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The Effect of Student Mobility on Achievement and Gain-score Test Results

Zenith Patton Gamble III
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Zenith Patton Gamble III entitled "The Effect of Student Mobility on Achievement and Gain-score Test Results." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Educational Administration.

Gerald C. Ubben, Major Professor

We have read this dissertation and recommend its acceptance:

Grady Bogue, Greg Petty, Mike Winstead

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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THE EFFECT OF STUDENT MOBILITY ON ACHIEVEMENT AND GAIN-SCORE TEST RESULTS

A Dissertation
Presented for the
Doctor of Education
Degree
The University of Tennessee, Knoxville

Zenith Patton Gamble III
May 2004

DEDICATION

This dissertation is dedicated to my parents, Z.P. Gamble Jr. and Reva Gamble. They provided a home where their children discovered a love for learning and developed a desire to attain knowledge through education. They have always been there with word and actions of support, understanding and encouragement. Thank you for always believing in me, and inspiring me to reach higher in order to achieve my goals.

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encouragement you provided to get me through this whole process. Your confidence in me has been an inspiration. I love you all!

ABSTRACT

The purpose of this study was to determine if there is a significant effect of student mobility on student achievement and/or a student's gain-score test results in both reading and mathematics. A conclusion was then reached as to whether or not the schools in Tennessee are being fairly assessed since mobility is not taken into account in the state's performance model.

The first step to this end required an investigation into the current knowledge of student mobility. The second step was an investigation into accountability in general and accountability specifically in the state of Tennessee. Approval to access the Tennessee Comprehensive Assessment Program (TCAP) data for Knox County Schools was obtained. I then received student demographic data and a user name and password to access the Tennessee Department of Education web site.

The population of this study consisted of all students in the Knox County School System in grades 3-5 at the 2003 spring administration of TCAP. The population consisted of 12,138 regular and special education students. The population data included: ethnicity, gender, grade level, membership (mobility status), school, and socioeconomic status for each student. The data obtained from the web site were four composite scale scores in reading and mathematics from the 2002 and 2003 TCAP. The 2002 scale scores were then subtracted from the 2003 scale scores to obtain a gain-score test result.

Statistical results were generated by using SPSS© with statistical significance set at the .05 level. The results of the study supported some previous research on the effect of mobility on student achievement, finding that mobility adversely effects student achievement in reading and mathematics in this school district. The results were mixed

when looking at the effect of mobility on student mean gain-score results. There was a significant negative effect in mathematics, but not in reading. Only 2 factors, gender and ethnicity, interacted significantly with mobility on mean mathematics achievement.

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CHAPTER ONE

THE PROBLEM AND ITS COMPONENTS

Introduction

Mobility is a societal issue that impacts families and schools. Children have to make many adjustments in their lives. School personnel just accept the children and attempt to do the best that can be done in an attempt to forward each child's education.

Geographic mobility has been a way of life for many Americans since the founding of this country. The country itself was, and continues to be, made up of individuals who seek after fresh starts in their life. The U.S. Census Bureau reported that 41% of the population, 94 million people, lived in a different house from the one they had lived in 1970 (U. S. Bureau of the Census, 1977). From 1975 to 1980, 45% of the population moved and between 1980 and 1985, approximately 42% of the population changed residences, 44% of the population was in a different home between 1985 and 1990 (U.S. Bureau of the Census, 1980, 1985, 1990). A recent report in the Johnson City Press reveals that as a nation we continue to be very mobile ("Moving Statistic," 2003).

> America really is a country on the move. In the last five years of the 20th century, close to half the population packed up and moved to different homes. ...Overall, 45.9 percent of the 262.4 million U.S. residents age 5 and older in 2000 had moved in the previous five years, according to the Census Bureau. That figure includes 7.5 million people who moved to America from abroad.
>
> The five-year moving rate has hovered at about 46 percent since 1970. (p. A1)

Other studies indicate that younger members of the population, those more likely to have school-age children, move more often than those 65 years old (Benson et al.,

1979; Chadler-Goddard, 1985). A quick mathematical calculation, based on a mobility rate of 20% per year and 40% during a 5-year period, indicates that the mobile segment of the population makes an average of two and one half moves during a 5-year period. This equates to a move every 2 years and six to seven moves during the years a student is in school.

Wood et. al., (1993) conducted a study on family relocation. The research revealed those children in families that moved frequently (six or more times by age 18), "were between 50% and 100% more likely to have a delay in growth/development, to have a learning disorder, to have repeated a grade, or to have four or more frequently occurring behavioral problems" (p. 136). Although there is some research in the area of family mobility, these students are rarely the subjects of sustained educational interventions; not surprisingly, educators tend to give priority to the more manageable needs of their relatively stable clientele.

School mobility is associated with poor student achievement in Language Arts, Mathematics, and Reading. However, Rumberger and Larson (1993) contend that these apparent detrimental effects may not be due to mobility itself but to other related student variables (p. 3). Economically disadvantaged children are more likely to be mobile and have problems in school. Associations between student mobility and low achievement may be due to other underlying family problems related to poverty (Rumberger and Larson, 1993, p. 3).

Research suggests that student mobility is detrimental to both mobile students and to the schools they attend. A study of mobile students in Chicago (Temple & Reynolds) revealed that one half of achievement differences between mobile and nonmobile

students could be connected to disparities that predated their transfers (1995). However, at least half of the differences in achievement do appear to be associated with mobility (Rumberger & Larson, 1998). A study by *Education* Week (1993) contends that fourth and eighth grade students who changed schools one or more times in the previous two years scored significantly lower than did other students on math proficiency exams.

Other studies indicate that changing schools has a detrimental effect on student achievement after controlling for differences in socioeconomic status and other family background factors. A Chicago Catholic elementary school study (Jason et. al.) discovered that high-risk transfer students had markedly lower grades than a comparable group of high-risk peers who had not transferred schools (1992). Even with all of the research pointing to mobility as a possible detrimental factor in student success, there has been relatively little research that examines the educational consequences of student mobility in Tennessee.

Accountability is not a new term in education. With the reauthorization of the Elementary and Secondary Act, "No Child Left Behind" act, accountability is more prominent than ever before in the United States (Hickock, 2002). Tennessee recognized this need more than ten years ago. The state of Tennessee adopted an accountability-testing model in 1992 developed by a University of Tennessee professor, Dr. William Sanders (Hill, 2000, p. 4). Tennessee Value-Added Assessment System, or TVAAS, was created by Sanders to annually assess student progress. The mixed-model methodology on which TVAAS relies addresses major patterns in using student achievement data in educational assessment. "The increased emphasis on testing and accountability is

seriously undermined, if not irrelevant, if the classroom is a revolving door." (Hartman & Franke, 2003, p. 2)

Teacher, school, and school system accountability has been on the rise for the past 20 years. Student achievement has and continues to be the major tool used in judging all aspects of the educational system in the United States. In Tennessee, both achievement and gain-scores are used to assess the quality of our public schools.

Student mobility in the state is coded on the answer sheets of all students taking the Tennessee Comprehensive Assessment Program (TCAP) beginning with the 2003 administration. Student membership coding included:

1. The student has been continuously enrolled in this school since the first 20 day attendance reporting period.
2. The student has not been continuously enrolled in this school, but has been enrolled in this school district since the first 20 day attendance reporting period.
3. The student has not been continuously enrolled in this school district, but has been enrolled in a Tennessee public school district since the first 20 day attendance reporting period.
4. The student has not been continuously enrolled in a Tennessee public school district since the first 20 day attendance reporting period.

For the purpose of this study, students that coded the first line were determined to be the non-mobile group. Students that coded any of the other three were considered the mobile group. The NCLB accountability model uses the same mobility accounting for schools.

For school system accountability only students coding the last two entries would be excluded.

This study will first attempt to explore the effect of student mobility on achievement and gain-score results with Tennessee's accountability model and the national accountability structure. Figure 1.1 visually represents the over arching scope of this study.

Secondly, there are multiple variables that may lead to student success or failure based on achievement tests. The links of a chain visually represent the interaction of these variables upon each other and high or low student achievement. The same can be said of the effects of these same variables on gain-score results. The effect on gain-score results may even be more profound, because the gain-score is purported to show growth over a one-year span of time. Figure 1.2 displays the multiple variables that will be studied as having possible interaction effects relating to student achievement or gain-score results.

This study should be undertaken at this time because schools in Tennessee may be unfairly judged when a student's mobility is not taken into account. Current research on student mobility in Tennessee is limited. According to Williams (2003), "there are several factors that necessitate that this study should be undertaken at this time:

1) Family mobility in America continues to increase;" (p. 7)
2) Tennessee value-added assessment system (TVAAS) in combination with the Tennessee Comprehensive Assessment Program (TCAP) is "virtually unique among the states in its ability to keep continuing record of students' achievement test scores as they move from grade to grade or school in each

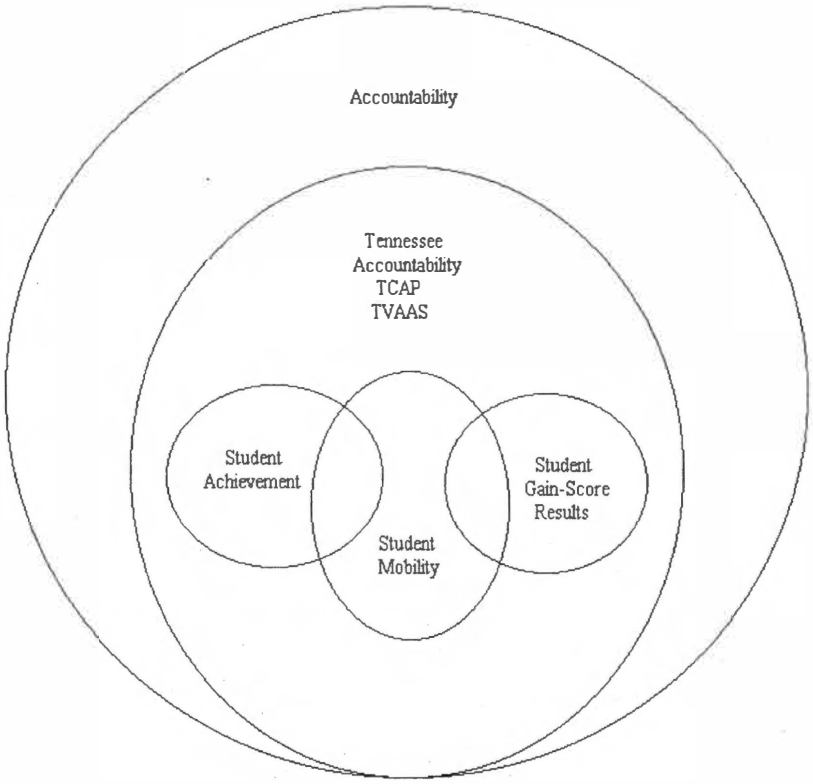

Figure 1.1: Association of the major components of this study.

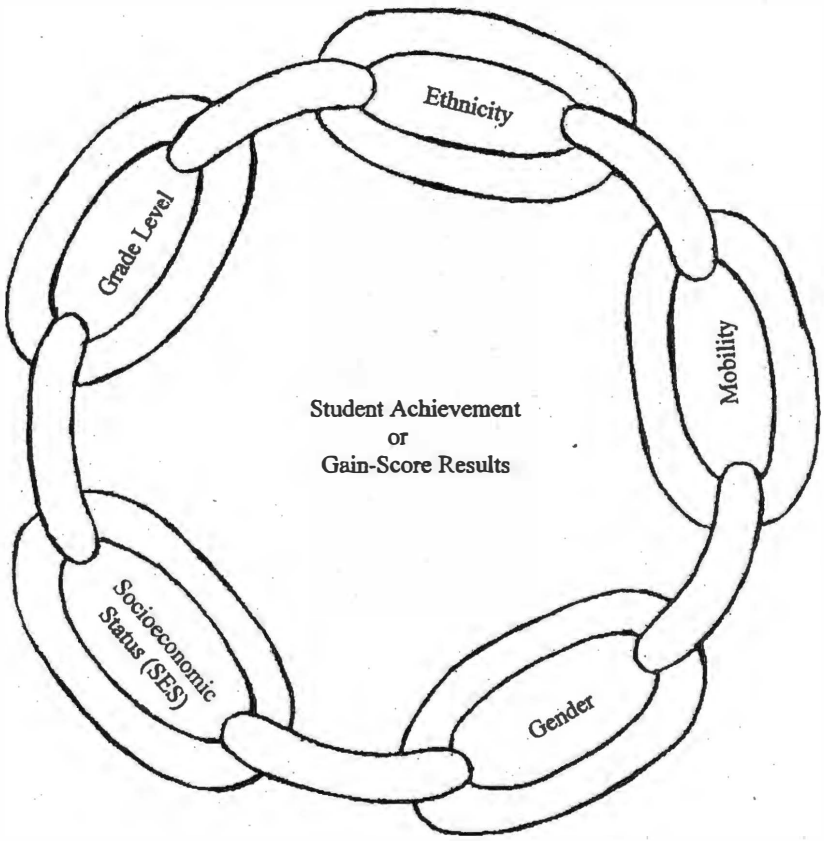

Figure 1.2: Chain symbolizes the interaction of multiple variables on student achievement or gain-score results.

county of the state." (Bock & Wolfe, 1996) According to Using and Interpreting TVAAS: A Primer for Teachers and Principals: User's Guide, a research question that needs to be pursued is 'How does mobility affect achievement'? (Using and Interpreting TVAAS, 2002)

3) The No Child Left Behind accountability act places a greater burden on schools;
4) Educational testing in Tennessee continues to drive the curriculum;
5) Few studies to date have examined the mobility/gain-score relationship.

Problem Statement

Tennessee's educational accountability model does not specifically account for student mobility for individual schools. Since individual student mobility is not specifically weighted for individual schools in Tennessee and student mobility is taken in to account with the "No Child Left Behind" act of 2001, this promotes confusion about the effect of student mobility on achievement and/or gain-score test results. A wealth of knowledge exists that reveal the negative effect of student mobility on student achievement. No research has been uncovered at present that deals with the effect of student mobility on student gain-score test results. This study was an attempt to support or refute the wisdom of the use of student mobility in these educational accountability models.

Purpose of the Study

The new "No Child Left Behind" act of 2001 requires that all states test students and set extremely high standards for academic achievement (Hickock, 2002). Tennessee has been testing students and reporting both achievement and gain-score results since

1992. Both national and statewide testing results are becoming more and more prominent in the judgment of a school's success. Considering the extensive use of these data, the purpose of this study was to determine if there is a significant effect of student mobility on student achievement and/or his/her gain-score test results in mathematics and reading. Also, to be determined was whether or not there is an interaction effect between a student's demographic characteristics; ethnicity, gender, grade level, mobility, and socioeconomic status on achievement and/or gain-score results in mathematics and reading. If a student's mobility proves to be a contributing factor in the lack of achievement or academic gain, then this will provide the rationale to address the reporting of school results.

Research Questions

Because there is no clear, empirically based understanding of the mobility/achievement relationship, the focus of this study is to compare achievement test scores and gain-score results of mobile and non-mobile elementary students. The following overarching question was the driving force behind this study. Are schools adversely affected by the inclusion of mobile students on the Tennessee state report cards in the areas of achievement and gain-score results? The four questions below were addressed to help in resolving our problem statement.

1. Are the mean achievement test scores of mobile students significantly different from the mean achievement test scores of non-mobile students?
2. Are mean gain-score results of mobile students significantly different from the mean gain-score results of non-mobile students?

3. Is there a significant interaction effect between mobility and a student's demographic factors including socioeconomic status (SES), gender, grade level, or ethnicity on mean achievement test scores?
4. Is there a significant interaction effect between mobility and a student's demographic factors including socioeconomic status (SES), gender, grade level, or ethnicity on mean gain-scores results?

Significance of the Study

This study will add to the body of knowledge in the area of mobility-achievement relationship. More importantly this study is among the very first to examine the mobility-gain-score test result relationship.

Each year, standardized achievement tests are administered to students in grades 3-8 across the state of Tennessee. The results are evaluated and used in various ways. Individual student data are used to identify individual weaknesses and strengths in skill development, as a basis for individualizing instruction, and as one criterion for placement in compensatory education programs. Individual gain-score data are associated with the instructing teacher. The teacher data, student yearly gain-scores, are evaluated to determine teacher effect in the value added to the education of the group of children instructed. Grade levels and whole school data are combined. These group data are used to diagnose strengths and weaknesses of the instructional program, to help determine curriculum changes, to evaluate educational programs, and to evaluate the effectiveness of the total school program. Group data also form the basis for federal project applications and for comparing schools. The Tennessee school performance model requires the dissemination of test scores by school and school system. The incidence of

comparisons by the public is readily available through the use of report cards (Report Card, 2002). In addition to the local uses of test results, the State of Tennessee uses these results to qualify individual schools for rewards or punishments. Rewards and sanctions for failing schools – are required under the federal No Child Left Behind Act. "The state is developing a reward system to highlight schools that make progress for two years or close achievement gaps" ("Reward system," 2003).

My interest in this study stems from experiencing three moves in my K-12 education. My brother and sisters dealt with many more changes in schools than did I. My father was required to move extensively as a sergeant in the United States Air Force. West View Elementary School, of which I am currently the principal, experiences many students leaving and enrolling through out the school year. These mobile students often do not make a place for themselves. Mobile students also have difficulty socializing and academically lag behind their peers. These children have many needs, and we work diligently to address these needs. It does not appear to give schools a fair shake to hold them accountable for children that have not had sufficient time for remediation or simple acclimation to their new surroundings. School systems are now required to code student mobility data on student answer sheets for the Tennessee Comprehensive Assessment Program (TCAP) testing each spring as of 2003. This information may be used as a preponderance of evidence that the school is doing an adequate job of instructing the children that are non-mobile for a school year.

Other studies focused attention on this problem, but the results were inconsistent and often conflicting (Mehanna, 1997; Jones, 1990). If the nagging suspicion, however, that achievement and gain-scores relate negatively to mobility is proven to be fact, the

student achievement and gain-score results in schools with high rates of mobility will be lower than expected and decisions made based on the scores without considering the mobility factor may be invalid. The converse may also be true. Student achievement and gain-score results in schools with unusually low rates of mobility may be higher than expected. Decisions made on the basis of these scores may be just as invalid as decisions that are based on scores resulting from high mobility rates.

Limitations

Since the sample under consideration is to be drawn from the student population of one school system, the results can only be generalized to those students and to that district. The results may or may not be typical of other schools or school districts in the state or country. The small percentage of mobile students compared to the non-mobile students in the sample is a weakness. In addition, the low percentage of African-American students compared to the White non-Hispanic is typical of most of the counties in Tennessee.

This study will not look at the various reasons for student mobility, nor will it attempt to establish causation. These factors are purposely omitted and provide topics for additional study.

Delimitations

1. TCAP data from the 2003 spring tests.
2. TCAP data from the Knox County School System.
3. Math and Reading Composite scores of all available students in grades 3 - 5.

4. Math and Reading gain-score test results of all available students in grades 3 - 5.
5. Mobility as defined.

Definition of Terms

1. CTBS/5– California Test of Basic Skills version 5. The current test used in the state of Tennessee assessment program. The 2003 edition was form G.
2. Gain-score – The academic improvement a student makes from one school year to the next on a standardized test. For this study the gain-score will be the subtraction of the 2002 composite score from the 2003 composite score in reading and mathematics.
3. High socioeconomic status – the group of students who pay full price for their meals.
4. Low socioeconomic status – the group of students who have been approved to participate in the federal free/reduced priced meal program. The free/reduced priced meal program is a federal program with strict criteria for student participation. Income eligibility criteria starts at $16,613 for a one-member household size and continues upward by adding $5809 for each additional family member.
5. Mathematics achievement – As operationally defined for the purpose of this study, the mathematics composite scale score for each student on the 2003 TCAP.

6. Mobile student – As operationally defined for the purpose of this study, a student who entered a school after the initial 20 days of the school year.
7. Non-mobile student – As operationally defined for the purpose of this study, a student that enrolled during the initial 20 days of the school year and was continually enrolled until the TCAP testing date.
8. Normal curve equivalent (NCE) – Is a way of measuring where a student falls along the normal curve. The numbers on the NCE line run from 1 to 99, similar to percentile ranks, which indicate an individual student's rank, or how many students out of one hundred had a lower score. NCE scores have a major advantage over percentiles in that they can be averaged. That is an important characteristic when studying overall school performance, and in particular, in measuring school-wide gains and losses in student achievement.
9. Reading achievement – As operationally defined for the purpose of this study, the reading composite scale score for each student on the 2003 TCAP.
10. Scale Score - Statistical transformation of a raw score, obtained by a learner on a test. The original result on a test is transformed to a value on a scale ranging from 001 to 999. Scale scores are used to compare test results over time and across different groups.
11. TCAP – Tennessee Comprehensive Assessment Program – Focus will be on the spring 2003 exam administered to all students in the state grades 3-8. CTBS/5 was administered to students in grades 2-8 in the Knox County School System. Scale scores will be the used to measure student achievement.

12. TVAAS – Tennessee Value-Added Assessment System created by Dr. William Sanders. TVAAS reports measure a student's academic improvement or gain-score from one school year to the next on a standardized test. The Tennessee General Assembly adapted TVAAS as part of the Education Improvement Act of 1992. Sanders purports that his formula factors in over 21 variables that affect student test scores and achievement. Mobility is one factor purportedly taken in to account in the TVAAS formula.

Assumptions

It was assumed that the following did not significantly affect the results of this study.

1. TCAP results are a valid measure of student achievement.
2. TVAAS calculations represent reliable measures of student academic gains.
3. Special education students – it was assumed that the inclusion of special education student scores would not adversely affect the study. A normal distribution of special education students for both mobile and non-mobile students will be obtained.

Research Methods

This is a secondary data analysis study that is both relational and co-relational. Data were analyzed to determine the degree of significant difference between a student's achievement and gain-score results and his/her membership status in a school for the entire year. The results quantitatively described the significant difference of the existing relationship through the application of a multiple analysis of variance (MANOVA). The co-relational analysis is the determination of the multiple affect of mobility, grade level,

gender, ethnicity and socioeconomic status on student achievement and gain-score results.

This study focused only on the comparative and relational aspects, as no attempt was made to establish causation. Existing data were gathered to investigate the differences between mobile and non-mobile students in terms of the dependent variables of achievement and gain-score results. The additional variables of gender, grade level, ethnicity and socioeconomic status were investigated to determine if there is an interaction effect on the mobility-achievement and mobility-gain-score relationships.

A secondary data analysis was chosen because the conditions have already occurred and neither manipulation of the conditions nor the random assignment of students to groups can be carried out (McMillan & Schumacher, 1984).

Population and Site

The population of the study was all the third-, fourth-, and fifth-grade students tested in the elementary schools in Knox County Tennessee at the spring 2003 administration of the TCAP. These grade levels where chosen because each has an achievement score. Each student is likely to have a gain-score if he/she took the TCAP any were in the state the previous school year. One requirement of the NCLB act that was initiated beginning with the 2003 TCAP administration was the coding of whether or not a student had been enrolled at the same school for the entire year. All of the elementary schools that have the desired grade levels were used so that the greatest cross section of students would be obtained.

Source of Data

The TCAP test was administered in the spring of the 2003 to all students, grades 2-8, in the Knox County School System. This testing was a part of the state-mandated assessment program (TCAP). The CTBS/5 form G was the specific test published by McGraw/Hill. The CTBS/5 is a norm-referenced test obtained from over 150,000 students tested nationally in 1996. The CTBS/5 test results demonstrate student achievement in mathematics, reading, language, science, and social studies. In addition, student scale scores from the previous year are subtracted from the present scoring to generate a gain-score result. Achievement scores are used as a measure of accountability for school systems and individual schools. Gain-score results are used to demonstrate accountability for school systems, individual schools, and is a major piece in determining teacher effect in the state of Tennessee.

Mobility data was an additional coding that the school system chose to have students mark on their answer sheets. In addition to mobility, socioeconomic status (determined by a student receiving free or reduced meals or not) was also coded. These two pieces of information for each student were employed as independent variables in this study.

Math and Reading scale scores were used as the measure of student achievement, because most of the studies investigated used these two academic areas (Mehanna, 1997; Jones, 1990). The number of correct items on each subtest determines the subject's raw score. Raw scores are converted to scale score, national percentile, norm curve equivalent, and stanine values. The scale score was chosen as the measure of achievement, academic attainment, because this value is most closely associated to the

raw score. The scale score was chosen even though the performance model for the schools and school systems in the state use the norm curve equivalent (NCE) as the measure of student achievement (Performance Model, 2002). The NCE is used to evaluate academic growth on a school-wide basis.

Subtracting a student's previous scale score from the present year scale score will obtain a gain-score result. The gain-score result is compared to an expected gain from the 1996 norm referenced group to determine if adequate academic growth has been made. The mean of all students' gain-score results in each subject area is also used as a part of the performance model for schools and school systems in the state (Performance Model, 2002). Thus the gain-score is an additional measure of accountability.

Procedures

An application for review of research involving human subjects, Form A, was submitted to the university's Internal Review Board (IRB). The application consisted of a letter to Dr. Charles Lindsey, Director, Knox County School System, requesting permission to access the Tennessee Comprehensive Assessment Program (TCAP) data for the school year 2002-2003. Also submitted was a letter to Dr. Mike Winstead, Coordinator of Research and Evaluation and Group Testing for the Knox County School System, requesting his assistance in gathering the needed data. Confidentiality of individual students and school results was assured to all parties involved. A letter of support was received and IRB approval obtained.

Data were condensed and sorted using TestMate Clarity, a computer software package used to sort and/or select specific sets of data. Student data included membership (mobility information), grade level, gender, ethnicity, and Socio-economic

status (SES) for all third-, fourth-, and fifth grade students in the Knox County School System at the time of TCAP testing. Student data were sorted, selected and entered into a Microsoft © EXCEL file. The Knox County School System Coordinator of Research and Evaluation provided me with a user name and password to access student testing data on the Tennessee Department of Education web site. Adjusted scale scores for each student in math and reading from the 2002 and 2003 TCAP test were added to the original file. A simple subtraction determined the gain-score test result for both subject areas. The state web site houses the testing data for all students in the state. The information on the website is posted by Dr. William Sanders and his associates as SAS InSchool. SAS InSchool was formed in January of 1997 to focus on the research and development of K-12 educational technologies; SAS InSchool offers multimedia instructional and gain-score technologies (ICDRI, 2001, p. 2). Student names and school names were deleted from the file and statistical analysis was conducted.

Data Analysis

Data were entered into a statistical package, SPSS©, to generate tables and reports. The hypothesis testing included several statistical analyses: mean(s), analysis of variance (ANOVA), multiple analysis of variance (MANOVA), and any post hoc test(s) that may were needed to help us understand the data.

Organization of the Study

An abstract of the study will precede five chapters. Chapter One is an overview of the major elements of the study including a summary of the research methods. Chapter Two is a review of literature. Chapter Three details the research methods used in the study. Chapter Four presents the finding of the study. Chapter Five contains a brief

review of the study, a summary of findings as it relates to the review of literature and research cited. Also included are conclusions and recommendations for future study.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

This chapter is a review of literature related to the effects of school mobility as it pertains to the effect on student achievement. The review of relevant literature will be divided into three parts. Accountability in general will be presented first as a means of helping understand how schools are being judged. Next a look at Tennessee's accountability system will be outlined. This study is Tennessee specific and thus we must know how schools are held accountable to determine if mobility has any impact on our present accountability system. Finally, mobility and its role in student learning will be laid out. A summary of these finding will conclude the review of literature.

Accountability

Accountability is a hot topic in education today. This accountability is the driving force of testing as noted by the National Center for Education Statistics. The 2001 reauthorization of the Elementary and Secondary Education Act, also know as No Child Left Behind (NCLB), carries testing and accountability requirements that will substantially increase student testing and hold all schools accountable for student performance. This legislation marks a departure from the federal government's role regarding elementary and secondary education. It requires that states administer reading and math tests annually in grades 3-8 and during one year in high school starting in 2005-06 (National Center for Education Statistics, 2002).

Accountability is a relatively new phrase for an old idea that has long been discussed in education, business, and industry. Much of the confusion surrounding the

concept of accountability can be attributed to the lack of uniform usage of the term. Alkins (1972) noted that the reader investigating the subject for the first time is inundated with a bewildering variety of conflicting views, schemes, and definitions. The use of the term in conjunction with teacher performance did not appear in the Education Index until June 1970 (Morris, 1972). Although accountability in education has been discussed frequently in the ensuing four decades, along with the reform movement in education, accountability may be taking on a meaning educators have never before seen. Ladd (1996) noted that present efforts to reform elementary and secondary education in the United States are focusing heavily on the outcomes of the educational system with a preoccupation with managerial efficiency. This notes a change in American educational accountability that emphasized the inputs such as the number of books in the library.

Frazier (1975) supported the contention that accountability represents a new way of describing an old practice. Riley (1977) observed that the accountability movement in the United States actually began in business and industry with Fredrick Taylor's scientific management movement and his study of time-work efficiency.

The person recognized by most educators as the father of the accountability movement in the United States is Leon Lessinger (Gay, 1980). Lessinger and Tyler, in their book Accountability in Education (1971), said that accountability was the important track for the 1970s. Following the passage of the Elementary and Secondary Education Act of 1965, Lessinger referred to it as a clear mandate for equity of educational opportunity and for equity of results as well (Mickler, 1984). With the latest reauthorization of this Title I act, "No Child Left Behind" as it is better know,

accountability is the central emphasis as we have began the 21st century. Lessinger (1970) defined accountability in a strict formal sense as follows:

> Accountability is the product of a process. At its most basic level, it means that an agent, public or private, entering into an agreement to perform a service will be held answerable for performing according to agreed upon terms within an established time period, with stipulated use of resources and performance standards. (p. 217)

Roush, Brattean, and Gillin (1971) defined accountability conceptually and operationally when they stated:

> Conceptually defined in its simplest form, accountability is a definitive delineation of the goals and functions of education, each of which is qualitatively described in measurable objectives which are either directly or indirectly related to student performance. Operationally defined accountability requires the reporting of achievement against promised results. (p. 40)

Bains (1971) viewed accountability more narrowly. She stated that it is a means of measuring teacher effectiveness by the amount students learn. She further claimed accountability only focuses on quantifiable skills.

Cunningham (1969), on the other hand, distinguished between accountability and evaluation as follows:

> Accountability is dependent upon evaluation obviously, but it is a broader concept. The accountability responsibility extends beyond appraisal; it includes informing constituencies about the performance of the enterprise. Similarly, it implies responding to feedback. (p. 285)

Dolmatch (1970) asserted that accountability is a marketing device for vendors, a selling device for school administrators to use on their school boards, a security blanket for teachers, and a political slogan for legislators.

Haden and King (1971) contended accountability is the extent to which an individual or institution is willing and ready to stand behind its work or product and correct a demonstrated or perceived fault. In public education, it refers to the commitment of teachers, administrators, and board members of being responsible for their performance and answerable for their results.

Citizens and taxpayers seem to be increasingly concerned with efficient use of resources. Ladd (1996) outlined three reasons for increased accountability in the U.S.

> First, many people believe that the K-12 system of education is not adequately preparing students, at reasonable cost, for the challenges of a global economy. Second, outcomes-oriented proposals are drawing attention because resources to increase K-12 education are expected to be tight in the next decade. Third, outcomes-based research has gained impetus from a feeling that the U.S. educational system has not been especially efficient in turning resources into educated students. (pp. 3-4)

A general consensus has emerged the last decade that more attention needs to be focused on the cognitive learning of students. For example, the Goals 2000: Educate America Act, passed in 1994, set eight goals, including two core goals related to student performance. Standards come from many sources. The National Council of Teachers of Mathematics (NCTM) developed voluntary standards designed to transform the teaching of math. With standards coming fast "states would shift the focus of their school accreditation efforts away from attention to inputs, such as the number of books in the library and the qualifications of teachers, and toward student outcomes" (Ladd, 1996, p. 4).

History of Accountability Development in the United States

"Our examination of the accountability movement has led us to conclude that it is not an educational but rather a political movement fueled by economic concerns" (Martin et al., 1976, p. 75). Economic and political forces provide the main thrust behind the movement that has attracted many who really believe that it will improve education. Do these forces aim to hold down the cost of education while at the same time striving to maintain the economic and political status quo, complete with its present inequities?

How long have these policy issues been raised? It has been far longer than just a couple of decades. Yes, Lyndon Johnson saw the need to improve education and pushed forward the original Elementary and Secondary Education Act in 1966. The Serrano case in 1971 set the tone attempting to equalize educational funding. Thus the quality and the equality of education were at issue and resolving both became the focus of most politicians since the early 80's.

Although not referred to by name, accountability dates long before these of recent memory. English schooling in the mid-nineteenth century was administered under a system known as "payment by results." Small (1972) noted that the payment-by-results system involved the examination of elementary school students by state school inspectors. The inspectors gave the same standard examination to each child. Funds were then appropriated to each school on the basis of its students' scores on the examinations. Small, went on to note, that one result of the system of payment by results was a considerable narrowing of the curriculum. "Matthew Arnold, in 1867 a school inspector in England, commented that students who passed the tests in reading, writing,

and ciphering did not necessarily possess the skills supposedly being measured" (Martin et al., 1976, p. 34).

The influence of Peter Drucker (1974), in his book *Management*, should not be underestimated. This 1974 publication was a must read for business leaders during the 70's. His beliefs were that schools are financed from economic surplus and, therefore, they are social overhead. The increasing cost, he thought, made it mandatory that they be managed. He went on to note; they are mismanaged and justifiably attacked for lack of performance. Managing schools for performance – holding them accountable – is our greatest managerial need today. To summarize, Druker's (1974) view of how schools should be held accountable, he offered these 8 steps; 1) clear objectives and goals, 2) priorities of concentration, 3) measurements of performance, 4) feedback and to build in self-control from results, 5) organized audit of objectives and results, 6) identification of unsatisfactory performance and activities which are obsolete, unproductive, or both, 7) abandonment of low-performance activities, and 8) competition between schools to hold them to performance standards.

Nationally businessmen such as Ross Perot were setting the scene. He was influencing policy in Texas by putting in place a business model of inputs, outputs, and checking quality. Texas went full force into this form of accountability according to Darling-Hammond (1997). Her opinion of the outcome was quite critical; she outlined the devastating effects in 4 different intercity high schools. One problem with high-stakes testing is that we have not laid out the goal of assessment. Is the goal to hold teachers, schools, and school systems accountable or is student learning the focus?

Perot's business goal, I believe, was to increase student learning for the economic gain of Texas. Litigation over funding set the stage for the perceived need for accountability.

Almost 2 decades of litigation had unfolded beginning with *Serrano v. Priest* in 1971. In *Serrano* the California Supreme Court found the state funding system violated the equal protection clauses of both the U.S. Constitution and the California State Constitution (VanSlyke, 1994). Then in 1973 the U.S. Supreme Court ruled in *San Antonio Independent School District v.* Rodriguez case that litigants were precluded from using the federal equal protection clause as a vehicle for finance reform. "Those seeking public school finance reform after the Supreme Court's *Rodriquez* ruling have to rely only on language in state constitutions when attempting to overturn school funding systems" (VanSlyke, 1994, p. 2).

Litigation continued on the state front. Major litigation and the different types of arguments used by the courts in overturning school finance systems are summarized here. *Serrano II* in 1977 reaffirmed the test in *Serrano I* that education is a fundamental right under the California constitution. The *Harper v. Hunt* ruling in a circuit court found Alabama's education funding to be unconstitutional. This ruling was significant because the court found the system to be both inadequate and inequitable. Thus ruling on the quality of education in the state.

Quality of education was a dramatic issue throughout the 80's and 90's. "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves … we have, in effect been committing an act of unthinking, unilateral educational disarmament" (National

Commission on Excellence in Education, 1983, p. 5). The issue of quality in education had been raised by the Coleman Report in 1966 and then again by the *A Nation at Risk* report in 1983.

Who should be held accountable? According to Ladd (1996) in the "new state accountability" the most appropriate unit of accountability is the school. Tennessee as well as other states has the school as the centerpiece of the accountability systems. The idea is that "programs that focus accountability and incentives on the school as a collective body are potentially more productive because they encourage teachers, principals, and staff to work together toward a common mission" (p. 11).

Tennessee's Accountability System

What was transpiring in Tennessee during this time of increased accountability? Tennessee, like so many other states in the early 80's, was in litigation over the constitutionality of their school finance system. Lamar Alexander, Governor of Tennessee in the 80's, pushed through legislation that modeled what other states were doing. Druker's (1974) business view and his prescribed steps to accountability would show up in Tennessee's blue print for education. Alexander pushed for merit pay for teachers as a way to raise the pay of teachers in the state, and hopefully raise the educational level of the children. Alexander's model of reform would be followed by other states. This, however, did not generate the success that the public was expecting from the added money spent on education in the state. This focus on inputs was about to come to an end.

As the litigation continued, Tennessee government officials could see the writing on the wall. *Tennessee Small School Systems et al. v. McWherter et al.* was filed on

behalf of 77 small school districts to challenge the constitutionality of the state's school finance system. The ultimate ruling in 1991 by Chancellor C. Allen High did indeed find the state's old funding formula unconstitutionally deprived children in poorer counties of an adequate education. In order to enact the court order change, the state would have to come up with millions of dollars in additional funding. Taxpayers in turn would demand something different to show a justified return on their investment.

The *Nation at Risk Report* in the early 80's helped form Tennessee legislators' opinions of a perceived problem with the quality of education provided to the children in the state. To address the problem and to show the citizens of the state, that their tax dollars were being well spent, legislators began drafting the Education Improvement Act (EIA) in 1991.

"At every level, the need for accountability and assessment was recognized as an essential component of educational improvement" (Sanders & Horn, 1994). The Tennessee Comprehensive Assessment Program (TCAP) was put in place for the accountability of the additional funds that would be spent on education in the state. Accountability would be insured in that "every local public school system shall meet the requirement of state law as to the operation of such system and of the rules, regulations, and minimum standards of the State Board of Education for the operation of schools" (Education Bill, 1992, p. 3).

One of the EIA's most important sections describes the means by which the state planned to hold educators accountable for their performance. The primary component of the EIA's accountability section is the Tennessee Value-Added Assessment System (TVAAS). According to the statute, TVAAS is "a statistical system for educational

outcome assessment which used measures of student learning to enable the estimation of teacher, school, and school district statistical distributions" (Tennessee Code, 2001, TCA 49-1-603 (a) (1)). This statistical model – designed to analyze the effects of districts, schools and teachers on students' learning – was developed by Dr. William Sanders, a statistician with the University of Tennessee of Tennessee at Knoxville. According to Sanders, the advantage of his model is that it focuses on student academic gains rather than raw achievement scores. The focus is on student improvement rather than on their absolute levels of achievement, which may be affected by socioeconomic status, parental education, and innate student ability. The guiding principle of TVAAS is that "society has a right to expect that schools will provide students with the opportunity for academic gain regardless of the level at which the students enter the educational venue. In other words, all students can and should learn commensurate with their abilities" (Sanders & Horn, 1994).

Performance goals were set for teachers, schools, and school systems. The goals for schools and school districts included academic achievement or value added to student learning. The goals have changed somewhat from the first ten plus years to include achievement and value added to student learning. Achievement is measured as a norm reference to a national sampling in five academic areas. The academic areas include Reading, Mathematics, Language Arts, Science and Social Studies. Value added is a measure of academic growth, gain-score results, from year to year in each of these academic areas. The value added measure is the centerpiece of the evaluation of teacher effectiveness. Writing is also included as a performance goal. Student writing is assessed at the fifth, eighth, and eleventh grades as of February, 2003. Other measures

that are a part of performance goals include: graduation rate, drop out rate, promotion rate, and attendance percentages.

The issue of accountability was very much evident in the EIA. Dr. William Sanders' mixed methodology was employed to judge performance. Teachers, schools, and school systems are expected to show value added to demonstrate student learning each year. The school and school systems must include all students in this calculation. Teachers on the other hand are not held accountable for students that have attendance less than 150 days during the school year. Also excluded from the teacher's effect data are special education children. Teachers receive a confidential account of his/her effectiveness data. School systems and schools on the other hand are graded through a highly publicized report card.

To date, what does Tennessee have to show for the accountability movement? Class size enrollments have decreased. This decrease is a result of legislation entitled the Basic Education Program. This legislation came about as a result of political pressure from educators. Since teachers were to be held to high standards of performance, they demanded class sizes that would help promote student success. The maximum averages that must be met in Tennessee public schools are K-3 (20), 4-6 (25), and 7-12 (30). For educators this is possibly the most dramatic change of all and more could be done in terms of placing instructional assistants in these classrooms.

As much as is possible, politics has been curtailed in the decision making process. With the election of the school board on a non-partisan basis and the appointment of the director of schools, we should continue to have decisions made in the interest of student learning. We are also getting relevant data on the testing program according to the 1995

and 2002 audits of Tennessee public education by the comptroller's office. With this volume of test data also comes the possibility of good research that will help to determine if the assessments now being undertaken are indeed the best possible means to make sure a student is learning.

Teachers will not say that the EIA has achieved pay equity. School systems are still very far apart in this area. In the school districts where parents have more money, so do the schools. The systems that were disadvantaged prior to 1992 are still disadvantaged today. The school systems that have fewer dollars continue to lose good teachers to higher paying systems and higher paying states. Tennessee as a whole ranks 32 in the nation in average teacher pay (Associated Press, 2002).

Test scores have come to dominate the discourse about schools and their accomplishments. High-test scores are selling houses. Druker's (1972) business model is at work when we do not have to look far to see that every aspect of school has an economic ramification. Tennessee's expenditures for assessment is approximately 2% of the total state education budget. Assessment should not be under taken just because it is cost effective. There should be a legitimate reason and this should revolve around student attainment. Student learning is at the heart of the Tennessee accountability system.

Accountability continues to be a primary focus of the Department of Education in Tennessee. Governor Don Sunquist in his 2001 State of the State address said that every school and school district now have report cards. He did not say that every child is learning and retaining more. *A Nation at Risk*, as history has found, was not accurate.

We have based our education system on faulty research. Thus we may be judging schools inappropriately.

Has the EIA been successful? By what measure should we judge success? Student learning, as measured by National Assessment of Educational Progress (NAEP), shows that from 1996 to 2000 there was a negative effect (Amrein and Berliner, 2002, p. 53). We have neglected to ask and research the question, what is the purpose of assessment? Are we about helping students or rewarding/punishing schools? As can be seen, many questions are yet to be answered.

There are a variety of potential problems associated with the testing emphasis. Madaus & Clark (2001) noted that the research and policy community have accepted a social science version of Heisenberg's Uncertainty Principle. That principle is "the more important that any quantitative social indicator becomes in social decision-making, the more likely it will distort and corrupt the social process it is intended to monitor" (Madaus & Clark, p.105). They argue that the meaning(s) of the TCAP tests may not be valid due to corruption of the teaching focused as simply taking a test. Teachers feel the pressure that the policy was designed to promote. This has raised serious questions about cheating. Although the law is clear that teachers can lose their jobs over security breaches, it does not address the narrowing of the curriculum to the tests.

Teachers spend the majority of their teaching on objectives that are provided from the test publisher. In January of each year the Department of Education provides a detailed list of the number and types of questions that will be asked on the TCAP test in the spring. Amrein & Berliner (2002) found that the concepts that are being tested through out the nation are not being transferred. They contend the scores of other widely

used assessments do not reflect the same gains that supposedly demonstrate learning. This teaching to the test is having profound effects on the education of the children in Tennessee. "The harder teachers work to directly prepare students for a high-stakes test, the less likely the test will be valid for the purposes it was intended" (p. 17).

Is the money there to reward or punish schools? The state is experiencing a shortfall in revenue, $350 million at present. Faye Taylor, former Commissioner of Education, sent out a weekly message to principals and directors of schools to keep us informed of the activity at the state level of education. She has informed us of a decline in extended contract money of 75% of the previous year. This has curtailed remedial programs for disadvantaged students and various other programs. Summer schools will not operate as extensively across the state due to this cut in funding. It is safe to assume that any financial rewards that a school might have received may not be there in the near future. Another example comes from Locker (2002) "Although the Gateway tests will assure that high school graduates have attained certain requisite skills, many students will need remediation to pass them. Gov. Don Sundquist's education proposal last year contained money to help students catch up, but it was not funded" (p. B3).

"Punishments are attached to school scores twice as often as rewards" (Amrein & Berliner, 2002, p. 6). Punishments have hit the most disadvantaged schools in the state. More than 60 of the state's 98 schools placed On Notice, for failure to meet state standards are from the Memphis school system. We do need solutions and this is what the EIA is lacking. Many problems can be found and punishments doled out, but how can we help these schools serve the children that attend. Testing may not be the answer. At the national level, as we can see in the "No Child Left Behind" legislation, testing will

continue to be a "bull market." Testing to monitor student learning is the central focus of this reauthorization of Lyndon Johnson's Elementary and Secondary Education Act of 1966. Testing for high-stakes accountability may have negative effects on student learning, but at present it is here to stay.

Amrein and Berliner (2002) put the high-stakes testing and student learning in perspective. "If we assume that the ACT, SAT, NAEP and AP tests are reasonable measures of the domains that a state's high-stakes testing program is intended to affect, then we have little evidence at the present time such programs work …Transfer of learning is not a typical outcome of their high-stakes testing policy" (p. 59). Examples of these poor outcomes are: 67% of the states that use high school graduation exams have demonstrated a decrease in ACT performance, 57% decreased in SAT performance, 75% had exclusion rates higher than the national average.

Other issues yet to be resolved are equity of race and socioeconomic factors. "The apparent inability of our public educational system to be as successful academically with children of color, particularly with those from low-income families, as the system is with middleclass white children is a direct threat to our claims to be truly a democratic country" (Scheurich et al., 2000). Scheurich et al. contend, "many schools and districts are engaging in very negative ways with their state accountability systems and, as a result, are decreasing equity" (p. 6). Mobility may also be a factor to be considered in the judging of schools as well. Tennessee's latest report cards to school districts and schools include a disagrigation of data to include performance measures by race, gender, and socioeconomic status. The report cards do not include mobility rates or the performance measures of these students apart from the whole.

Are schools are being unfairly judged in both student achievement and gain-score results when mobile students are included in the evaluation? Students that move into a school, at any time before or during the tests, are required to take the TCAP tests. These scores are included in the school and school system report cards. Tennessee Code Annotated excludes students from teacher effect results if they have been in attendance less than 150 days during the school year (TCA 49-1-606). It stands to reason that since mobile students' scores are excluded from the teacher value added system, then these scores should also be excluded from the report cards of schools and school systems. Does mobility literature support this assertion?

Mobility

Education Weekly offers a simple definition in their glossary of educational terms. "Student mobility refers to the phenomenon of students changing schools for reasons other than grade promotion. Students that tend to be highly mobile are from low-income families, are homeless, or are children of migrant workers" (Student mobility, 2003).

Studies of mobility began in the 1940's and accelerated after World War II as soldiers and their families sought their share of the prosperity brought on by the American industrial explosion. Educators recognized that residential mobility had an effect on student performance. An early study by Larson (1940) focused on what was thought to be the two most mobile groups of Americans: (1) the migrant farm workers and (2) military families. Looking at these two diverse groups of highly mobile families, researchers were puzzled by the differences between academic test performance and duration of the effect(s) of mobility on the test data (Lacey and Blane 1979). Early

studies were thus often conflicting in their conclusions (Pedersen and Sullivan 1963; Holland-Jacobsen, Holland, and Cook 1984).

Larson (1940) is frequently cited in other mobility studies. His early research, examining the children of migrant workers, was probably the first serious modern research to explore differences in student performance based upon mobility. Although Larson (1940) studied students in Arizona, his conclusions may well apply to all schools with a large mobility rate. He did not directly measure economic status of students in his study, but he did speculate that the roots of mobility might well have been economic. He particularly saw the need to modify the curriculum to those "high transiency" schools to accommodate shorter learning opportunities. He suggested lower class loads and more high-interest learning materials for teachers with large numbers of transient students in their classrooms.

Larson (1940) also saw a direct role for the federal and state governments in assisting schools with a high transient population. The added expense of educating transient students, he believed, should not be borne solely by the school district that simply happened to be near the highly transient populations.

Mobility, when examined as a factor of student achievement, is very complex. However, early research of student mobility did not employ significant theory in the field. Coleman's landmark study, Equality of Educational Opportunity (Coleman, et. al., 1966), collected mobility data but did little analysis of that data related to variables predicting student outcomes. Other early studies of mobility tended to be found in psychiatric studies dealing with only the most severe affects of student transfer. In fact, according to Metz (1971) and Long (1975), there was essentially no theory facilitating

the study of transfer students. Bayer (1982) recommended a typology for school transfer students that utilized a more extensive examination of the characteristics that influence mobility. The focus of this study deals with the impact upon schools so there continues to be no theoretical framework for the study of mobility's' effect upon student achievement.

Frequent moves from school to school place students, particularly poor urban students, as well as their teachers, at a disadvantage. Mobility rates at such schools are frighteningly high and getting worse. Fowler-Finn (2001) states, "Stability in family, residence, school and school attendance support better learning. Those who need stability the most, the poor, appear to have the least" (p. 36). Districts have little opportunity to influence the learning of students who move into the district late in the school year. Also, the best school-wide curriculum mapping in the world falls apart unless we have a national curriculum. Most textbooks are designed to be a flow of material, for a school year, beginning to end with material in the early content being built upon in subsequent units.

Mobile students experience a greater adjustment time to their peer group, the classroom and the school. This adjustment time takes away from the time that a student could spend on academic learning. "Each withdrawal and each entry takes a toll on the student who is moving, on the students who remain, on teachers, on support staff, on the office and on parents – schools spend a lot of time on activities that impede direct uninterrupted instruction" (Fowler-Finn, 2001, p. 36)

"Mobile students lose continuity of instruction and the peer relationships with familiar friends that provide security for learning. They cannot take easy advantage of

remedial instructional programs for which diagnoses emerge over time, or of programs for which eligibility must be established. The achievement of all students in high-mobility schools suffer because teachers must devote instructional time to review for newcomers and to the organizational tasks of incorporating them into classrooms" (Rothstein, 2001, p. 5). Although the research has not determined that mobility is the cause of lower academic scores. Thomas (2001) points out an area that is over looked, "teachers of classrooms with these students tend to 'flatten' the curriculum by reviewing more than usual" (p. 2).

Frequent changes in schools can result in gaps in the essential skills needed to work well in the classroom. Many school systems have policy in place to keep students from changing schools at times other than the start of a new school year or semester, unless there is a change in residence. This type of move is like moving from one ladder to another in midair. The chance of being at the same height after the move is very slight. First grade teachers have pointed out another occurrence to this researcher over several years. Students can miss one day, thus one concept and that decreases their overall success level in subsequent years. A large number of students have school absences between school changes. These added days contribute to less content being covered and prolongs the assimilation into the new classroom routine.

"Children with special learning needs have an even greater difficulty because teachers may not have records detailing their disabilities and plans for modifications" (Thomas, 2001, p. 15). Mobile students' transitions into new schools are often hindered by the lack of information about their previous education, experiences, and needs. School officials have difficultly getting records from many schools, although Tennessee

state law addresses the transfer of records. Many times these children have financial obligations and the previous school demands that these be cleared before sending records.

Mobility has an impact on the classrooms and schools involved. The students in the classroom of the mobile student are also affected by the influx of new students (Kerbow, 1996). Teachers must review records, evaluate, and at times, re-teach students who may not be on the same level as students who have been in the classroom from the first day of school. Overall, mobility results in a broad range of issues for student learning, classroom management, classroom instruction, and school organization.

Kerbow (1996) charted the influx and exit of students over time. The composition of the classrooms changed continuously. Long-term planning becomes extremely difficult. Students for whom a particular unit was planned may move away. Other students may move into the classroom setting in the middle of the unit and not have been exposed to all the skills. This makes assessment of the unit more difficult. Teachers reported less collaboration with their peers, less collective focus on student learning, and a lower orientation to innovation in instruction.

Kerbow (1996) also reported that teachers in classrooms of highly mobile students became more review-oriented in their lesson plans. Because new students have missed the specific instruction that was presented at the beginning of the unit, teachers review old material and introduce new material at a slower pace. New students may also be weak academically, necessitating tutorial work and repetition of material. Repetition slows the instructional pace of the entire class and disrupts the flow of instruction for all students.

Teachers are affected by curriculum planning for the entire school. Not only will new skills not be taught if time must be spent on review, but plans made for specific groups of students in the spring may not be needed if those students have moved away by fall. When Kerbow (1996) compared schools, with stable verses highly mobile students, in curricular pacing, highly mobile fifth-grade classrooms had lost a year of instruction. It was also emphasized that this "flattening" of curricular pace limits the amount of material to which all students are exposed, not just mobile students. Therefore, highly mobile schools have a dilemma: how to incorporate the mobile students without sacrificing the learning of the other children.

Public school student mobility has had an increasing impact on the performance of individual students and school systems in recent decades, particularly in urban school systems. A 1994 report to the House of Representatives by the General Accounting Office (U. S. GAO, 1994) reviewed current available information pertaining to mobility and its effects on student achievement. The report found that students with high mobility are more likely to be low income, inner city, migrant, or limited English-proficient (LEP) children. These students also are more likely to be low achievers and to repeat a grade. Numerous studies before and since the GAO report have documented differences in the achievement levels of mobile and nonmobile students.

Mehanna and Reynolds (1995) found that frequent mobility is related negatively to sixth-grade reading achievement after controlling for kindergarten achievement. Among low-income, black sixth-grade students followed since preschool, free lunch eligibility was also related to mobility. Ingersoll, et al. (1989) studied the effects of mobility among students in the Denver Public Schools. Achievement scores were

examined among several categories of mobility, both within and external to the district. Results showed negative effects for all types of mobility, especially at the earlier grade levels.

There have been indications that student mobility may not carry as much weight in the explanation of student achievement as assumed. Many studies have considered mobility as merely one of many factors influencing achievement, and not always one of preeminent importance. Adduci (1990) studied 10th graders in one New Jersey high school. Primary language and family income, socioeconomic status, were used along with mobility indicators to predict achievement. It was found that mobility added little to the prediction of achievement beyond the other factors. Parades (1993) examined the effect of student mobility, family income, ethnicity, and grade level on student achievement in the Austin, Texas schools. There was a strong relationship between low income and mobility. Students who moved more frequently scored lower on tests, although mobility was only one influence among the other significant predictors. Alexander et al. (1996) studied elementary students in 20 Baltimore public schools. Ethnicity and low income were considered along with mobility. Higher income students frequently transferred into and out of the district, whereas lower income students more often transferred within the district. By the end of fifth grade, mobile students had lower test scores and lower classroom grades, and they were more likely to have been retained and to have received special education services. However, the effect of mobility was greatly reduced when ethnicity, family income, and early school achievement were taken into account.

Nelson et al. (1996) studied 2,500 early elementary, low-income students in urban schools. Achievement and behavioral data were collected early in the study, and then the students were followed for 3 years. The most mobile students were rated lower initially in behavior and school adjustment. Findings suggested that both poor school functioning and mobility might be related to additional influences such as at-risk family traits. Premobility differences in achievement could not be demonstrated at the kindergarten level, but Nelson et al. (1996) implied strongly that they existed. Williams (1996) confirms students that become mobile demonstrate preexisting achievement deficits. In conclusion, Williams (1996) stated "mobility is subordinate in its effects on achievement to the risk factors for ethnic minority status and low family income" (p. 352).

The effects of student mobility also were thought to have broad implications beyond individual student achievement. Kerbow (1996) studied student mobility among Chicago elementary students and found that most schools did not have stable cohorts of students that could be tracked over time. Kerbow also observed that reform efforts designed to improve student achievement often assume continuity of attendance, but schools as well as individual students may lose resulting gains because of student mobility. Bruno and Isken (1996) found that school transience rate was a significant predictor of school-level achievement scores in Los Angeles area schools. They also determined that transiency had its greatest impact on instructional continuity at the classroom level. Williams (1996), observing high rates of mobility in Chicago elementary schools, suggested a common curriculum to minimize the impact on individual students. Lash and Kirkpatrick (1994) studied teacher beliefs about student mobility and strategies used to assist transfer students. They found that urban teachers

planned their teaching as though students would be with them continuously through the school year, even in schools where annual mobility approached 50%. The researchers suggested that an assumption of population stability appears to underlie the education system. An example of this comes from Fowler-Finn (2001), in the Fort Wayne Community Schools, "a longitudinal study of the effectiveness of the Success for All program had to be ended prematurely in the final year because not enough students remained for three years in the schools to provide a statistically significant sample" (p. 36).

Even from the earliest studies comes the recommendation that schools with highly mobile populations be treated differently. Different may not necessarily mean monetarily, but just a recognition and an understanding of the limitations placed on an institution by a factor out of the control of the school. This study may have an impact on state policy framing performance standards for schools and school systems.

Review of Jones' Findings: In addition to the narrative literature review on mobility presented thus far, Jones (1990) conducted a meta-analytic review of school mobility effects on achievement in the literature review section of his dissertation entitled "The relationship of student achievement to mobility in the elementary school." His initial broad search yielded 93 studies. Five inclusion criteria were followed: first, studies included students from kindergarten through twelfth grade; second, the studies measured the relationship between mobility and achievement; third, studies defined mobility in a manner that implied a change in schools; fourth, achievement was measured by either grade point average or a norm-referenced test score; and fifth, ERIC documents were included but not master's theses.

Studies were conducted between 1938 and 1987 and covered six countries: Australia, Canada, Great Britain, Sweden, West Germany, and the United States. The median sample size was 539 but the mean was 4,998 due to the presence of four studies with large sample size including one that comprised 345,453 students. Twenty-one effect sizes were positive and 49 effect sizes were negative for reading. As for math, 16 effect sizes were positive and 38 were negative. Few studies reported a composite effect size; four were positive and 13 were negative. The mean effect sizes were -.29 and -.10 for reading and math, respectively. Both estimates were significantly different than zero at the .01 significance level.

Additional analyses revealed that the mean effect size was different (1) between military dependents and civilian children, (2) between studies conducted in the United States and studies conducted outside the United States, and (3) between studies that used an ability measure as a covariate and studies that did not. As a result, Jones (1990) reanalyzed the results after excluding studies with the above criteria and also studies that only included high school students. A total of 37 studies remained. Of these 37 studies, 36 reported results for reading; two showed a positive effect and 34 showed a negative effect. Twenty-two studies reported results for math among which one study found a positive effect and 21 showed a negative effect. The new composite correlation was -.31 for reading and -.17 for math. Both estimates were significant at the .01 levels. There were no differences between the studies by source, statistical test, achievement test, effect sizes or the sample size. However, in 14 studies where authors reported SES, nine studies showed that SES interacted with mobility. Ethnicity and gender, on the other hand, interacted with the mobility-achievement relationship in two studies.

Jones (1990) studied mobility effect for grades three through five in three separate years. Results indicated the non-mobile students' achievement was higher than mobile students' achievement. The differences were not significant in all grades, however, but were significant main effects in mathematics at the third- and fifth-grade levels and significant interaction effects in reading, also at the third- and fifth grade levels.

Review of the Mehanna's Findings: The Mehanna (1997) study evaluated the effects of school mobility on reading and math achievement in the elementary grades (K-6) using meta-analysis for studies dated between 1975 and 1994. Mobility was defined as any change in schools. The sample sizes of the 26 studies examined ranged from 62 to15,000 students. "The statistics in the studies were converted into d which is an effect size (ES) derived by taking the mean difference between the treatment and control groups and dividing by the pooled standard deviation. The individual effect sizes were almost all negative except in cases where the sample consisted of military personnel's dependents" (Mehanna, 1997, iii).

Mobility was negatively associated with reading and math achievement. The effects were relatively small to moderate in magnitude depending on the frequency of mobility. The mean effect sizes for mobile groups were negative with the frequently mobile group more impacted than less frequently mobile or non-mobile groups.

Summary

Accountability is becoming more prevalent in the United States. The "No Child Left Behind" legislation will insure that schools will be held accountable for many years to come (Hickock, 2002). The Tennessee Department of Education is pushing ahead to meet the legislative requirements of this federal mandate. In an attempt to meet these

guidelines, the current testing program, TCAP, will continue to be utilized. One of the drawbacks to this program is that the mobile student is included in a school's report card no matter how long the student has been a member of the reporting school.

Change may be in the works. An addendum to the 2003 TCAP writing assessment, given in February, required marking student academic membership data. The addendum noted the "recent interpretations of No Child Left Behind (NCLB) require the following changes to be implemented immediately for Tennessee assessments." (Writing Assessment Instructions, 2003) The addendum states, "as a component of NCLB's accountability requirements, the state must gather membership information for every child." (Writing Assessment Instructions, 2003) The possible four responses to be marked were: has been enrolled in this school since the 1st reporting period, not enrolled in this school but has been enrolled in the school district since the 1st reporting period, not enrolled in this school district but has been enrolled in a Tennessee public school district since the 1st reporting period, and has not been enrolled in a Tennessee public school district since the 1st reporting period.

Mobility's effect on student achievement has been demonstrated to have a negative relationship through many studies. Although there is not a consistent relationship, there is enough evidence to support the need to investigate further the effects of mobility on achievement in the state of Tennessee. "TCAP's vast database is yielding far more than assessment data. Because it encompasses so much student data, educational findings that were invisible in the past are now readily apparent" (Sanders & Horn, 1994). With such a large database of student achievement and TVAAS

information, it seems very appropriate to tap this database to discover if student mobility adversely affects the performance of public schools in Tennessee.

CHAPTER THREE

METHODOLOGY

Introduction

This study investigates the impact of mobility on student achievement and gain-score results in both reading and mathematics. Also, to be determined was the interaction effect of mobility and the following student demographics; SES, gender, grade level and ethnicity with student achievement and gain-score results in reading and mathematics. Based upon this investigation, the purpose of this chapter is to describe the methodological procedures used to complete the study.

The primary objectives of this study were as follows:

1. To determine if student achievement in reading and mathematics are significantly different for mobile verses nonmobile students in the study;
2. To determine if gain-score results in reading and mathematics are significantly different for mobile verses nonmobile students in the study.
3. To determine any interaction effect between mobility and a student's socioeconomic status (SES), gender, grade level or ethnicity on student achievement in reading and mathematics.
4. To determine any interaction effect between mobility and a student's socioeconomic status (SES), gender, grade level or ethnicity on student gain-score results in reading and mathematics.

Addressing the above objectives should help determine if schools are adversely affected by the inclusion of mobile students on the Tennessee state report cards. The

results will be used to identify policy implications and instructional concerns related to student achievement and gain-score results in reading and mathematics.

This section presents an overview of the research methodology used in this study. It includes a description of the community and school district, research design, description of the variables, population, data collection procedures, data analysis, and concludes with a summary of methodology.

Description of Community and School District

This study was conducted using data from Knoxville, Tennessee. According to the local chamber of commerce, Knoxville is one of the five largest cities in the state. The school district is comprised of urban, suburban, and rural areas, because it comprises the city of Knoxville and the surrounding Knox County. The county population is approximately 380,000 people. A wide diversity of individuals is to be found among this population. The facilities and services that a moderate size city can provide along with a major university attract all kinds of people to the city and surrounding area.

The school district reflects the diversity of the community. The school board supports a philosophy of neighborhood schools. In addition to the district administrative center, there are 89 attendance facilities in the school district (Report Card, 2002, p. 1). According to the Knox County School System web site (Knox County Schools, 2003) of demographics, there are 51 elementary schools that provide instruction to approximately 25,000 students. These neighborhood schools range in size from 104 to 1017 students. These elementary schools vary in the grade level make up from K-2, 3-5, to K-5 configurations. There are 14 middle schools that facilitate learning for approximately 13,000 students and range in size from 582 to 1800 students. Thirteen high schools

promote educational experiences for over 15,000 students and range in size from 755 to 2017 students. Other schools in the system meet a variety of needs and include learning opportunities in technology and special education. Adult leaning centers and transition schools are also a part of the educational services provided. Demographics place the annual student population for this school district at over 51,000 students. The diverse ethnic composition of the city is duplicated in the school district population. District demographic information (Report Card, 2002) lists the following ethnic composition as White (83.1%), African-American (13.7%), Asian (1.5%), Hispanic (1.3%), and Others (0.3%). The socioeconomic breakdown for the district consists of 34.3% of the students receiving free or reduced lunches. Students enrolled in special education make-up 13.4% of the total students in the district.

Student mobility in the state is coded on the answer sheets of all students taking the Tennessee Comprehensive Assessment Program (TCAP) beginning with the 2003 administration. Student membership coding included:

1. The student has been continuously enrolled in this school since the first 20 day attendance reporting period.
2. The student has not been continuously enrolled in this school, but has been enrolled in this school district since the first 20 day attendance reporting period.
3. The student has not been continuously enrolled in this school district, but has been enrolled in a Tennessee public school district since the first 20 day attendance reporting period.

4. The student has not been continuously enrolled in a Tennessee public school district since the first 20 day attendance reporting period.

For the purpose of this study, students that coded the first line were determined to be the non-mobile group. Students that coded any of the other three were considered the mobile group. The NCLB accountability model uses the same mobility accounting for schools. For school system accountability only students coding the last two entries would be excluded.

Research Design

A secondary data analysis design was employed in this study. This design is appropriate when random assignment of subjects to treatment groups is not possible (Borg & Gall, 1989). While this design comprises some of the rigor of the controlled experiment, it does maintain the argument and logic of experimental research. This type of research has also been called "ex post facto research," a systematic empirical approach in which the investigator does not employ experimental manipulation nor random assignment of subjects to conditions because events have already occurred or they are inherently not manipulable (Rudestam & Newton, 1992).

The primary research design used in this study was a factorial. "When more than one independent variable is included in a study, whether a true experiment or a quasi-experiment, a factorial design is necessary" (Best and Kahn, 1989, p. 136). The factorial design was determined to be appropriate for examining the impact of student mobility on the academic achievement and gain-score results of students in reading and mathematics.

Several available references assisted in developing a clear understanding and a working definition of factorial designs. According to Hopkins (1980), a factorial design

is used to facilitate study of the effects of more than one independent variable and to permit study of combinations of variables. Additionally, Cates (1985) described the benefits of factorial designs that allow the simultaneous testing of several hypotheses. Borg and Gall (1989) defined factorial design as "... an experiment in which the researcher determines the effect of two or more independent variables (i.e., factors)—each by itself and also in interaction with each other—on a dependent variable" (p. 694). Tuckman (1988) concluded "All that can be said of the true experimental design can be said of factorial designs, with the addition that the factorial design makes it possible to deal systematically with more than one independent variable" (p. 146).

Two reasons for using the factorial design were outlined by Hopkins (1980). First, the control of one or more independent variable while manipulating another independent variable is desired. The same or different effects of the interaction at each of the established levels are determined by examining the interaction effect of one independent variable on different levels of another independent variable. Second, the study of the interaction effect of two or more independent variables is wanted. The interaction effect of combinations of independent variables may be investigated to determine if an interaction is present, yet not uniform across the other variable, or greater than the interaction of either of the two variables separately.

A further elaboration of the factorial design process was presented by Borg and Gall (1989) when defining main effect and interaction effect. The main effect is the effect of each independent variable on the dependent variable; and the interaction effect is the effect of the interaction of two or more independent variables on the dependent variable. In the opinion of Tuckman (1988), the factorial design makes it possible to

evaluate the separate effects of all independent variables used, as well as the interaction effects of all variables.

The cleanest factorial design presented in educational research is the basic 2 x 2 factorial design. The first number represents the number of rows and the second number denotes the number of columns used in the design. In the basic 2 x 2 design study, two factors are studied and each factor has two levels. This design uses four cells to represent each subgroup. The four cells are then statistically analyzed for interaction or combinations of interactions at the different levels.

Two such factorials were evaluated in this study. Each factorial consisted of student mobility status (mobile or non-mobile) and student achievement or gain-score results. Figures 3.1 and 3.2 are two matrixes that visually represent the factorials to be employed in this study.

Research Questions

The following research questions were used to generate the null hypotheses.

1. Are the mean achievement test scores of mobile students significantly different from the mean achievement test scores of non-mobile students?
2. Are mean gain-score results of mobile students significantly different from the mean gain-score results of non-mobile students?
3. Is there a significant interaction effect between mobility and a student's demographic factors including socioeconomic status (SES), gender, grade level, or ethnicity on mean achievement test scores?

Mobile	Student Achievement Mathematics
Non-Mobile	Student Achievement Reading

Figure 3.1: Mobility/Achievement factorial.

Mobile	Gain-score results Mathematics
Non-Mobile	Gain-score results Reading

Figure 3.2: Mobility/Gain-score results factorial.

4. Is there a significant interaction effect between mobility and a student's demographic factors including socioeconomic status (SES), gender, grade level, or ethnicity on mean gain-scores results?

Table 3.1 lays out the variables used to help answer research questions three and four. The possibility of multiple interactions between any two of the independent variables was analyzed.

Null Hypotheses

The following null hypotheses were used to help address the previous research questions.

H_0 1: There is no significant difference between the mean achievement test scores in reading for students that are mobile and those that are non-mobile.

H_0 2: There is no significant difference between the mean achievement test scores in mathematics for students that are mobile and those that are non-mobile.

H_0 3: There is no significant difference between the mean gain-score results in reading for students that are mobile and those that are non-mobile.

H_0 4: There is no significant difference between the mean gain-score results in mathematics for students that are mobile and those that are non-mobile.

H_0 5: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean achievement test scores in reading.

Table 3.1: Interaction effect of the independent variables on the dependent variables.

Independent Student Variables	Dependent Variables
Ethnicity	Student Achievement (Mathematics)
Grade Level	Student Achievement (Reading)
Gender	Gain-Score Results (Mathematics)
Mobility	Gain-Score Results (Reading)
Socio-Economic Status (SES)	

H_o 6: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity as measured on mean achievement test scores in mathematics.

H_o 7: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean gain-score results scores in reading.

H_o 8: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity as measured on mean gain-score results in mathematics.

Description of the Variables

Dependent variables used in this study were the mean scale scores (SS) measuring student achievement in reading and mathematics. Additional dependent variables included gain-score results in reading and mathematics. The Tennessee State Department

of Education, by law, requires the annual administration of a norm-referenced examination of all students in grades three through eight. In the spring of 2003, the California Tests of Basic Skills (CTBS/5) form G was the exam administered across the state. This testing is a part of the Tennessee Comprehensive Assessment Program (TCAP). In addition the Knox County School System chose to test the second grade students. This choice of testing second graders allows the school system to obtain gain-score results at the third grade level.

Each year, test results are presented to and encoded into the district's computer student database and also become a part of a student's permanent record. Academic achievement is recorded in a student's permanent record in the form of scale scores, national percentiles, norm curve equivalents, and stanines in each of five academic areas. The scale score is used to determine academic growth for year to year. The gain-score results, in each of the five academic areas, are derived from a subtraction of the student's previous year's scale scores from the current scale scores. This process is completed under the direction of the state department of education by Dr. William Sanders now employed by SAS inSchool.

The Normal Curve Equivalent (NCE) is used to measure academic attainment for Tennessee schools and school systems. Since this research dealt with individual students it was decided that a more appropriate measure to use were scale scores, because it is the closest value to the actual raw score. Data for this study employed scale scores and gain-score results from the 2002 TCAP administration. The academic areas of reading and mathematics were statistically analyzed, because of the large amount of previous studies also focused on these two academic areas (Mehanna, 1997; Jones, 1990).

Scale scores, a form of standard scores, are a statistical transformation of an original result, obtained by a learner on a test. The original result on a test is transformed to a value on a scale ranging from 001 to 999. Scale scores are used to compare test results over time and across different groups. For this study the scale score from the composite reading score and the composite math score were used for each student. In addition, this study used the gain-score results in reading and mathematics that were derived from the subtraction of a student's 2002 TCAP results from his/her 2003 TCAP results. These 4 scale scores were obtained from the Tennessee Department of Education's restricted web site, which has the score of every student that took the test in any of the last five years.

Independent variables used in this study were drawn from coding on student answer sheets. The independent variables included information about student mobility, student socioeconomic status (SES), gender, grade level, and ethnicity. Mobility for this study is operationally defined simply as whether or not a student was enrolled continuously in the same school after the initial 20 days of the school year. Student mobility was required to be coded on each student's TCAP answer sheet for the first time in the fourteen-year history of the Tennessee educational testing program. Socioeconomic status (SES) is determined by approved student participation in the federal free/reduced lunch program within the district. Students are classified high SES if they pay full price for their meals, or low SES if they have been approved to participate in the federal free/reduced priced meal program.

Population

The population for this study was all the third-, fourth-, and fifth-grade students tested in the elementary schools in Knox County Tennessee at the spring 2003 administration of the TCAP. These data were chosen because the school system required mobility coding, of whether or not a student was a member of the tested school for the entire school year or not, on each student's answer form. All of the elementary schools with third, fourth or fifth grade students in attendance were used so that the greatest cross section of students would be obtained. Of the 51 elementary schools in the Knox County system, 47 of these schools presently have the grade requirements for this study.

Data Collection Procedures

An application for review of research involving human subjects, Form A, was submitted to the Internal Review Board (IRB) of the University of Tennessee. The application consisted of a letter to Dr. Charles Lindsey, Superintendent, Knox County Schools, requesting permission to access the Tennessee Comprehensive Assessment Program (TCAP) data from the school year 2002-2003. Also included was a letter to Dr. Mike Winstead, Coordinator of Research and Evaluation and Group Testing for the Knox County School system, requesting his assistance in gathering needed data. Additionally, a letter of support from Dr. Winstead, on behalf of the Knox County School System, was included. Confidentiality was assured and the research should be of interest to the school system.

Data were generated from the student TCAP database that is provided to each school system in the state. Data were condensed using TestMate Clarity©, a computer software package used to sort and/or select specific sets of data. The data included all of

the third-, fourth-, and fifth- grade students in the Knox County School System. Each student record consisted of the following: student name, school, membership status (mobility information), ethnic origin, gender, grade level, and socioeconomic status (SES). These data were compiled and entered into a Microsoft© EXCEL file.

The Tennessee Value-Added Assessment System (TVAAS) database was accessed through the Tennessee Department of Education web site. The Knox County School System Coordinator of Research and Evaluation provided this researcher with a user name and password for the restricted access to the needed data. Data obtained on the web site were the adjusted scale scores for each student from the 2002 and 2003 state testing. The data pulled were the composite scores in mathematics and reading. There were missing data for the 2002 score(s) for a variety of reasons. Student names were deleted from the file. Data were then analyzed with the assistance of Cary Springer of the Statistical Consulting Group at the University of Tennessee at Knoxville. The statistical software package employed was SPSS© (Effective administration and management, 2004).

All of this was completed in compliance with state law. Tennessee's public records act classifies student records as confidential, with few exceptions. "Statistical information not identified with a particular student may be released to a person, agency, or the public" (Tenn. Code Ann. 10-7-504(a)(4)).

Data Analysis

Data analysis required statistical evaluation. Multiple analysis of variance (MANOVA), a hypothesis-testing procedure, was used to determine if means are significantly different between the groups in the sample. "A MANOVA is used to see the

main and interaction effects of categorical variables." (Garson, 2003) Although the analysis of variance (ANOVA) will provide the same information, this statistic analysis was chosen because there is more than one dependent variable.

A MANOVA was employed twice in this study to address the research questions and to evaluate the null hypotheses. The first analysis evaluated the data to help address research question one. The means comparison was to determine if there was a significant difference ($p < 0.05$) between mobile verses non-mobile students in achievement test results in both reading and mathematics. If a significant difference were found then an ANOVA would be run on the two dependent variables separately. The results of the ANOVA helped determine which one or if both of the mean achievement scores were significantly different at the alpha level of 0.05.

The second MANOVA was conducted with the data to help address research question two. The means comparison was to determine if there was a significant difference ($p < 0.05$) between mobile verses non-mobile students in gain-score results in both reading and mathematics. If a significant difference were found an ANOVA would be run on the two dependent variables separately. The results of the ANOVA helped determine which one or if both of the mean gain-score results were significantly different at the alpha level of 0.05.

ANOVA was also employed independently to make decisions, rejecting or failing to reject the null hypotheses, in connection with research questions three and four. ANOVA is used to determine if differences between samples are simply due to chance or whether there are systematic treatment effects that have caused the scores in one group to be different from scores in another group. ANOVA is used to measure the size of

differences or the amount of variability and to explain where they come from. A two-way ANOVA was used in this study to analyze the interaction effects of the independent variables; ethnicity, gender, grade level, mobility status, and SES on the dependent variables; math achievement, reading achievement, math gain-score results, and reading gain-score results.

The process described required combining all scores from the separate populations to obtain one general measure of variability. Scores were analyzed by calculating an F value for each of the independent variable distinctions on achievement scores and another on gain-score results. Scores were examined from two basic components of variability: between-treatments variability, and within-treatment variability. The F ratio was then built from these two sources of variance as follows:

$$F = \frac{\text{between-groups variance}}{\text{within-groups variance}}$$

The value of F indicates whether the sample means of various factors in the experiment differ significantly from each other. In this study, F ratios generated were the final measure to determine the significance of each factor and interaction of effects on the dependent variables. The information necessary to calculate the F test came from the gathered data. The following formula provided the F ratio:

$$F = \frac{MS_b}{MW_b} = \frac{SS_b \,/\, df_b}{SS_w \,/\, df_w}$$

After referring to the F ratio table, each interaction was assessed for statistical significance at the .05 levels. Each of the established null hypotheses were examined and

tested at .05 levels for rejection or failure to reject. In determining significance for this study the p value of the obtained F statistic was compared to the critical *p* value ($p < .05$). According to Borg and Gall (1989), the level of significance is used to make decisions about rejecting the null hypotheses.

After the analysis and the determination about rejecting the null hypotheses, a t-test was performed with the data that showed interaction effects. Like the F statistic the t statistic is used to test hypotheses. The t statistic is built from the following formula:

$$t = \frac{\text{sample mean} - \text{population mean}}{\text{estimated standard error}}$$

The goal of using this statistic is to use the sample as a basis for determining whether or not there is an effect. After using the formula and obtaining a *t* value, a decision can be made about rejecting or failing to reject the null hypotheses. When the value of the *t* statistic is near zero, the conclusion is drawn that there is no significant difference and the null hypotheses is not rejected. However, when the value of *t* is significant according to the tables and exceeds the established levels of significance, the hypothesis is rejected. The *t*-test is used when there are two-sample groups to be used in a comparison for statistical test significance. In this study the two-sample group that was of most concern were those of mobile and non-mobile students.

Summary

This chapter presented a description of the methods and procedures that were used in this study. The descriptions presented included the objectives of the study, description of the community and school district, design of the study, null hypotheses of the study,

population of the study, procedures for collection of the data, and the method used for analysis of data. The analysis of these data is presented in Chapter 4.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF DATA

Introduction

In this chapter, the data regarding the effect of student mobility on achievement and gain-score test results are presented, analyzed and discussed. The purpose of this study was to determine if there is a significant effect of student mobility on student achievement and/or a student's gain-score results in both reading and mathematics. Also, to be determined was whether or not there is an interaction effect of mobility and a student's demographic characteristics with student achievement and gain-score results in reading and mathematics.

Description of the Data

The data sample consisted of 12,138 third-, fourth-, and fifth- grade students from the Knox County School system as of the 2003 spring testing of Tennessee Comprehensive Assessment Program (TCAP). Of the valid responses Table 4.1 indicates the ethnic origins of the students in the study. The majority of the students were white, non-Hispanic (80.5 %). African-American students comprised 15.3% of the sample. The remaining 4.1 % of the students were of other ethic origins or simply lacked the coding for classification.

Gender, as would be expected, approached an even split between male and female students. Table 4.2 displays the actual percentages with slightly more boys than girls and 74 students had missing information for the gender category.

Of the valid responses 37.4% of the students were eligible to participate in the federal free/reduced meal program. Students considered to be in the high socioeconomic

Table 4.1: Ethnic frequency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	9777	80.5	80.9	80.9
	African-American	1863	15.3	15.4	96.3
	Other	444	3.7	3.7	100.0
	Total	12084	99.6	100.0	
Missing	System	54	.4		
Total		12138	100.0		

Table 4.2: Gender frequency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	5877	48.4	48.7	48.7
	Male	6187	51.0	51.3	100.0
	Total	12064	99.4	100.0	
Missing	System	74	.6		
Total		12138	100.0		

status (SES), because they were required to pay the full price for lunch, made up 61.5% of the sample study. Table 4.3 outlines the SES including the 131 students with missing information in this field. Grade levels were evenly distributed as indicated in Table 4.4.

Non-mobile students accounted for 88.2% of the sample study. A total of 925 students were coded as being mobile. Thus the mobile students made up 7.6% of the sample. Students with missing information in the membership field numbered 505 or 4.2% had not coded this information. Frequency table 4.5 from the SPSS© analysis lists this mobility break down.

Two dependent variables, student achievement in the form of composite scale scores in reading and mathematics from Form G of the 2003 edition California Test of Basic Skills (CTBS/5), were examined.

Table 4.3: Socioeconomic status frequency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Free/Reduced Lunch	4545	37.4	37.9	37.9
	Full Price Lunch	7462	61.5	62.1	100.0
	Total	12007	98.9	100.0	
Missing	System	131	1.1		
Total		12138	100.0		

Table 4.4: Grade level frequency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	3936	32.4	32.4	32.4
	4	4058	33.4	33.4	65.9
	5	4144	34.1	34.1	100.0
	Total	12138	100.0	100.0	

Table 4.5: Mobility frequency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-mobile	10708	88.2	92.0	92.0
	Mobile	925	7.6	8.0	100.0
	Total	11633	95.8	100.0	
Missing	System	505	4.2		
Total		12138	100.0		

Two additional dependent variables, gain-score results from the simple subtraction of a student's 2002 score from his/her 2003 result in reading and mathematics, were also examined. The number of possible gain-scores available in the sample were limited to the number of students that had 2002 TCAP results posted on the Tennessee Department of Education restricted web site. Tables 4.6 and 4.7 provide descriptive statistics; mean scores by grade, for the dependent variables for both reading and math respectively.

Analyses conducted for null hypotheses one, two, three, and four, research questions one and two, included all students in each of the three grade levels. A concern of achievement differences for each grade level had to be addressed because of the use of scale scores. Additionally, gain-score test results have varying target gains for each grade level and this too needed to be resolved. The analyses used to address the null hypotheses five, six, seven, and eight, research questions three and four, focused on the interaction effect of student demographic factors and student mobility. A student's grade level and his or her mobility status interaction were not significant. Therefore grade did not have an effect on mobility differences on student achievement scores or gain-score test results. This lack of significance allowed greater confidence in the MONOVA analyses for the first two research questions.

Analysis of Data

This study used multivariate analysis of variance (MANOVA) as the statistical method to test null hypotheses 1, 2, 3, and 4. This study used analysis of variance (ANOVA) as the statistical method to test null hypotheses 5, 6, 7, and 8 as stated in chapter 3. Results of the MANOVA and ANOVA are presented in summary tables

Table 4.6: Descriptive statistics in reading.

Grade		N	Minimum	Maximum	Mean	Std. Deviation
3	Reading 2002	3372	413	714	611.22	43.838
	Reading 2003	3903	449	733	632.25	44.951
	Reading Gain Score	3372	-136	153	21.58	28.160
	Valid N (listwise)	3372				
4	Reading 2002	3663	449	733	629.62	44.356
	Reading 2003	4039	451	760	643.26	45.832
	Reading Gain Score	3663	-129	164	14.30	28.962
	Valid N (listwise)	3663				
5	Reading 2002	3798	449	760	645.21	42.417
	Reading 2003	4085	486	770	656.10	42.292
	Reading Gain Score	3798	-117	148	11.25	25.381
	Valid N (listwise)	3798				

Table 4.7: Descriptive statistics in mathematics.

Grade		N	Minimum	Maximum	Mean	Std. Deviation
3	Math 2002	3367	376	657	561.36	38.136
	Math 2003	3905	374	713	600.71	46.686
	Math Gain Score	3367	-144	157	39.66	30.782
	Valid N (listwise)	3367				
4	Math 2002	3654	371	717	594.12	46.526
	Math 2003	4036	419	740	623.83	42.098
	Math Gain Score	3654	-106	176	30.19	30.705
	Valid N (listwise)	3654				
5	Math 2002	3810	419	740	628.73	43.230
	Math 2003	4102	438	770	652.61	46.201
	Math Gain Score	3810	-124	176	24.12	27.786
	Valid N (listwise)	3810				

and graphs in this chapter. Each explanation for the acceptance or rejection of the null hypotheses contains tables and/graphs with information related specifically to each null hypothesis. In this study, each F ratio was assessed for significance at the .05 level and is listed as $p < .05$.

Null Hypotheses 1 and 2

A MANOVA was performed looking at Mathematics and Reading achievement at the same time with regard to mobility differences. This was done to reduce the Type I error. Results of the MANOVA found that there are significant differences when we look at the Wilk's Lambda line of output. The results were $F(2, 11510) = 103.33$, $p < .001$. At this point we ran two ANOVAs to determine if the differences were in Mathematics and/or Reading achievement. The results indicate there were significant differences in both mathematics and reading ($p < .001$ and $p < .001$ respectively). To determine how they differ I then looked at the means of each. In both cases the non-mobile group have significantly higher means than the mobile group as noted in Table 4.8.

Null hypothesis 1: There is no significant difference between the mean achievement test scores in reading for students that are mobile and those that are non-mobile.

Reject the H_o: There is enough evidence to show a significant difference between the mean achievement test scores in reading for students that are mobile and those that are non-mobile.

Null hypothesis 2: There is no significant difference between the mean achievement test scores in mathematics for students that are mobile and those that are

Table 4.8: Scale score means for non-mobile and mobile students in mathematics and reading achievement.

Dependent Variable	Mobility	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Math 2003	Non-mobile	628.024	.477	627.090	628.959
	Mobile	605.787	1.644	602.565	609.009
Reading 2003	Non-mobile	645.936	.436	645.081	646.791
	Mobile	624.361	1.504	621.412	627.309

non-mobile.

Reject the H_o: There is enough evidence to show a significant difference between the mean achievement test scores in mathematics for students that are mobile and those that are non-mobile.

Null Hypotheses 3 and 4

A MANOVA was performed looking at Mathematics and Reading gain-scores at the same time with regard to mobility differences. This was also done to reduce the Type I error. Results of the MANOVA found that there are significant differences when we look at the Wilk's Lambda line of output. The results were $F(2, 10309) = 8.389$, $p < .001$. At this point we ran two ANOVAs to determine if the differences were in Mathematics and/or Reading gain-scores. The results indicate that there is a significant difference in math gain-score results but no significant difference in reading gain-score results ($p < .001$ and $p = .967$ respectively). To determine how they differ we then looked at the means of each. Table 4.9 shows the means and as indicated non-mobile

Table 4.9: Gain-score means for non-mobile and mobile students in mathematics and reading.

Dependent Variable	Mobility	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Math Gain Score	Non-mobile	31.301	.308	30.697	31.904
	Mobile	26.094	1.267	23.610	28.578
Reading Gain Score	Non-mobile	15.412	.280	14.862	15.961
	Mobile	15.461	1.154	13.199	17.722

students had significantly higher gain-score results in math than the mobile student. Reading gain-score results indicate less than 5/100 of a point difference for the non-mobile compared to the mobile students in the sample.

Null hypothesis 3: There is no significant difference between the mean gain-score results in reading for students that are mobile and those that are non-mobile.

Fail to reject the H_o: There is not enough evidence to show a significant difference between the mean gain-score results in reading for students that are mobile and those that are non-mobile.

Null hypothesis 4: There is no significant difference between the mean gain-score results in mathematics for students that are mobile and those that are non-mobile.

Reject the H_o: There is enough evidence to show a significant difference between the mean gain-score results in mathematics for students that are mobile and those that are non-mobile.

Null Hypotheses 5 and 6

Two ANOVAs were run to determine is there were interaction effects between mobility and other student demographic factors on mean achievement test scores in reading and mathematics. The ANOVA was chosen because of the complexity of multiple interactions. Only two-way interactions were explored. The main interactions that were of interest were those factors that interacted with mobility. The first ANOVA provided that the significant interactions with a student's mobility were his/her ethnic origin and gender on mean achievement test scores in mathematics. The alpha levels were $p = .004$ and $p = .030$ respectively. Figure 4.1 illustrates that within the mobile group there is not much of a difference between the scores of the White student and the African-American student. The same may not be said of the non-mobile students, as there is wide disparity between the two ethnic groups. Figure 4.1 also visually highlights the wide gap of achievement in mean mathematics test scores between the white mobile and the white non-mobile student. There is not much disparity between the mobile and non-mobile African-American student's achievement in mean mathematics test scores.

A *t*-test was performed to investigate ethnicity difference within the mobile and non-mobile groups on mathematics achievement. Within the non-mobile group, race is significantly different ($p < .001$) with the whites significantly higher on average by 29.62 points. Within the mobile group, race differs ($p < .001$) with the whites higher on average by 15.41 points. The race difference appears greater in the non-mobile group. Figure 4.2 illustrates that within the non-mobile group there is not much of a difference between the scores of the female and male students. The same may not be said of the mobile students, as there is wide disparity between the female and male students. Figure

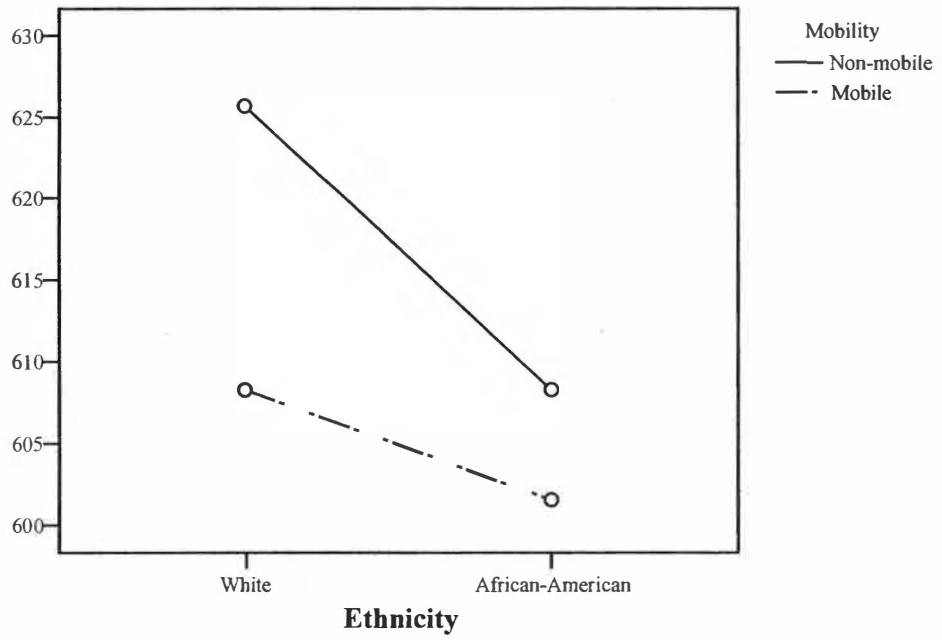

Figure 4.1: Two-way interaction between mobility and ethnicity on mean mathematics achievement.

Figure 4.2: Two-way interaction between mobility and gender on mean mathematics achievement.

4.2 also visually highlights the wide gap of achievement in mean mathematics test scores between the male mobile and the male non-mobile student. There is not as much disparity between the female mobile and the female non-mobile student's achievement in mean mathematics test scores.

A *t*-test was performed to investigate gender difference within the mobile and non-mobile groups on mathematics achievement. Within the non-mobile group, males and females significantly differ ($p = .041$) with the females significantly higher on average by 1.93 points. Within the mobile group, gender differs ($p = .001$) with the females higher on average by 12.04 points. The gender difference appears greater in the mobile group.

The second ANOVA provided no significant interaction effects; only main effects were significant with regard to mean achievement in reading. Since mobility was thoroughly explored within the discussion of null hypotheses 1, 2, 3 and 4, we will only deal with the remaining demographics. Significant differences were found between the three different grade levels as would be expected since the measure of reading achievement are scale scores. Significant differences were also noted between the two SES groups, between the two ethnic groups, and between the females and males. Tables 4.10, 4.11, and 4.12 show the mean scores for each of the demographic factors of SES, ethnic groups, and gender.

Null hypothesis 5: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean achievement test scores in reading.

Fail to reject the H_o: There is not enough evidence to show a

Table 4.10: Mean scores for high and low SES groups in reading achievement.

SES	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Free/Reduced Lunch	616.017	1.026	614.005	618.029
Full Price Lunch	641.773	1.553	638.729	644.818

Table 4.11: Mean scores for ethnic groups in reading achievement.

Ethnicity	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
White	637.387	.851	635.719	639.055
African-American	620.403	1.711	617.050	623.757

Table 4.12: Mean scores for gender groups in reading achievement.

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Female	633.751	1.273	631.255	636.247
Male	624.039	1.235	621.619	626.460

significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean achievement test scores in reading.

Null hypothesis 6: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean achievement test scores in mathematics.

Reject the H_o: There is enough evidence to show a significant interaction effect between mobility and a student's demographic factors; gender and ethnicity on mean achievement test scores in mathematics.

Null Hypotheses 7 and 8

Two ANOVAs were run to determine is there were interaction effects between mobility and other student demographic factors on gain-score results in reading and mathematics. The main interactions that were of interest were those factors that interacted with mobility. The first ANOVA provided no significant interactions with a student's mobility. One interaction effect of interest was that of ethnic origin with student mobility. It appears that this may be an area for further study ($p = .058$). Figure 4.3 is a graph of the interaction between ethnic origin and student mobility. Note that the African-American ethnic group shows little gain-score results difference between the mobile and non-mobile student. The white ethnic group, on the other hand, shows a large gain-score difference between the mobile and non-mobile student.

A *t*-test was performed to investigate race difference within the mobile and non-mobile groups on mathematics gain-score results. Within the non-mobile group, race significantly differs ($p = .005$) with the whites higher on average by 2.39 points. Within

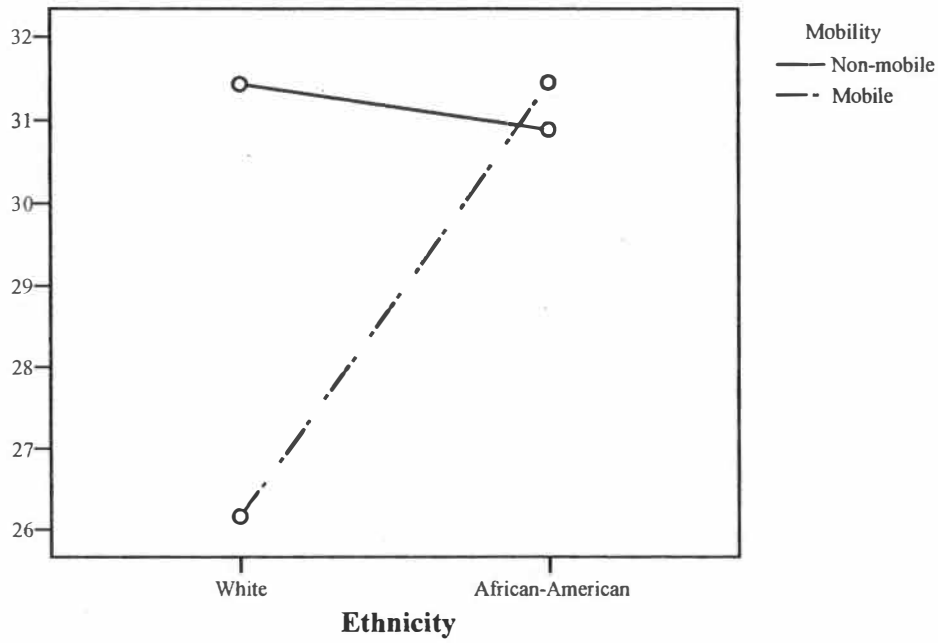

Figure 4.3: Two-way interaction between mobility and ethnicity on mean mathematics gain-score results.

the mobile group there was not a significant difference between the white and African-American students.

Both ANOVAs provided no significant interaction effects; only main effects in grade level differences were significant with regard to mean gain-score results in reading and mathematics. Grade level differences would not be expected in gain-score results, but since this demographic did not interact with mobility it will not be explored further.

Null hypothesis 7: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean gain-score results in reading.

> Fail to reject the H_o: There is not enough evidence to show a significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean gain-score results in reading.

Null hypothesis 8: There is no significant interaction effect between mobility and a student's demographic factors; SES, gender, grade level, or ethnicity on mean gain-score results in mathematics.

> Fail to reject the H_o: There is not enough evidence to show a significant interaction effect between mobility and a student's demographic factors; gender and ethnicity on mean gain-score results in mathematics.

Summary

In this chapter, the data regarding the effect of student mobility on achievement and gain-score test results were presented, analyzed and discussed. Null hypotheses: 1, 2, 4, and 6 were rejected because there was enough evidence to show significant differences

between the mobile and non-mobile students. We failed to reject the null hypotheses: 3, 5, 7, and 8.

Chapter 5 reviews the findings of this study and presents a discussion of the problem. In addition, Chapter 5 includes suggestions for district and legislative policy and recommendations for future studies.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine if there is a significant effect of student mobility on student achievement and/or a student's gain-score results in both reading and mathematics. Also, to be determined was whether or not there is an interaction effect of mobility and a student's demographic characteristics with student achievement and/or gain-score results in both reading and mathematics.

The first step to this end required an investigation into the current knowledge of mobility and its effect on student achievement. The second step was an investigation into accountability in general and accountability specifically in the state of Tennessee. Next letters of request to access TCAP data for Knox County Schools were sent to Dr. Charles Lindsey, Director and Dr. Mike Winstead, Coordinator of Research and Evaluation. A letter of support was presented to this researcher and IRA approval was then obtained. The Coordinator of Research and Evaluation provided the student demographic data along with a user name and password to access the Tennessee Department of Education web site.

The population of this study consisted of all students in the Knox County School System in grades 3-5 at the time of the 2003 Tennessee Comprehensive Assessment Program (TCAP) exams. The population included 12,138 regular and special education students and included the following data for each student: ethnicity, gender, grade level, membership (mobility status), school in which each student attended, and socioeconomic status. The Tennessee Value-Added Assessment System was then tapped for the needed

scale scores for each of the students in the sample. The information obtained from the Tennessee Department of Education web site was four composite scale scores in reading and mathematics from the 2002 and 2003 Tennessee Comprehensive Assessment Program (TCAP). The 2002 scale scores were subtracted from the 2003 scale scores to obtain a gain-score test result. Statistical results were generated by using SPSS© with statistical significance set at the .05 level.

Findings

The results of the study supported some previous research on the effect of mobility on student achievement, finding that mobility adversely effects student achievement in reading and mathematics in this school district. The results were mixed when looking at the effect of mobility on student mean gain-score results. There was a negative association in mathematics and a positive association in reading.

Additionally, this study compared various student demographic factors with student mobility for interaction effects. Only 2 factors, gender and ethnicity, interacted significantly with mobility in mean mathematics achievement.

The following were the major findings of this investigation:

1. The mean mathematics achievement test scores of non-mobile students were significantly higher than the mean mathematics achievement test scores of mobile students in the study.
2. The mean reading achievement test scores of non-mobile students were significantly higher than the mean reading achievement test scores of mobile students in the study.

3. The mean mathematics gain-score results of non-mobile students were significantly higher than the mean mathematics gain-score test results of mobile students in the study.
4. There was no significant difference in mean reading gain-score test results of mobile and non-mobile students in the study.
5. There were only two interaction effects between mobility and other factors associated with the same student on mean mathematics achievement. Ethnic origin interacted significantly with student mobility. Also, student gender interacted significantly with student mobility.
6. There were no other interaction effects between mobility and other factors associated with the same student on mean reading achievement, mean reading gain-score results, or mean mathematics gain-score results.

Discussion

One of the results of this study showed an effect on the mean gain-score results in mathematics, but not in reading. Since the gain-score test result is purported to represent one year of academic growth, if would stand to reason that moving during that school year would have an effect on all areas of a student's learning. One reason may be that mathematics at these grade levels is very sequential. Thus if a student moved from one school to another, he/she may experience gaps in his/her learning due to missing fundamentals. Reading on the other hand is taught one skill at a time and does not necessarily require one skill to build upon another.

Student mobility, in this study, was shown to effect student achievement in the academic areas of both reading and mathematics. These students, moving in and out of

schools, are often forgotten and lost in a system that is not meeting their needs. Will our accountability policy in under "No Child Left Behind" lead us to welcome a student's exit. Often we educators welcome a student's exit, as this will mean one less child to deal with. Outside of attempting to get records to the student's new school, the previous school does not track or keep up with the student in any way after his/her exit. With accountability come unintended consequences "but that talk is becoming so lopsided that such choices are increasingly being made to seem more about physics and less about ethics." (Jerald, 2003, p. 12) According to Lewin and Medina (2003, p. A1) we see an example of these 'unintended consequences,'

> Growing numbers of students – most of them struggling academically – are being pushed out of New York City's school system and classified under bureaucratic categories that hide their failure to graduate. Those students represent the unintended consequence of the effort to hold schools accountable for raising standards … Given the pressure on schools to show good results, it is understandable that principals would have little interest in holding onto low-performing students.

The negative effect of mobility on student achievement confirms the majority of the literature reviewed for this study. This study, while it encompassed a large sample group, may not be a good representation of other districts. A mobility rate of eight percent appears to be very low. Another explanation for this low percentage might be in the way that mobility was defined for this study. According to Hartman and Franke (2003) a more clear definition of mobility is needed.

> A clearer definition of mobility is needed. At present, there is no single formula used to calculate mobility nationally, so the various data sets often are describing different phenomena. A uniformly accepted measure is needed, one that takes into account, while making necessary distinctions between, interschool year and intraschool year mobility, and discontinuous periods of attendance within the school year.

The ethnic make up of the school system, 80.5% White, 15.3% African-American, and 3.7% other, may not be indicative of many districts in the United States as well. Most of the counties in Tennessee have a low ethnic diversity, which may be an anomaly.

A student's socioeconomic status (SES) did not interact significantly with his/her mobility. Over 50% of the studies reviewed prior to this research showed a correlation between these two factors. Again, the small percentage of mobile students in this study could be a contributing factor in not finding a significant interaction. SES was a main effect in reading and mathematics achievement and mathematics gain-score results, but not in reading gain-score results. This would be expected considering the expanded culture of students from high a socio-economic status (SES).

"The 2001 reauthorization of the Elementary and Secondary Education Act, also know as No Child Left Behind (NCLB), carries testing and accountability requirements that will substantially increase student testing and hold all schools accountable for student performance." (Abrams & Madus, 2003, p. 32) The NCLB act rightly excludes students that are mobile from the school and school system accountability. The trend as noted is for increased accountability. Schools are being judged inappropriately in the state of Tennessee by not taking into account the percentage of mobile students. Rewards and/or sanctions may not be administered appropriately if the mobility student is not taken into account. Public policy revolving around the student mobility issue is an area that must be addressed.

Accountability in general needs to be open for discussion. "Standardized testing is relatively cheap and easy to implement … Policy makers generally like solutions that are simple and cheap rather than those that are complex and expensive." (Elmore, 2003, p. 6)

Conclusions

1. With the No Child Left Behind legislation and its criteria reference test accountability, schools are being and will continue to be fairly judged. The negative effects of student mobility are being taken into account. Schools have little or no control over student moves and the wisdom of not including the mobile student should be commended. The major legislation apparently has taken into account the know research on the negative effects of student mobility.
2. This research, even with a low percentage of mobile students, highlights the deficiency in Tennessee's accountability initiative. In addition, the change to Tennessee's model of accountability compounds the problem. Prior to 2002, the state's educational performance model judged the performance of schools based on student achievement or gain-score results. Since 2002, the model of accountability in the state calls for both high academic achievement and high gain-score results. So instead of moving toward excluding mobile students in the state's accountability model, we have doubled the possible negative effects.
3. The gain-score test result, better know in Tennessee as value-added, research has shown promise. This research highlighted the significant differences in

mobile and non-mobile students' mean achievement scores in both mathematics and reading. Also highlighted were significant differences in mobile and non-mobile students mean gain-score test results in mathematics. The Tennessee Department of Education should go back to the previous model of accountability or beyond, to the point that gain-score test results be the only focus of accountability in the state.

4. Dr. Bill Sander's Tennessee Value-Added Assessment System (TVAAS) model, although purported to account for mobility does not or cannot adjust scale scores enough to fully offset the negative effects of student mobility. The significant difference in the mean mathematics gain-score test results of mobile and non-mobile students exemplifies this.
5. States have an obligation to collaborate with schools and school systems intensively, so that school staffs are informed about the needs of mobile children. These invisible students must be made visible. When school staff are more informed, they are better prepared to plan educationally sound programs; provide high-quality instruction; access outcomes; and be accountable to local, state and federal decision-makers. In addition, all schools have a collective responsibility for assuring that each educational component blends into a cohesive whole for our state's children on the move. While the need is evident and NCLB requires the use of best practices, there is a model that can and should be followed. Military connected students in the United States have and continue to be successful despite high mobility rates. The efforts of the school districts serving military dependents have merit.

These efforts include timely transfer of records, efficient record keeping, articulated graduation requirements, and clearly specified course transfer agreements. This system-wide and outside the system coordination effort signifies a heightened awareness and commitment to the issues associated with high mobility students.

With the increased pressure on schools to adopt reforms and raise test scores, addressing the issue of mobility may not seem to be a high priority for schools. But failing to do so could easily undermine those efforts as well as hurt the students and families the schools are charged to serve. While school-based strategies designed to encourage student longevity are valuable and have positive benefits beyond decreased student mobility, school systems cannot and should not be relied on as the primary force to reduce student mobility.

Parents too have a responsibility. The NCLB act call for schools to be rewarded or sanctioned for lack of adequate yearly progress. Parents should be held accountable for negative results based upon their decisions. Only through joint efforts will we mitigate the negative effects of student mobility.

Recommendations

- Additional research in the area of student mobility and its effect on student achievement needs to be investigated. The shortcomings, of the population in this study, hinder the ability of prediction outside of this one school system. There is a need to collect systematic data at all levels, on mobility. How many students are coming and going, who are they, what are their reasons for transience, and what impact do these students have on the classroom, school, and school district?

- We need to track how the new No Child Left Behind legislation is impacting school mobility and inclusion of transient students in new accountability systems. Will this added accountability drive students to more transience or stability?
- We need to disaggregate the various reasons and populations that move to different schools on a regular basis. Different subpopulations have differing needs that may need to be addressed in order for these students to be more academically successful. Seven subpopulations and their specific problems were recently brought to light in the Winter 2003 edition of The Negro Journal of Education. The subpopulations were: the homeless, where housing is an issue to be addressed; migrant farm workers, by definition are regularly mobile; immigrant children, have language barriers to overcome; special education students; foster children; children impacted by welfare reform; and ways in which the new NCLB Act may increase and encourage classroom turnover or leave highly transient students out of the desired reform measures. One additional group that was not addressed was the Native American students. Each of these groups, require a variety of measures to deal with their needs.
- A more clear definition of mobility is needed in order to make comparisons between schools and between school systems legitimate. It may be that many students are not accounted for in the accountability models that we presently operate under. Schools should not be judged by student academic achievement without taking into account the mobility rate of its student population.
- An area of need in the research of this topic is the impact of mobility on teachers, principals, and school/district administrative staff. None of these factors were

taken into account during this study. This further research may well lead to interventions that could benefit the mobile student greatly.

- This study demonstrated a significant difference in the effect of mobility on mean reading achievement scores but not on mean reading gain-score test results. The area of value-added research is promising and should be continued and possibly be an alternative measure of school and school system success as was the case in Tennessee prior to the NCLB legislation. Achievement or gain-score results were used to avoid sanctions or to dole out rewards to schools meeting the set standards. At present schools must meet achievement levels and gain-score results in order to be rewarded.
- Transportation should be provided for students to return to the same school if a transfer has occurred within the same district. The NCLB legislation has a school choice feature that would require transportation to a higher performing school in the district if a school were not performing at acceptable rates. Since this would be a major expense to school systems, transportation to the school a student has just left might be a cost savings. The monetary savings would be realized if student achievement is increased and the school in question meets the required performance standards.
- Student records should follow the mobile student promptly and properly to the new school. Parents should be informed about the importance of school stability. If this was done, parents might be more apt to avoid or at least delay a move if possible. Schools should develop programs to integrate transferring students in an

appropriate, supportive manner. This may lead to negative impacts of mobility being greatly reduced.

- Further research is needed in the area of the causes of student mobility. These may be societal issues that are beyond the scope of the school. School systems that have planned and attempted to meet mobile student needs may be able to diminish the harmful effects of mobility.
- Districts that are considering intra-district school consolidation should take the time to investigate mobility patterns within the district. School boundaries might need to be set to take in housing areas where a great deal of intra-mobility exists. A result of this attention might be less overall mobility and more consistent classroom attendance in the same school.
- Although this study found only two interaction effects with other factors influencing a student's achievement, further research if needed in this area. As figure 1.2 demonstrates, there are many other factors that may effect student achievement other than just those addressed in this research.

In closing, this research has added to the body of knowledge in the area of mobility. Much more will need to be done in order to help mitigate the negative effects of mobility.

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Writing Assessment Instructions, 2003, Tennessee Comprehensive Assessment Program, supplemental instructions.

APPENDIX

Patton Gamble
116 Timber Ridge Road
Jonesborough, Tennessee 37659
Phone: (423) 753-4157; Email: gamblep@wcde.org

November 28, 2003

Dr. Charles Lindsey, Director
Knox County Schools
912 S. Gay Street
Knoxville, TN 37901

Dear Dr. Lindsey:

I am a doctoral candidate in Educational Administration and Policy Studies at the University of Tennessee. This letter serves as a request to conduct research in your school district. The title of the study is "The Effect of Mobility on Student Achievement and Gain-score Results." The purpose of this study is to determine if there is a significant effect of student mobility on student achievement or gain-score results. Also, to be determined is whether or not there is an interaction effect between a student's socioeconomic status, gender, grade level, and ethnicity and his/her mobility status.

This research will go forward if I may confidentially access TCAP test result data from the 2002 administration in Knox County Schools. I respectfully request individual student data including; scale scores in composite reading and mathematics, socioeconomic status, gender, grade level (3-5), ethnicity, and mobility status. In addition, I request access to the Tennessee Department of Education TVAAS data. This study will be completed in compliance with state law. Tennessee's public records act classifies student records as confidential, with few exceptions. "Statistical information not identified with a particular student may be released to a person, agency, or the public" (Tenn. Code Ann. 10-7-504(a)(4)).

The information from this study will be of great significance and interest to educators and other stakeholders. Most accountability systems have relied on the use of standardized test results; however, few accountability studies have focused on the effects of mobility on these results. Even fewer accountability studies have focused on the effects of mobility on gain-score results. Tennessee and Knox County Schools have a wealth of data that might assist me in answering questions about mobility's effect on the elementary schools in Knox County.

If it is acceptable for your district to participate, the University of Tennessee requires that I have your written permission on official letterhead. Upon receipt of your approval, I will then contact Dr. Mike Winstead, your system's coordinator of research and evaluation. Dr. Winstead is a member of my doctoral committee. My goal is to initiate the study as soon as possible, and your prompt response to this request would be greatly appreciated. Thank you for your consideration of this request.

Sincerely,
Patton Gamble, Principal, West View Elementary School, Washington County Schools

Patton Gamble
116 Timber Ridge Road
Jonesborough, Tennessee 37659
Phone: (423) 753-4157; Email: gamblep@wcde.org

November 28, 2003

Mike Winstead, Ph.D., Coordinator of Research and Evaluation
Knox County Schools
912 S. Gay Street
Knoxville, TN 37901

Dear Dr. Winstead:

I am a doctoral candidate in Educational Administration and Policy Studies at the University of Tennessee. This letter serves as a request for your assistance to conduct research in your school district. I have just recently received permission from Dr. Lindsey, to conduct such research in Knox County Schools. The title of the study is "The Effect of Mobility on Student Achievement and Gain-score Results." The purpose of this study is to determine if there is a significant effect of student mobility on student achievement or gain-score results. Also, to be determined is whether or not there is an interaction effect between a student's socioeconomic status, gender, grade level, and ethnicity and his/her mobility status.

This research will go forward if I may confidentially access TCAP test result data from the 2002 administration in Knox County Schools. I respectfully request individual student data including; scale scores in composite reading and mathematics, socioeconomic status, gender, grade level (3-5), ethnicity, and mobility status. In addition, I request access to the Tennessee Department of Education TVAAS data. This study will be completed in compliance with state law. Tennessee's public records act classifies student records as confidential, with few exceptions. "Statistical information not identified with a particular student may be released to a person, agency, or the public" (Tenn. Code Ann. 10-7-504(a)(4)).

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Sincerely,

Patton Gamble, Principal, West View Elementary School, Washington County Schools

FORM A

IRB #_____

Certification for Exemption from IRB Review for Research Involving Human Subjects

---

A. PRINCIPAL INVESTIGATOR(s) and/or CO-PI(s):

Zenith Patton Gamble III, student

Gerald C. Ubben, Ph. D., Advisor

B. DEPARTMENT:

Educational Administration and Policy Studies

C. COMPLETE MAILING ADDRESS AND PHONE NUMBER OF PI(s) and CO-PI(s):

Zenith Patton Gamble

116 Timber Ridge Road

Jonesborough, TN 37659

Gerald C. Ubben

A320 Claxton Complex

UT Knoxville

D. TITLE OF PROJECT:

The Effect of Student Mobility on Achievement and Gain-Score Test Results

E. EXTERNAL FUNDING AGENCY AND ID NUMBER:

Non-Applicable

F. GRANT SUBMISSION DEADLINE:

Non-Applicable

G. STARTING DATE: (NO RESEARCH MAY BE INITIATED UNTIL CERTIFICATION IS GRANTED.)

Upon approval of IRB

H. ESTIMATED COMPLETION DATE:

Spring 2004

I. RESEARCH PROJECT:

1. **Objective(s) of Project**:

The purpose of this study is to determine the effect of student mobility on achievement or gain-score results. Also to be determined is whether there are interaction effects between ethnicity, gender, grade level, mobility and a student's socioeconomic status as these relate to student achievement or gain-score results.

2. **Subjects**:

This study follows ex post facto design. The data to be used have already been made available to the Knox County School System. Therefore, no human subjects will be used in the gathering of data.

3. **Methods or Procedures**:

Permission and assistance in obtaining the data has been obtained from Dr. Charles Lindsey, Superintendent, Knox County Schools, and Dr. Mike Winstead, Coordinator of Research and Evaluation and Group Testing, Knox County Schools. (See attached letters).

Knox County Schools will provide to the researcher condensed and sorted student data from the Knox County Schools database of the 2003 spring administration of Tennessee Comprehensive Assessment Program (TCAP). The data will initially consist of each student's name, identification number (SS#), composite test scores in math and reading, ethnicity, gender, grade level, mobility status, and socio-economic status.

The data will be formatted as an EXCEL® file which will be used to concatenate 2 additional pieces of information. These are value-added results for all students in both math and reading using Knox County Schools' access to the Tennessee Value-Added Assessment System (TVAAS). The TVAAS access consists of a password protected web-site set up by the Tennessee Department of Education. Lastly, all student identification numbers and names will be deleted to insure the anonymity of the students.

A factorial design will be used for data analysis. The clean EXCEL® file and all analysis data will be stored on CDs both with the researcher and Knox County Schools for the three years required by the University of Tennessee. Because of the sensitive nature of the data, Knox County Schools requires that the data be stored in their files rather than at UT.

4. **CATEGORY(s) FOR EXEMPT RESEARCH PER 45 CFR 46:**

Category for exemption is (4) Research involving the collection or study of existing data, documents, records, pathological specimens or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. All research will be completed in compliance with state law. Tennessee's public records act classifies student records as confidential, with few exceptions. "Statistical information not identified with a particular student may be released to a person, agency, or the public" (Tenn. Code Ann. 10-7-504(a)(4)).

J. CERTIFICATION: The research described herein is in compliance with 45 CFR 46.101(b) and presents subjects with no more than minimal risk as defined by applicable regulations.

Principal Investigator, Zenith Patton Gamble III _____ _____

Name Signature Date

Student Advisor_____ _____ _____

Name Signature Date

Dept. Review Comm.Chair_____ _____ _____

Name Signature Date

APPROVED:
Dept. Head_____ _____ _____

Name Signature Date

COPY OF THIS COMPLETED FORM MUST BE SENT TO COMPLIANCE OFFICE IMMEDIATELY UPON COMPLETION.

Rev. 01/97

VITA

Zenith Patton Gamble III was born in Tripoli, Libya on January 10, 1960. He attended public schools in Michigan, Illinois and Tennessee. Patton graduated from David Crockett High School, Jonesborough, TN in 1978. He entered East Tennessee State University one year later.

In May 1983, he received a Bachelor of Science degree from East Tennessee State University. He began working in the restaurant industry and worked on receiving his teaching credentials in the evenings at East Tennessee State University. Patton did his student teaching at the University School, Johnson City, TN during the spring of 1987. The following fall he began teaching algebra, computer programming and computer applications at the University School.

He entered the Danforth Foundation program for principal preparation in 1989 and received the Master of Education degree in 1990. Patton took a teaching position at West View Elementary School in Washington County, Tennessee in the fall of 1992. Three years later he served as the assistant principal at Jonesborough Middle School, Jonesborough, TN. The following year he became the principal at South Central Elementary School, Chuckey, TN. Five years later he was transferred back to West View Elementary School where he became the principal. He continues in this role at the publishing of this document.

Patton began work on his doctoral degree at The University of Tennessee in August of 1999.