter-group performance a 2 X 2 ( X 4 ) mixed-effects factorial design was used. The greatest achievement gains were made for average students. High-ability students also benefited, but not to the same degree. The results support studies reporting the effectiveness of learning in small groups as opposed to working alone. This study suggested greater mental effort is invested in completing a task (e.g. explaining methods or processes for completing a task) while working in a small group. This type of active learning could assist the student in processing content more in-depth.

Hoeffler conducted a study in 1992 investigating the effects of ability grouping for students placed in science and mathematics classes. The students' progress was monitored from seventh grade through ninth grade. The class placement for these students was made according to ability level with control features in place to adjust for varying social background and achievement levels. The results from the study indicated there were no significant effects on the high-ability group. When analyzing achievement data, findings did show negative affects for students of average or low ability.

In 1993, King studied the effects of thought processes of third grade math students in heterogeneously grouped math classes. The students identified as high achievers expressed feelings of frustration at the amount of time spent aiding other members of their group who were not high achieving students. The assistance provided to others prevented them from completing their own work according to their personal standards and usual time frame. The low achieving students, however, did feel as though they were making a positive contribution to the group and gained an increased level of self-esteem.

Mason and Good (1993) completed a study comparing math achievement of 1,736 fourth, fifth, and sixth grade students. The students were assigned to groups according to their ability within a one classroom, one teacher design in a within-class ability group for learning. The remaining students were grouped so each teacher was assigned an entire class of students with similar ability levels. Enrichment and remediation practices were provided daily in both settings. The teachers who instructed students assigned to the same ability level within one class, whether it be high, average, or low achieving, reported their quality of instruction was higher than those who had varying abilities within one class. Teachers reported having more time to instruct and more time to assess the students' learning than did their counterparts. Student achievement scores were higher in the classes where students were grouped with similar ability levels.

Williams conducted a study in 1993, the purpose of which was to investigate whether students placed in a Remedial Education Program (REP) attained higher gain scores in reading and math when placed in an alternate mixed model which was heterogeneously or homogeneously grouped. Questionnaires were sent to 2009 Georgia elementary schools to provide data regarding the delivery model and student results of participation in the REP program. Data were analyzed from the 160 elementary schools from which completed responses

were received. A chi-square analysis was applied to the mathematics and reading gain scores. The level of significance for the null hypothesis was an alpha level of .05. The null hypothesis to determine if there was a significant difference in reading gain scores between REP students who received educational services in the alternate mixed model of delivery and those who received services in the all REP model was retained. The second null hypothesis to determine the mathematics gain was rejected. Data were also sent to the researcher regarding opinions about the effectiveness of both grouping patterns. The majority of the responses were in support of mixed ability groups, although some responded this was primarily due to central office philosophies and policies.

Carter and Jones (1994) conducted a study of 30 students from fifth-grade elementary science classes in South Carolina. The results indicated that low-ability students have significantly greater achievement when paired with high ability students. No evidence was discovered of a decrease in achievement for high-ability students when paired with low ability students. The group of students, which included all low ability students, exhibited more off-task and disturbing behaviors. The researchers indicated when students were heterogeneously grouped; the high achieving students appeared to assume the role of peer tutors.

Data collected by Fuligni, Eccles, and Barber (1995) were a part of a longitudinal study of adolescent development and the effects of ability grouping on children's development. The study was a part of a large-scale study of the Michigan Study of Adolescent Life Transitions.

The study examined the long-term correlates of being placed in an ability grouped mathematics class upon entry into junior high school. The study consisted of 1,139 students who attended school in six, predominantly white, lower middle to middle income school districts in southeastern Michigan. Data were collected on the students during the 6<sup>th</sup>, 7<sup>th</sup>, and 10<sup>th</sup> grades.

The two primary predictors used were ability level and ability grouping. Analyses of variance were conducted to measure the interactive effects of ability grouping X ability level. The interaction was determined by comparing regression slopes of ability level within each ability group.

Contrasts of ability groups were conducted within each ability level category. The means of ability levels were broken down into different categories due to school variations in ability level. Results from the study indicated the main effects of ability level significantly affected student's performance. The analysis indicated the long-term impact depends upon both the students' ability levels and the ability level into which they were placed. In terms of ability level, there were no long-term positive effects for low-ability students placed in a low-ability mathematics classroom as compared to low-ability students placed in a non-grouped classroom. For medium and high-ability students grouped placements were generally related to more positive outcomes. The results also showed placement at a level higher than one's ability resulted in positive outcomes for low and medium-ability students.

Even when controlling for performance and ability, students in grouped math classes scored higher on the 10<sup>th</sup> grade math assessment if their ability level was medium or high. Students with low-ability scored higher when placed with medium-ability students, as did medium-ability students placed in a high-ability class. The effect size of ability grouping in this study accounted for two percent or less of the variance of the sample. Some of the differences in the study could be a result of within-school effects (achievement levels), as well as instructor quality, class selection, and peer group association.

In 1995, Watson and Marshall performed a study which assessed achievement and attitude of students placed in either a homogeneous or heterogeneous college freshman science

class. Reported findings claimed the academic assessment indicated no significant difference in posttest scores between the two groups. When assessing student perception of learning, the heterogeneous groups had a lower perception of their learning than did their peers who were grouped homogeneously. The study results did not support the effectiveness of homogeneous grouping for improving overall academic achievement.

A meta-analysis completed by Lou et al. (1996) investigated how student achievement was influenced by heterogeneous or homogeneous grouping. Of the 20 studies analyzed, students who were placed in homogeneous groups scored significantly higher on achievement tests than those placed in heterogeneous classes. Lou et al concluded to help maximize instruction students should be placed in classes by ability level and further broken into cooperative learning groups depending upon task and skill level.

In an analysis performed by Rees, Argys, and Brewer (1996) on the use of ability grouping across the United States, data were collected from the *National Educational Longitudinal Study of 1988*. In the findings, students in grades seven through ten were predominantly placed in homogeneously grouped classes, particularly for science and math. In the analysis of the make-up of students in the low ability classes there was a disproportionately high number of African American, Hispanic, and students from low socioeconomic backgrounds. The researchers cautioned that students placed in low ability groups may have difficulty performing beyond a minimal level of expectation.

Baron (1997) explored the effects of microcomputer learning with different ability groupings. The sample consisted of 276 fifth and sixth grade students from four middle-income Montreal schools. Students were randomly assigned to a low, middle, or high ability group as a result of achievement scores on microcomputer learning. The design was a 2 (grade) X 2

(training) X 2 (group composition) X 2 (ability level) between-subjects analysis of variance. Results showed a significant effect for the high ability level students. The heterogeneous groups scored significantly higher than homogeneous groups in grade five. Grade six students showed no statistical difference. The analysis provided evidence that low-ability students perform better in heterogeneous groups on achievement measures, whereas high ability students in homogeneous groups perform better. Baron suggested students should be grouped heterogeneously or homogeneously according to the nature of the difficulty of the tasks being completed.

In 1999, Alexander-Sawyer conducted a study to determine the effects of using heterogeneous and homogeneous grouping to teach reading in fifth grade classrooms. The non-randomized sample consisted of 59 fifth-graders from a public suburban southeastern elementary school. The students were mostly from middle to upper-middle class families. In the control group, the students were placed into subgroups (high, average, or low) based upon their performance on the Iowa Test of Basic Skills test given the previous year. The experimental group was taught heterogeneously with mixed ability grouping patterns. All students were taught the same curriculum; however the pacing varied based upon the needs of the students. A two-tailed t test at an alpha level of .05 was used to determine significance. The group of 59 students were administered a thematic skills test. After comparing the mean scores of the skills test, the null hypothesis, there is no significant difference in reading achievement for fifth graders placed in heterogeneous groups, was accepted.

In 1999, Safarriyeh studied 53 students from a suburban area of a major southeastern city. The students were grouped in either a homogeneous or heterogeneous science class for instruction by the principal and the fifth grade teachers. At the end of the period of study student



performance was analyzed by applying a t-test to the results of a standardized science assessment. The results showed no significant difference between students placed in homogeneous or heterogeneous classes.

The research findings supporting ability grouping as an effective method are inconclusive and vary from study to study. Achievement level does appear to most likely increase when peers of high ability are placed together. Some of the variations in research findings could also be a result of instructor quality, peer associations, and time devoted to on-task behaviors. Some of these factors, which may affect student learning, are reviewed later in this chapter.

Some researchers' findings show ability grouping may have a negative affect on students' perceptions of their own cognitive abilities and on their development of leadership skills and a belief the students would not have adequate role models for the acquisition of skills. Others believe the opposite to be true. Proponents of ability grouping believe one of the important benefits of ability grouping is that students will take on leadership roles and will develop and heighten these skills. This often does not occur in a traditional classroom.

In this study, student grouping was manipulated to maximize learning potential of students. As well, additional resources were made available that many traditional classes would not have. It was proposed the amount of time students were engaged in learning activities would increase due to the similarity of needs of other students. Many learning activities did not include a wide variety of performance levels as was present in classes with more diversity in learning needs.

### Reduced Class Size

Discussions about the importance of class size originated during the 17<sup>th</sup> century when Cominius and Locke expressed differing opinions regarding the subject (Ryan & Greenfield,

1975). Research pertaining to the topic of appropriate and effective class sizes began in the early 1900s with a study completed by Rice which aimed at applying efficiency models borrowed from private industry. Focus then shifted to how class size affected individual student achievement. Researchers began using newly developed tests to measure achievement and intelligence in their research designs (Mitchell, 1989). Attention later shifted to measuring increasing class size to accommodate rising enrollment during World War II. The 1960s brought about an emphasis on documenting benefits of small group instruction and benefits of this grouping for disadvantaged students (Mitchell & Beach, 1990).

Because of differing goals and perspectives, people involved in the class size debate often have had conflicting interests (Achilles, Finn, & Bain, 1997). Confusion sometimes exists over the terms “class size” and “pupil teacher ratio”. Pupil teacher ratio often leads one to believe class sizes are smaller than actually exists. When calculating pupil teacher ratios, the number of students in the school is divided by the number of certified teachers in the school, which will often include support personnel for programs such as art, music, physical education, etc. This does not mean each of those teachers has a homeroom of students to teach. There has been an unfortunate history of inconclusiveness, which has failed to provide answers needed for guiding policy decisions (Blatchford & Mortimore, 1994).

The number of students in a classroom considered “large” and “small” has changed over time and is relative to grade level and subject matter. The goals of optimizing learning and economic efficiency of programs have been considered for years.

Many factors influence student learning, such as student ability, student interest, family characteristics, etc. It is important, however, to determine how class size contributes to learning (Mitchell, 1989).

In Indiana from 1981-1983, a study was conducted called PRIME TIME. During the study, additional funding was allocated to reduce the student/teacher ratio to 18:1 in 24 kindergarten, first, and second grade classrooms. The schools chosen were located in rural areas, cities, and small towns. The study sought to determine if the students in the reduced classes would attain higher achievement scores and master more skills. When mean scores of the PRIME TIME group were compared to the scores from the larger classes there were significant gains in the small classes. Data collected indicated smaller class size increased individual attention teachers gave to students (McGiverin, Gilman, & Tillitski, 1989).

In a 1979 meta-analysis completed by Glass, Cahen, Smith, and Filby on the effects of class size on student achievement, findings showed students achieved at higher levels if taught in a small class for over 100 hours. An average student, in a class size of 40, would score at the 50<sup>th</sup> percentile on an achievement test. A like student taught the same 100 hours in a class of 20 would score at the 60<sup>th</sup> percentile. When class size is reduced below 20 more dramatic results occur. A student in a group of 5 would, on average, score in the 80<sup>th</sup> percentile. The average gain continues as the group size reduces. Individual tutoring provides the most effective results with higher gains in achievement.

In 1984, Project STAR (Student-Teacher Academic Ratio) was conducted by the Tennessee State Legislator as a result of a comprehensive education reform called the Better Schools Program. The focus of the study was to consider the effects of class size on students in the primary (K-3 ) grades. A consortium of professionals worked to plan the design and research, analyze the data, and prepare reports for the State Board of Education and the legislature (Word, 1990). The four-year longitudinal study began with the 1985 kindergarten class and followed the students through third grade. All Tennessee schools were invited to

participate representing inner city, suburban, urban, and rural schools. Random assignments of teachers and students to different class conditions were made. However, students placed in a small class in kindergarten remained in the small class for grades one, two, and three to assist the measurement of cumulative effects.

The purpose of the study was to investigate the effect of class size on reading achievement and to correlate the effect of class size as related to gender, race, socioeconomic status, geographic location, and student attendance rates. At the end of the first grade, STAR students in reduced classes were outperforming others on the Basic Skills First Test by a substantial margin. At the end of grade three, results of the study showed students in the reduced classes scored higher on the Stanford Achievement Test in all geographic locations. The report of this research suggested that if a school system would invest in a reduced class size model early during the students' school career there would be a greater return for the investment. The STAR research team did share the belief that reduced class sizes are not sufficient to remediate students' learning problems, particularly when students are placed into these settings later in their elementary career (Blatchford & Mortimore, 1994).

In 1996, Wisconsin implemented a Student Achievement Guarantee in Education (SAGE) Class-Size Reduction Program. This program was implemented to address academic needs specific to children of poverty. The program reduced class sizes to 15 students per teacher, beginning in kindergarten and first grade. The program evaluation was based upon a quasi-experimental, comparative change design. The comparison schools had more classes of normal size, but resembled the targeted SAGE schools in family income, reading achievement, and racial composition. Inferential tests which compared post-test scores on the Comprehensive Test of Basic Skills for the SAGE schools to comparison groups showed a significant difference

on all test scores (Molnar et al., 1998). The three major studies presented findings that academic achievement increased when students were placed in a reduced-size class.

A review of studies focused on the reduction of class size brings a number of different factors to the surface. Mitchell (1989) contends many variables influence the effects of class size and are easily confounded by the other factors. One of the most controversial is the teaching/instructing behaviors, which occur once the number of students is lowered. Helmich and Wasem (1993) indicated having a reduced class size has very little benefit without appropriate instructional methods. Small group and individual instruction is what makes the class size reduction plan most beneficial.

Although research has shown that teaching practices do not change significantly, the teachers reported there was little need for drastic changes as less time is spent on discipline issues and classroom/ student interruptions. This automatically allowed more time spent on instructing students individually and less time instructing whole class. Achilles, Finn, and Bain (1997) found teachers in classes with a smaller number of students were better able to diagnose learning difficulties and were able to do so more quickly than teachers in larger classes. This early identification lead to cost savings on special projects needed to address improving learning difficulties at a later age.

In 1980, the South Carolina Department of Education published a report indicating the positive effects of reduced class size included an increased opportunity for individualizing instruction, better classroom organization and effective use of teaching materials, more creative activities that actively engage students, quality and accurate needs assessments, higher quality of cognitive and task monitoring, and more opportunities for students to engage in learning experiences using concrete materials.

The report also implied teachers were able to cover the curriculum more in-depth and use more supplementary materials. Long-term benefits to students resulted in improved creativity and divergent thinking, more positive attitudes and perceptions about themselves and their peer relations, the students functioned more effectively as group members and leaders, and had higher attention spans and lower absence rates.

Bracey (1995) estimated small classes would require an additional cost of approximately \$1,000 per student per year. He contended achievement scores would rise and retention and dropout rates would go down, resulting in overall savings to society in later years.

A reduced class size is one factor to be manipulated in this study. Research regarding the optimal size for instruction varies somewhat. Although the transition class size in this study will not be as low as some research suggests is effective, it is markedly smaller than is recommended by the state as an average size class.

### Student Productivity

During the 1980s, with the release of *A Nation at Risk* and *A Nation Prepared: Teachers for the 21<sup>st</sup> Century*, reports indicated the average performance of students was declining and the rise of the number of at-risk students was on the rise. The reports caused many to rethink aspects of schooling. Reform efforts initiated as a result of this investigation included restructuring schools, setting academic standards, and adopting new academic assessments. A new attitude was taken regarding ways to target teachers' instruction and student learning time.

In 1985, Walberg and a team of experts under the National Institute of Education and the National Science Foundation began to compile reviews of the productive factors associated with learning. A quantitative synthesis of 2,575 studies was formulated to review factors which can affect and promote learning. The study outlined three factors that should be addressed in order

to maximize affective, behavioral, and cognitive learning. The factors of learning included student aptitude, methods of instruction, and environmental factors.

Student aptitude includes ability or prior achievement as measured by standardized tests, development with regard to age or maturation, and student motivation and self-concept. Walberg contends student aptitude is only partially alterable by educators as these factors are a partial result of parental influence, prior learning, and the student's own initiatives. Wang, Haertel, and Walberg (1997) noted student initiative and motivation is a key attribute necessary for developing self-controlled, self-regulated learners. The metacognitive process learned has one of the most powerful effects on a student's ability to learn. This sub-conscious level of activity and strategy for learning enables the students to best perform as they are cognizant of strengths and weaknesses in their own learning and understand how to access various strategies for learning.

The factor of instructional learning includes the amount of time students are actually engaged in learning, as well as the quality of the instruction. Townsend (1994) suggested teachers have placed a greater emphasis on improving their instruction and levels of effectiveness. Brophy (1997) suggested by defining the teacher's role, creating a sense of efficacy, displaying belief students can learn and can teach, and by providing a supportive learning environment, strong gains in academic achievement can occur. Wang (1985) noted instruction is of great import and should be based on periodic assessment of the capabilities of each student. Instruction should be provided at a pace that permits students to make progress in mastering instructional content at a pace commensurate with his/her abilities.

Finally, the environmental factors affecting learning include the climate of the home, the social groups within the classroom, the outside peer groups, and the amount of leisure time spent

watching television. The influences of the student's environment are numerous. The environmental traits are crucial in supporting growth and the development in children. Caring relationships in the home provide loving support, foster trust, and provide unconditional love. Holding high expectations for children supports the belief goals can be accomplished. Also, providing children with opportunities to participate in activities of interest (sports or hobbies) helps instill responsibility and provides opportunities for extensive decision-making (Benard, 1996). Factors which can negatively impact the environment for a child include: divorce, domestic violence, drug use by parents, low socioeconomic status, exhibiting a poor attitude toward schooling, and antisocial behavior. Walberg states these factors influence learning and one another.

In 1992, Reynolds et al. conducted a survey on the importance of variables affecting school learning. An analysis was completed rating important factors related to school learning. The population consisted of 134 research experts who authored the 179 articles in the Wang et al. (1990) analysis. The experts were given a survey asking them to rate the variables related to school learning, both processes and outcomes. A total of 61 experts responded to the survey. A meta-analysis of the research literature on school learning showed the calculations of effect sizes and correlations. In addition, a search was conducted to provide subsequent meta-analysis. The weighted mean correlations from the data were converted into z-scores and then transformed into t-scores. An overall mean was conducted for each of the theoretical constructs. The correlations supported agreement between experts regarding the effects of student learning. The study noted that student characteristics and classroom practices were primary determinants of student learning. Proximal variables, such as curriculum, instruction, and assessment had a greater influence on student learning than distal variables (policy driven initiatives). The number and



cognitive level of questions between the teacher and student can have greater influence on increasing student learning as students become more aware of knowledge structures. During the interactions the teacher can model appropriate behaviors and better establish a classroom conducive to learning. These positive interactions help increase the self-esteem of students and a sense of membership in the classroom and school.

Many methods of analysis have been used to identify specific factors that influence learning. Wang (1993) suggested this knowledge base should include theories explaining influences on learning, empirical data from research, as well as opinions of experts. The examination of the research enhanced program development by exploring learning conditions and analyzing student achievement outcomes. Gaining this information has broadened the knowledge base, thus, providing a basis for future planning. Regardless of the method of analysis used, evidence continues to emerge and supports these factors as important to learning. Gaining a knowledge base of factors which influence student learning is crucial in making decisions regarding school policy, program development, and in program implementation.

In this study, many features of student productivity have been outlined. Methods of instruction, a lowered class size, and homogeneous grouping were used in concert to measure the effects upon improving student achievement. The results of this study could contribute to the body of research for the factors identified as important to student productivity. The classroom teachers participated in professional development to enhance skills involved in differentiating instruction for students with differing needs. The engagement time for students increased as there were not as many students in the class to instruct. Students had similar learning needs thereby reducing the need for great variances in planning lessons. There was also support provided by an additional certified teacher (the transition teacher) for a portion of the day.

## Summary

The literature review helped to establish a foundation for the study of effective program options of increasing student achievement for students who experience difficulty attaining basic skills. There are multiple factors which influence student learning ranging from cognitive ability, influences in the home environment, and methods of instruction. Many methods have been used, some with more success than others. Learning for at-risk students can be maximized if provided with instruction to meet their developmental needs and learning styles. Educators must continuously focus upon ways to provide successful opportunities for these students. White (1999) noted that student success could be greatly improved if educators understand the essential characteristics of at-risk programs and ensure the programs address developmental needs of the students involved.

The study was unique whereby factors which were isolated for study in past research were manipulated in unity. As results were analyzed to identify whether a statistical significance existed in reading and math achievement for students placed in the transition class, implications related to the effect of a reduction in class size, homogeneous grouping, and specialized teacher training was also assessed (although not as a direct correlation). Walberg (1980) commented on primary influences of learning and indicated a belief that by improving only one factor and keeping other factors constant, the returns would have a diminishing impact on student achievement. The study on combined classroom processes could be used to more effectively inform instruction, thus resulting in improved student achievement.

## CHAPTER III

### RESEARCH PROCEDURES

This study compared language arts and math achievement of fourth-grade students placed in a transition class to the language arts and math achievement of fourth grade students placed in traditional classrooms. The transition class was limited in size, was homogeneously grouped, and was served by teachers who participated in teacher staff development which targeted instructional strategies to better assist students who experienced difficulty attaining basic skills. This chapter will describe the research to be used in this study and includes the following sections: restatement of the purpose, the program description, the research questions, population and sample, variables, instrumentation, research design, data collection procedures, and method of data analysis.

#### Restatement of the Problem

The purpose of this research was to evaluate the academic achievement of students who experienced difficulty mastering basic academic skills. More specifically, this research sought to determine whether a statistically significant difference existed in language arts and mathematics achievement means in low performing fourth graders placed in a transition class as compared to similar students placed in traditional classrooms.

#### Hypotheses

The principle reason for formulating this study was to test the following null hypotheses:

1. There will be no statistically significant difference in the mean academic achievement in language arts of fourth graders placed in a transition class as compared to mean academic achievement in language arts of fourth graders not placed in a transition class.

2. There will be no statistically significant difference in mean academic achievement in math of fourth graders placed in the transition class as compared to mean academic achievement in math of fourth graders not placed in a transition class.

### Research Design

The research design of this study was a quasi-experimental convenience sample post-test-only comparison group design. Dependent variables consisted of measures of achievement in reading and mathematics as assessed by the sub-tests on the Gateway Assessment.

$$\begin{array}{ll} (n1) & X_{00} \\ (n2) & 0 \end{array}$$

The experimental group, n1, consisted of low performing students placed in a transition class. The control group, n2, consisted of low performing students not placed in a transition class.

### Population and Sample

The school in which this research was conducted was located in a suburban public elementary school located outside a major southeastern city. Total student enrollment is 1,292; the free and reduced lunch rate was 5%. The school had students in kindergarten through 5<sup>th</sup> grade.

The fourth grade class included 207 students. There were 51 of these students who were identified prior to the start of the school year as having difficulty mastering basic skills. The parents of these students were given the option of their child being placed in a transition class which had students homogeneously grouped in a reduced class size or in a regular fourth grade class. The transition class had a student teacher ratio of 17:1. The regular classrooms had students with varying ability levels and a student/teacher ratio of 24:1. The final placement decision of the 51 students was based on parental choice. The students were selected for the

transition program based on ability as assessed by a standardized ability test. Teacher recommendation and previous student performance were the primary components used to determine student eligibility for placement in the transition class. The students eligible for the transition class were not included if they were determined eligible to receive service through special education programs. Further discrimination of placement in the program was based on good attendance and the absence of disciplinary problems.

The sample of 51 students was placed in 1 of 9 self-contained classrooms. Seventeen of the students were placed in one homogeneously grouped class (the transition class). The remaining 34 students were randomly assigned placement in the 8 remaining heterogeneously grouped classrooms.

## Variables

### Independent Variables

The independent variable for this study was placement in a transition class versus non-placement in a transition class.

### Dependent Variables

The dependent variables were reading and mathematics scores on the Gateway Assessment criterion-referenced test.

## Data Collection Procedures

Data were gathered from the students' permanent records regarding performance and ability, as well as Gateway Assessment results. The data were accessible by the researcher due to internal privileges granted based on regular employment duties.

## Instruments

Information on student performance was gathered by individual classroom teachers for this study. A standards based criterion-referenced test, the Gateway Assessment, was used to determine student achievement levels in reading and mathematics. Internal validity coefficients for these achievement assessments have been measured by CTB McGraw Hill.

## Statistical Analysis

Descriptive analysis of the transition group and the students in the control group of the traditional classes were used. A t-test was used to determine if statistical differences existed between the two groups' mean language arts and mathematics scores on the Gateway Assessment. An alpha level of .05 was used to determine significance. The purpose of this study was to determine whether the factors controlled (homogeneous grouping, reduced class size, and improvement in instructional methods) in the transition program helped increase student achievement

## Treatment

Students were placed in the transition program at the beginning of their fourth grade year. Placement was determined by standardized test data gathered from permanent records, as well as recommendations from the previous year teacher.

Eight of the teachers were regular education teachers who taught 34 students who did not participate in the experimental group. The transition class teacher was also a regular education teacher and was assigned the remaining 17 students. The transition teacher showed a particular interest in working with students who needed additional academic support in attaining basic skills. She earned a specialist degree in education and proposed to teach in this type of

classroom with the belief the factors associated would improve the opportunity for students to learn.

The transition class teacher agreed to participate in professional development classes that provided strategies in differentiating instruction for students. O'Connell and Smith (2000) indicated the success of class size reduction (one of the components of the transition class) is dependent on having adequately trained, competent instructors. Johnston (2000) stated teachers who have special in-service training are better able to maximize instruction and will be more apt to achieve positive results.

The decision to initiate a transition class was made cooperatively by the administrative team and the fourth grade teachers. It was important this decision be shared by all who were affected as there was an impact on all the fourth grade classes as a result of this program. The impact increased student numbers in the non-transition classes, and required additional staffing which helped support the students placed in the transition class. Townsend (1994) indicated these types of decisions must be made by all involved as the entire group will ultimately work together to identify goals, plan for implementation of the program and allocation of resources, and evaluate program success.

The transition class had additional teacher support provided by a certified, regular education teacher. This teacher participated in staff development focused upon differentiating instruction to help meet needs of low performing students (see Appendix A for the Staff Development Plan Profile).

After being assigned to a transition or non-transition class, the students were taught language arts and mathematics skills as identified in the school system's core curriculum. All 51

students participated daily in a two and one-half hour block of language arts instruction and one hour was spent on mathematics instruction.

### Summary

This chapter described the procedures and methodology used in this study and included a description of the sample and the statistical treatment to be used to analyze the data. The design was intended to investigate language arts and mathematics achievement of low-achieving fourth graders when placed in a transition class where they were homogeneously grouped in a reduced size class, and where the teacher participated in staff development to learn differentiation strategies for instruction. The information was used as the basis for determining whether or not the null hypothesis was rejected.



## CHAPTER IV

### ANALYSIS OF DATA

This study was conducted to determine if there were statistical differences in language arts and mathematics scores of students placed in a transition class as compared to students not placed in a transition class. The study was designed to determine if students who experience difficulty mastering basic skills attained higher scores when placed in a transition, reduced-size, homogeneously group class or in heterogeneously grouped classes. Data used in this study were collected from a suburban elementary school located outside a major southeastern city.

The scores of the two groups were measured in percent of items correct using the Gateway Assessment. This chapter reports the results of the data collected in this study. The chapter is organized as follows: (a) Description of the population/sample in the study, (b) description of the data by research question, (c) statistical analysis, and (d) presentation of findings.

#### Description of the Population/Sample in the Study

The population/sample used in this study consisted of two groups of fourth grade students. To determine students who may benefit from placement in the transition class, third grade teachers were asked to complete a rating scale for students whom they identified in their classroom as experiencing difficulty mastering basic skills. The parents of the students who were recommended and considered for placement were contacted to gain permission for placement. The students who had parental consent were placed in the transition class. Students' whose parents did not agree to placement in the class were placed in heterogeneously grouped classes throughout the remainder of the grade level.

The questions developed for this study were designed to help determine:

- 1). Does placement in a homogeneous, reduced-size transition class help students attain higher scores on a language arts assessment as compared to students in a traditional heterogeneously grouped class?
- 2). Does placement in a homogeneous, reduced-size transition class help students attain higher scores on a mathematics assessment as compared to students in a traditional heterogeneously grouped class?

#### Description of the Data by Research Question

Two null hypotheses were selected for study and were tested using an independent t-test. The objective of the test was to determine if a significant difference existed in percent of items correct on the assessment between the control and experimental groups. Scores were recorded for language arts and math subtests. Of the 51 students recommended by third grade teachers, results were obtained for 45 students. The remaining 6 students moved during the school year and did not participate in the final assessment. The population/sample used in this study consisted of two groups. The transition class had 16 of the students recommended for the program and the remaining 29 students were randomly placed throughout the grade level. A comparison of the gender make-up of the students in the control and experimental groups shows a fairly normal distribution of males and females. The control group consists of 13 females and 16 males; the experimental group consists of 8 females and 8 males. Of the six students who withdrew from the school prior to taking the Gateway Assessment, three were female and three were male.

The two null hypotheses developed for this study were:

H<sub>0</sub>1: There is no statistical difference in mean academic achievement in language arts for fourth graders placed in a transition class as compared to mean academic achievement of fourth graders not placed in a transition class.

H<sub>0</sub>2: There is no statistical difference in mean academic achievement in mathematics for fourth graders placed in a transition class as compared to mean academic achievement of fourth graders not placed in a transition class.

### Statistical Analysis

The null hypotheses were tested using an independent t-test to determine if there was a significant difference in mean language arts and mathematics percent correct scores for fourth graders placed in a transition class as compared to mean academic achievement of fourth graders not placed in a transition class. Throughout the school year six students who had been identified and placed in the transition class moved. In the experimental group one of the students moved during the school year. There were originally 51 students identified and selected for this study. Although not specifically identified as part of the hypotheses for this study, the researcher talked with the transition teacher to gather anecdotal information about potential benefits or shortcomings of this type of educational setting as they related to improved student academic progress.

### Presentation of Findings

The first null hypothesis tested mean percent correct scores in language arts using an alpha level of .05. A two-tailed t score of .265 was obtained indicating there was no statistical significance in the percent correct scores on the language arts subtest of the Gateway Assessment. Relevant findings for the language arts assessment showed the mean percent

correct score for the control group to be 67.48 while the experimental group mean percent correct was 63.56. A mean difference of 3.92 existed between the control and experimental groups. Although the mean scores were slightly higher for the control group, the data scores were similar enough to indicate student placement in one group was as effective as placement in the other group. The null hypothesis was accepted.

Table 1  
Language Arts Independent Samples Test

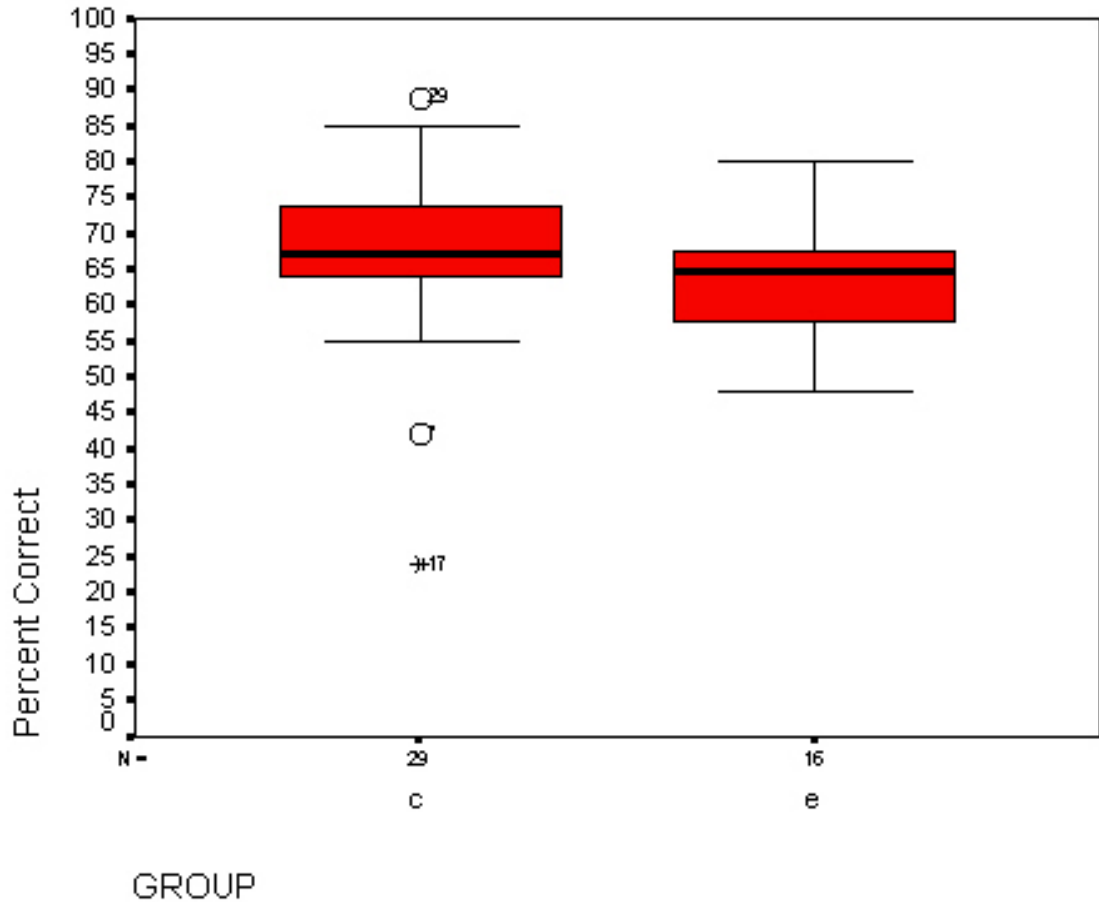
Independent Samples Test						
t-test for Equality of Means						
t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
1.129	43	.265	3.92	3.471	-3.081	10.921

Table 2  
Language Arts Group Statistics

Group Statistics					
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Percent Correct- Control	C	29	67.48	12.735	2.365
	E	16	63.56	7.312	1.828

Figure 1

Language Arts Percent Correct Scores



The second null hypothesis was tested using an independent t-test to determine if there was a significant difference in mathematics scores for fourth graders placed in a transition class as compared to mean academic achievement of fourth graders not placed in a transition class. An alpha level of .05 was used. A two-tailed t score of .001 was obtained indicating there was a statistically significant difference in the percent correct scores on the mathematics subtest of the Gateway Assessment. A mean difference of 13.76 existed between the control group and the experimental group. Data findings on the mathematics assessment showed students who were a part of the traditional heterogeneously grouped classes outperformed those students in the

transition class. This evidence suggests these findings would very likely occur again and that placement in traditional classrooms better serves children as they learn mathematical concepts.

The null hypothesis was rejected.

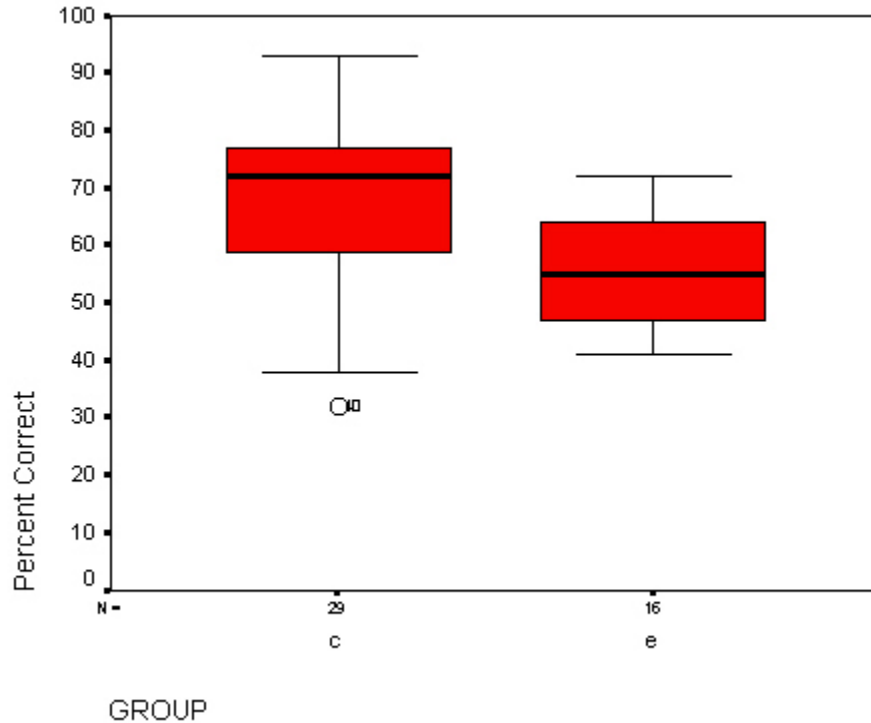
Table 3  
Mathematics Independent Samples Test

t-test for Equality of Means						
t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
3.472	43	.001	13.76	3.964	5.769	21.757
3.857	40.660	.000	13.76	3.569	6.554	20.972

Table 4  
Mathematics Group Statistics

Group Statistics					
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Percent Correct- Control	c	29	69.14	14.081	2.615
	e	16	55.38	9.715	2.429

Figure 2  
Mathematics Percent Correct Scores



An informal discussion held between the researcher and teacher revealed the teacher observed an improvement in independence and leadership skills of the students in the classroom. Time was spent specifically teaching students how to interpret questions and information, social cues, and how to guide/lead others. Time and opportunity was provided for the students to practice these skills in a non-threatening environment among peers. The teacher reported students seemed more assertive in assuming leadership roles and in understanding how to relate to others. The confidence level of the students seemed to improve as a result of participating in the transition class.

Findings from this study indicate no statistical significant difference in percent correct scores on the reading subtest of the Gateway Assessment between students placed in a transition class and students not placed in a transition class. There was a statistically significant difference

in percent correct scores on the mathematics subtest of the Gateway Assessment scores between students placed in a transition class and students not placed in a transition class. The data gathered in this study further support the varied findings of studies performed in the past as the review of literature presented varying results from previous studies performed with both positive and negative achievement results when homogeneous, reduced-size class placement was used.

Although statistical significance was not tested, an analysis of the sub-group performance revealed the female students scored consistently higher on both curriculum content measures. Implications of this could suggest there is an important need to differentiate instruction for male students. Consideration should be given to the method and delivery of instruction and to include more tactile and multi-sensory activities to help ensure learning takes place. It could be important to all students' learning to assess whether key information necessary for building learning existed to ensure scaffolding of skills to enhance learning.

Table 5  
Gender Group Comparison Table

Group	Curriculum Content	Males	Females
		Mean (Standard Deviation)	Mean (Standard Deviation)
Control	Language Arts	65.19 (13.02)	70.31 (12.28)
	Mathematics	65.81 (16.05)	73.23 (10.37)
Experimental	Language Arts	62.88 (7.18)	64.25 (7.87)
	Mathematics	54.25 (9.95)	56.50 (10.01)



## Summary

Class size reduction and homogeneously grouping students were chosen as a focus for this study in an attempt to allow the teacher to focus more time and attention on individual students increasing their time on task and providing more assistance as needed to learn tasks. By grouping students heterogeneously the intent was to provide an opportunity for the teacher to deliver instruction to students who exhibited similar learning needs and to allow the teacher to vary pacing and level of instruction to correspond to the students' levels of readiness and learning rate. The curriculum was also delivered by a certified teacher who had participated in specialized training to learn effective methods for differentiating instruction for students. Student performance was analyzed to review the impact on student achievement with a focus on finding a combination of strategies to deliver instruction and improve academic achievement. This link is not as strong when the research is reviewed and findings compared.

Numerous factors have been proven to affect student learning to varying degrees. In an attempt to make a direct cause-and-effect interpretation of combining some of these factors, the study was designed to review the impact of placing students who have difficulty mastering basic skills in a reduced-size, homogeneously grouped class.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents a summary of the research conducted on the comparison of language arts and mathematics achievement for fourth-grade students placed in a transition class to students placed in traditional classrooms using a criterion referenced assessment. The purpose of the study was to measure language arts and mathematics achievement of students in a reduced-size, homogeneously grouped class as compared to students placed in heterogeneously grouped classes. Information presented in this chapter includes a summary, conclusions, and recommendations for further research.

#### Summary

The review of literature conducted for this study examined research findings of studies performed on the effectiveness of reduced-class size models, heterogeneous versus homogeneous grouping of students for learning, and factors which can influence student productivity. Studies performed by Slavin (1986), Hooper (1992), Mason and Good (1993), and Williams (1993) found that heterogeneously grouping students helped increase student performance on standardized assessments. Additional studies were presented with findings that student performance did not increase when these grouping methods were used: Hoeffler (1992), King (1993), Carter and Jones (1994), Fuligni, Eccles, and Barber (1995), Baron (1997), Alexander-Sawyer (1999), and Safarriyenh (1999). The research on class size reduction did prove to have positive effects in the Indiana PRIME-TIME study, the Tennessee STAR study, and the Wisconsin SAGE study. The purpose of this study was to determine if these factors, when applied in unity, help to produce positive results in improving student learning. This study was

designed to compare percent correct scores on language arts and mathematics achievement between students placed in a transition class and students placed in traditional classrooms. Data were collected from a suburban elementary school outside a major southeastern city. Two null hypotheses were developed for this study and were tested using a t-test. No significant difference was found in percent correct scores on the language arts subtest resulting in an acceptance of the null hypothesis. A statistical significant difference was found in percent correct scores on the mathematics subtest resulting in a rejection of the null hypotheses.

### Conclusions

Students previously recommended by previous teachers as having greater difficulty learning basic skills and who scored poorly in academics were placed in two different types of classroom settings to compare academic achievement gains of each group. Specifically, language arts and mathematics mean percent correct scores were measured for each group to compare academic growth.

The null hypothesis for reading was accepted as there was no statistical difference in mean scores. This finding indicated student placement in the control group was as effective on increasing academic achievement as placement in the experimental group.

The null hypothesis for mathematics was rejected. Data suggested students who were a part of the traditional heterogeneously grouped classes outperformed those students in the transition class. This evidence suggests placement in traditional classrooms may better serve children as they learn mathematical concepts.

A conclusion was made that placement in the transition class is no more effective than placement in a non-transition class. The transition class required additional costs to run the classroom as there was a lower student/teacher ratio and expenses were required for additional

teacher staff development classes. The conclusion, however, cannot be definitive as there are variables in the study which could account for some of the outcomes. The determination of equivalency between the two student groups at the beginning of the study limits the conclusiveness of these findings.

Further investigation regarding the differences in math scores is needed. A comparison of prior achievement performance on standardized math tests would further inform whether the gap in student performance in mathematics existed at the same degree while they were placed in classes during the previous year. A learning gap of the same degree could carry over to the current performance making it appear the study components had little or negative impact on the results of the experimental and control groups.

A challenge for educators is to ensure every child masters basic skills identified as critical to their learning so they may experience success at the next level of learning, whether at the next grade level or the next school level. In working with students who experience difficulty grasping basic concepts, teaching strategies, grouping methods, practice models, student readiness, and a host of additional features are continually examined to try and to provide the optimal learning environment for students. By studying these components in combination, learning can be gained to broaden the body of research related to student productivity. Educators must make every effort to supplement services and continually examine how they can best serve students in their classrooms to ensure learning is maximized.

## Discussion

The factors identified in the body of research for student productivity include affective, behavioral, and cognitive learning. For the purpose of this study, cognitive learning was a major focus as it related specifically to methods of instruction. Features of the classroom learning environment were specifically targeted to measure impact on student achievement. Features included homogeneous groups, specialized teacher training, and a reduced class size for the experimental group. As Wang (1993) suggested, the knowledge base for student productivity factors should include information from studies which have explored learning conditions and have analyzed student achievement outcomes. By expanding this knowledge base, data could better inform planning for future educational instruction. This information could influence the knowledge base which can affect school policy, program development, and program implementation (Wang, 1993). The data collected in this study could inform and to the body of research for factors affecting student productivity.

## Recommendations for Future Research

The following recommendations are presented for further consideration based on findings in this study.

1. This study should be replicated to generate additional data by using a larger sample population to include more schools in the county using the Gateway Assessment. Historical data could be retrieved from schools that have implemented similar student grouping models. Standardized test data are now available from 2000 to the present.
2. Data should be gathered on students in grades seven and ten and comparisons made where different grouping patterns are used to impact student learning. Studying this data could provide information on whether a positive impact is made with older students.

3. This study should be replicated in schools where alternate student grouping methods are used to determine effectiveness on improving student achievement using an alternative assessment measure. The state of Georgia requires the Criterion Referenced Competency Test (CRCT) be administered; this assessment could be used to measure effectiveness of alternative grouping as related to student achievement. States other than Georgia also administer criterion-referenced assessments which could be used.
4. Professional development methods should be analyzed for effectiveness in training teachers who work with students identified as needing additional assistance in learning basic skills.

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Appendix A  
Staff Development Program Profile

<b>Process Implemented</b>	<b>Professional Development Context/ Process/ Content</b>	<b>Theorist to Support Process</b>	<b>Resources</b>
<p>Cross functional team formed to investigate effective strategies proven to increase student learning.</p>	<ul style="list-style-type: none"> <li>● Learning Communities</li> <li>● Research-Based</li> <li>● Data-Driven</li> </ul>	<p><i>Professional Learning Communities at Work</i> By Rick Dufour, &amp; Robert Eaker; <i>Practices That Promote Leadership in Learning Communities</i> by Sally Zepeda; <i>Results-based Professional Development</i> by Kay Burke</p>	
<p>Professional literature recommended for reading.</p>	<ul style="list-style-type: none"> <li>● Research</li> <li>● Resources</li> </ul>	<p><i>A new vision for staff development</i> by Dennis Sparks &amp; Stephanie Hirsh; <i>Results-based Professional Development</i> by Kay Burke.</p>	<p><i>The Differentiated Classroom: Responding to the Needs of All Learners</i> by Carol Ann Tomlinson</p> <p><i>Best Practices: New Standards for Teaching and Learning in America's Schools</i> by Steve Zemelman, Harvey Daniels, &amp; Arthur Hyde</p> <p>“You are their Merchant of Hope” <i>From Rage to Hope</i> by Crystal Kuykendall</p>

<b>Process Implemented</b>	<b>Professional Development Context/ Process/ Content</b>	<b>Theorist to Support Process</b>	<b>Resources</b>
<p>District leadership to share goals of session, support of process, and charge to participants for implementation.</p>	<ul style="list-style-type: none"> <li>● RPTIM Model</li> <li>● Leadership</li> <li>● Collaboration</li> </ul>	<p><i>How to organize a school-based staff development program by Wood, &amp; Killion; Practices That Promote Leadership in Learning Communities by Sally Zepeda</i></p>	
<p>Identified experts in field provided theory and strategies to improve student learning.</p> <ul style="list-style-type: none"> <li>● International</li> <li>● National</li> <li>● Regional</li> <li>● Local</li> </ul>	<ul style="list-style-type: none"> <li>● Design</li> <li>● Quality Teaching</li> <li>● Resources</li> <li>● Learning</li> </ul>	<p><i>Promote Leadership in Learning Communities by Sally Zepeda</i></p>	<p>Dr. Crystal Kuykendall, KIRK, Inc.; Kimberly Emanuel, Henry County Schools; Sherry Norfolk, Storyteller; Gail Heidenhain, Delphin, Inc.; Marcia Roberts, DeKalb School System; Susan Jones, Lighthouse Professional Alliance; Dr. David Sousa (by video) Dr. Robert Brooks (by video)</p>
<p>Three ½ day professional development sessions provided throughout year of implementation.</p>	<ul style="list-style-type: none"> <li>● Transfer of Practices</li> <li>● Peer Coaching</li> <li>● Reflection</li> </ul>	<p><i>How to organize a school-based staff development program by Wood, &amp; Killion; Promote Leadership in Learning Communities by Sally Zepeda Results-based Professional Development by Kay Burke.</i></p>	

Process Implemented	Professional Development Context/ Process/ Content	Theorist to Support Process	Resources
<p>Class Framework</p> <ul style="list-style-type: none"> <li>• Whole group lecture</li> <li>• Break-out sessions related to specific content areas</li> <li>• Viewed videos with examples of effective teaching practices.</li> <li>• Participated in planning sessions to ensure vertical and horizontal alignment of activities</li> </ul> <p>Program evaluation</p>	<ul style="list-style-type: none"> <li>• Adult Learning Theory</li> <li>• Reflection and Dialogue</li> <li>• Learning</li> <li>• Collaboration</li> </ul>	<p><i>Promote Leadership in Learning</i> Sally Zepeda</p>	<p>“How the Brain Learns” by Dr. David Sousa</p> <p>“Look What You’ve Done! (Hope and Resilience for Student with Learning Difficulties)” by Dr. Robert Brooks</p>
<p>Program evaluation</p> <ul style="list-style-type: none"> <li>• Evaluation</li> <li>• Data Driven</li> </ul>		<p><i>Evaluating Professional Development</i> by Thomas Guskey, T. <i>Results-based Professional Development</i> by Kay Burke</p>	

## **National Staff Development Council**

### **Standards defined** –

Collaboration – provides educators with the knowledge and skills to jointly work to solve educational issues.

Data Driven – uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement.

Evaluation uses multiple sources of information to guide improvement and demonstrate its impact.

Learning Communities – organizes adults into learning communities whose goals are aligned with those of the school and district.

Leadership – requires skillful school and district leaders who guide continuous instructional improvement.

Learning – applies knowledge about human learning and change.

Quality Teaching – deepens educators’ content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately.

Research Based – prepares educators to apply research to decision making.

Resources – requires resources to support adult learning and collaboration.

Appendix B

Language Arts Assessment Data

Language Arts

Assigned Student Number	Gender	Percent Correct-Control	Assigned Student Number	Gender	Percent Correct-Experimental
2	female	80	1	male	71
4	female	73	9	female	65
5	female	71	15	male	48
7	female	42	19	female	62
8	male	55	34	male	67
11	male	67	35	female	65
12	female	67	37	male	64
13	male	61	39	male	65
14	female	79	42	female	58
16	male	68	43	female	58
17	male	24	46	male	62
20	female	58	58	male	58
21	male	67	48	male	68
23	male	64	49	female	80
24	male	62	50	female	56
25	male	68	51	female	70
26	male	85			
27	male	79			
28	male	67			
29	female	89			
30	male	65			
31	female	82			
32	female	67			
33	male	67			
36	female	65			
38	female	62			
40	male	74			
41	female	79			
45	male	70			



Appendix C

Mathematics Assessment Data

Mathematics

Assigned Student Number	Gender	Percent Correct-Control	Assigned Student Number	Gender	Percent Correct-Experimental
2	female	86	1	male	72
4	female	74	9	female	68
5	female	77	15	male	41
7	female	54	19	female	43
8	male	68	34	male	51
11	male	75	35	female	43
12	female	77	37	male	45
13	male	75	39	male	64
14	female	72	42	female	64
16	male	58	43	female	49
17	male	38	46	male	51
20	female	67	47	male	55
21	male	55	48	male	55
23	male	59	49	female	64
24	male	72	50	female	59
25	male	58	51	female	62
26	male	93			
27	male	84			
28	male	59			
29	female	93			
30	male	74			
31	female	58			
32	female	74			
33	male	72			
36	female	67			
38	female	75			
40	male	32			
41	female	78			
45	male	81			

â€¢ Fourth-grade students who used technology to play learning games and develop higher order thinking performed only 3 to 5 weeks ahead of students who did not use technology. â€¢ Both fourth- and eighth-grade students who used drill and practice technologies performed worse on NAEP than students who did not use drill and practice technology. 6. Scardamalia & Bereiterâ€™s Computer Supported Intentional Learning Environment (CSILE) Studies. Recent advances in networked technologies are making working on a computer a social and collaborative enterprise.Â Report on the effectiveness of technology in schools, 1990-1997. Software Publisherâ€™s Association. Scardamalia, M., & Bereiter, C. (1996). Poverty directly affects academic achievement due to the lack of resources available for student success. Low achievement is closely correlated with lack of resources, and numerous studies have documented the correlation between low socioeconomic status and low achievement. Several strategies exist to assist teachers in closing the poverty achievement gap for students.Â ACHIEVEMENT OF LOW-INCOME STUDENTS A study conducted by Sum and Fogg (1991) found that poor students are ranked in the 19th percentile on assessments while students from a mid-upper income family are ranked in the 66th percentile on assessments.Â researched for effectiveness in closing the poverty achievement gap. Numerous researchers have examined the academic achievement of home-educated children and youth, their social, emotional, and psychological development, and their success into adulthood, and various aspects of homeschool families in general. Researchers have also explored myriad other aspects and issues related to home education in disciplines such as philosophy, sociology, and law. Only a handful of studies, however, have looked closely at a large nationwide sample of home educators and their children in the United States, and the last one of this nature was conducted about a decade ago. Revi