THE EFFECTS OF CURRICULUM STRUCTURE ON THE ACHIEVEMENT OF GRADE 3 AND GRADE 5 MOBILE STUDENTS AS MEASURED BY THE MARYLAND SCHOOL ASSESSMENT

by

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Abstract

School systems are under continual pressure to increase student achievement on high-stakes tests and make Adequate Yearly Progress based on the *No Child Left Behind* mandate. One population which struggles to achieve on such tests is the mobile student population. Recent studies have shown that these students do not typically score as high on standardized tests as the stable student population. While past studies have focused on the ethnicity and socio-economic status of mobile students, very little research has been conducted to examine the effects of curriculum structure on the achievement of these students. This study examines the effects of synchronous and non-synchronous curriculum structure on mathematics and reading achievement in mobile and non-mobile students as measured by the Maryland School Assessment (MSA). Using third and fifth grade data from 2003-2004 MSA Mathematics and Reading, a two-way analysis of variance was conducted to analyze data from two Maryland school districts with differing curriculum structures. Non-mobile, with-in-school district mobile, and out-of-school district mobile student data were evaluated. Combined third and fifth grade data were examined, as well as data from each grade level, independently. Significant differences were found in the mean scores of non-mobile and mobile students, with the non-mobile students recurrently having the highest mean score in sub-test areas. No differences were found between mean scores based on curriculum structure, nor the interaction of curriculum structure and mobility status. The author provides recommendations for practice and further research.

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CHAPTER 1

INTRODUCTION

Throughout the history of education there has been a central focus on educational reform. With the inception of *No Child Left Behind (NCLB)*, accountability continues to play a considerable role in educational reform. Consequences to school systems that do not show progress are severe, resulting in fundamental changes in schools or complete surrender of a school to an outside management source or takeover by the state (United States Department of Education, 2002). As school systems diligently prepare to make improvements in high-stakes test scores, they search for ways to meet the needs of all students, in the hopes that all students will make academic gains.

Schools find that they are held accountable for students whom they have had little influence over academically. Many of these are the students who are highly mobile. Schools may be accountable for students who have received most of their education from another school, yet have recently transferred into a new school. Current research has shown that highly mobile students often perform poorly on standardized tests (Alexander, Entwisle, & Dauber, 1996; Applegate, 2003; Heinlein & Shinn, 2000; Mao, Whitsett, & Mellor, 1997; Paredes, 1993; Sewell, 1982).

The effects of mobility go beyond standardized test scores. In 1994, a study by the United States General Accounting Office (USGAO) reported that mobile students were more likely to show poor performance in school than their stable counterparts. These students were more likely to perform below level in reading and mathematics and to repeat a grade level. Gottieb and Weinberg (1999) found that mobile students were more likely to be referred for special education services.

While students who changed schools did so for various reasons and were from various backgrounds, some common characteristics of highly mobile students were identified (USGAO, 1994). High mobility rates occurred among Hispanics and Blacks, among those individuals below the poverty level, and in homes where parents were not married or were separated from their spouse.

Mobility Rate

Student mobility rate can be defined in various ways. A study by Ligon and Parades (1992) reported 62 formulas and definitions for student mobility gathered from various state agencies and directors of research. They organized responses into four categories, including stability indices, turbulence indices, mobility indices, and mobility counts. Ligon and Parades argued that one must consider five dimensions when developing and selecting a mobility index. The first dimension to consider was the level of analysis. These levels could include individuals, schools, districts, states, or groups. Next, the term was to be considered, such as one year or cumulative years. Frequency was determined by the number of moves made, while nature could be defined as intradistrict or interdistrict. Finally, one would consider the cause of the move. These could be positive causes or negative causes such as growth or change. While there was no one correct formula for determining mobility, they stressed that “the definition and formula chosen for a student mobility statistic should match the question being asked and the use to which the index will be put” (p. 1).

Developing a Supportive Curriculum

Schools face the challenge of filling the instructional gaps that mobile students incur as they move from school to school. Some researchers suggested that the only way to ensure that students are not missing large portions of curriculum was to adopt a national curriculum (Allen & Brinton, 1996) that would provide continuity and lessen learning gaps for mobile students. Others argued that this would challenge states' local control of education, but suggested districts create a core curriculum aligned with state standards and develop assessments to analyze students' progress (Family Housing Fund, 1998). Kerbow (1996) warned of difficulties of implementing such a curriculum and determining school-based accountability to the curriculum in a large school district. These difficulties included coordinating and managing a large set of schools, as well as assuring that the curriculum met the needs of diverse populations of students.

School districts must determine the amount of autonomy that they will give to each school as they interpret the scope and sequence of the curriculum. While some districts may use the curriculum as a guideline, ensuring that all aspects are taught throughout the school year, those concerned with the effects of mobility may choose a more rigid approach to implementing the sequence of the curriculum. A set sequence would ensure that all teachers were teaching the same content at approximately the same time throughout the school year. This would allow students transferring within a school district to enter a new school, with few instructional gaps to be filled by the new teacher.

Maryland School Assessment

The Maryland School Assessment (MSA) was administered statewide to students in grades 3 through 8. Students were tested in the areas of mathematics and reading. Each test took two days to administer. The test included selected response questions, as well as questions requiring students to write a short response. Student scores were reported in terms of basic, proficient, and advanced. Adequate progress for that year was determined by the percentage of students who scored proficient and advanced. All students were required to take the test. Those students who were unable to take the test due to severe disabilities took an alternative test (Alt-MSA) (Maryland State Department of Education, 2005).

Statement of the Problem

School systems are under continual pressure to increase student achievement on high-stakes tests. As educators target specific populations that may struggle to achieve, one that emerges is the mobile student population. Recent studies have shown that these students do not typically score as high on these standardized tests as the stable student population (Alexander et al., 1996; Applegate, 2003; Heinlein & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Sewell, 1982). Much of the research focused on such attributes as ethnicity and socio-economic status to further identify which students were at greatest risk (Alexander et al., 1996; Fowler-Fin, 2001; Kerbow, 1996; Nelson, Simoni, & Adelman, 1996; Offenberg, 2004; Shaft, 2003; US Department of Commerce, Economics, and Statistics Administration, 2004; USGAO, 1994; Wright, 1999). From these studies, researchers and educators have recommended ways to assist mobile students and lessen the impact of their transition. Little research has been conducted in relation to the effects of curriculum structure within states and school districts on student performance. When the flexibility of a curriculum allows individual teachers to decide when they will teach concepts throughout the year, there is the risk of gaps of instruction occurring as students transfer in and out of schools. When a curriculum has more structure based on when concepts are to be taught during the school year, more continuity in instruction may result in fewer instructional gaps. This study determined if a system-wide synchronous standardized curriculum had a significant impact on achievement of students in a school district as measured by the MSA. Comparisons were made between the achievement of mobile students who were taught with this synchronous curriculum and those who were taught with a curriculum that was standardized, yet not synchronous throughout the system.

Research Question

What are the effects of curriculum on with-in-district mobile students receiving instruction based on a system-wide synchronous standardized curriculum and within-district mobile students receiving instruction based on a system-wide non-synchronous standardized curriculum as measured by achievement in mathematics and reading on the MSA?

Null Hypotheses

1. There is no significant difference in MSA mean mathematics scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) ($\alpha = .01$).
2. There is no significant difference in MSA mean mathematics scores according to curriculum structure (synchronous or non-synchronous) ($\alpha = .01$).
3. There is no significant interaction in MSA mean mathematics scores between mobility status and curriculum structure ($\alpha = .01$).
4. There is no significant difference in MSA mean reading scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) ($\alpha = .01$).

5. There is no significant difference in MSA mean reading scores according to curriculum structure (synchronous or non-synchronous) ($\alpha = .01$).
6. There is no significant interaction in MSA mean reading scores between mobility status and curriculum structure ($\alpha = .01$).

Significance of the Problem

This study was designed to determine the effects of curriculum on the achievement of mobile students, should any exist. While research has shown that mobile students are more likely to perform poorly on standardized tests than non-mobile students, little has been done to examine the effects of curriculum sequencing on the achievement of these mobile students. As educators strive to ensure that all students receive the scope of the curriculum, they must be aware of gaps that occur with transient students. These gaps may affect student performance on federally mandated high-stakes tests.

Numerous suggestions have been made regarding how mobile students can be assisted in the transition to a new school. This wide range of suggestions included counseling for social adjustments, effective record keeping, communication between schools, developing school and family relationships, and community assistance. While these supports may help the child transition into a new school smoothly, they did not address the breach in instruction that is incurred when a child changes schools. An examination of curriculum design regarding scope and sequence was needed in order to find a way to lessen the negative impact of this instructional gap.

This study examined two curricular designs in an attempt to find one that best met the needs of transient students. Both curricula were standardized, based on Maryland state educational objectives, and contained the skills and information measured in the MSA. They differed in sequence. A non-synchronous curriculum allowed the teacher to choose with greater flexibility, when concepts were taught throughout the school year, while a synchronous curriculum dictated when those skills are taught. For those students transferring within a school district where the curriculum was non-synchronous, gaps may have been created and skills and knowledge omitted when the student moved from one school to another. A synchronous curriculum ensured that the student's instruction continued seamlessly, unaffected by the move to a new school.

Definition of Terms

Adequate Yearly Progress (AYP)

The gain that must be made each year in reading and mathematics proficiency towards the 2014 goal of 100%. AYP also requires 95% student participation in testing and the additional academic indicator of 94% attendance in elementary and middle schools in Maryland (Montgomery County Schools, 2003).

Curriculum Structure

Sequence and timeline of concepts and skills to be taught at a given grade level.

Free and Reduced Meals (FARMS)

Through the National School Lunch Program, "children and families with incomes at or below 130% of the poverty level are eligible for free meals. Those with incomes between 130% and 185% of the poverty level are eligible for reduced-price meals" (United States Department of Agriculture, 2005, p. 2).

Mobility

Movement of a student into or out of a school. Transfer of school enrollment.

Mobility Index

The complement of the stability index; Mobility index = 100 – Stability index (Rogers, 2004, p. 17).

Mobility Status

Mobility of a student occurring within one school year (with-in-district, out-of-district and non-mobile).

Maryland School Assessment (MSA)

"A statewide test of reading and mathematics achievement which measures basic as well as higher level skills. The MSA meets the requirements of the federal No Child Left Behind Act" (Maryland State Department of Education, 2005, p.1).

No Child Left Behind (NCLB)

Federal legislation that "provides an unprecedented increase in federal resources to states to improve low-performing schools. In exchange, the federal government expects more accountability from state education systems and the guarantee that no child will be left behind. To meet this end, states are required to increase student testing, collect and disseminate subgroup results, ensure a highly qualified teacher in every classroom, and guarantee that all students, regardless of socioeconomic factors, achieve a "proficient" level of education by the 2014-2015 school year" (National Conference of State Legislatures, n.d.).

Non-mobile

A student enrolled in one school for an entire school year, attending from September 30 to the time of MSA administration.

Non-synchronous standardized curriculum

Curriculum is developed and presented so that, given their grade level, students within a school district receive the same content and skills over the course of a school year. The instructional timeline is flexible and at the discretion of the classroom teacher. A non-synchronous standardized curriculum may range from a quarterly sequence of content taught to no specific sequence.

Out-of-school district transfers

Students who transfer into a school from another school district.

Performance Indicator

The percentage of students who attain proficient or better in reading/language arts and mathematics on the Maryland State Assessment (United States Department of Education, n.d.).

Synchronous standardized curriculum

Curriculum is developed and presented so that, given their grade level, students within a school district are receiving the same content and skills based on a highly structured timeline. This timeline may range from a specific daily sequence to monthly sequence.

Stability index

"The percent of students who started school in September who were still present at the end of the school year, adjusted for the percent of students who transferred into the school during the year" (Rogers, 2004, p. 16).

Standardized curriculum

The expectation at the school or district level that all students receive the same content and skills. Standardized curriculum must be able to be taught in the time available for instruction, adequately addressed, and provide the basis for student grades (Marzano, 2002).

Voluntary State Curriculum

"Academic standards for what teachers were expected to teach and for what students were expected to learn in schools" set by the Maryland State Department of Education (Maryland State Department of Education, 2003, p.2).

With-in-school district transfers

Students who transfer into a school in the same school district.

Assumptions

It was assumed that:

1. Individual student data from 2004 MSA Mathematics and Reading would be available from both school districts.
2. Individual student mobility data would be available from both school districts.
3. Curriculum matrices and timelines would be available from both school districts.
4. All subjects were third or fifth grade students.
5. All subjects were enrolled in one of the school districts during testing.
6. Student transfers occurred during the 2003-2004 school year.

Limitations of the Study

The author recognized the following limitations of the study:

1. The analysis of the study was limited to the 2003-2004 school year.

2. The analysis of the study was limited to third and fifth grade students in two Maryland public school districts.
3. The study was limited to examining only those third and fifth grade students who remained in the two Maryland public school districts for 2004 MSA testing.
4. The study was limited to students who took the MSA.
5. This study was limited to two metropolitan school districts, located in a suburban area.

CHAPTER 2

LITERATURE REVIEW

In an attempt to promote high academic achievement for all students in the United States, information with regard to mobility was gathered and reported by the USGAO in 1994. This report was the basis for many studies on highly mobile students over the past decade. Students considered to have changed schools frequently were those third graders who attended three or more different schools since the beginning of first grade (p. 1). Information reported about these students included the number of students and their characteristics, a comparison between highly mobile students' success in school and those students who have never changed schools, educational programs provided by the federal government, and the impact of improved student record systems.

The USGAO study found that one in six third graders in the United States changed schools frequently. Students who attended inner city schools or were from low-income families earning below $10,000 were more likely to have changed schools frequently (p. 5). The educational impact of these moves was also reported. Of those students who changed school frequently, 41% were below grade level in reading, compared with 26% of those who have never changed schools (p. 6). In mathematics, 33% were below grade level compared with 17%, respectively. These mobile students were also more likely to repeat a grade.

Recommendations from this report included changes in migrant education funding, limiting funding to those migrant students who had changed schools during the last 2 years, determining why Title1 services were often discontinued when a child changed schools frequently, and developing strategies to ensure that Title I services followed students. A new electronic record system was also recommended to accelerate the transfer process of student records.

In order to address the issues brought forth by mobility, it is important to understand the general characteristics of highly mobile individuals. Population reports from the 2003 United States Department of Commerce, Economics and Statistics Administration (2004, p. 3) described the geographical mobility and population characteristics of the United States. Of those surveyed, 14.2% had moved within the last year. Among races, Hispanics and Blacks had the highest mobility rate of 18% each. Additional data showed the highest mobility rates among those individuals below the poverty level (24.1%), persons who rented dwellings (30.7%), those whose household income was less than $25,000 (19%), and those who never married (19.7%) or were divorced or separated (17.8%). When asked the reason for moving, the highest percentage (51.3%), moved for housing related reasons (p. 12). Those moving within their county or within their state predominately moved for housing related reasons, while those moving from abroad to the United States moved typically for work-related reasons.

Demographics of Highly Mobile Students

Understanding the characteristics of mobile students may give educators more insight into developing strategies to teach these students. Several studies have been conducted on mobility in urban school districts. When examining mobility in urban schools, Kerbow (1996) focused on understanding the characteristics of the students who move, why they move, and patterns of connection among the schools. In his study of Chicago public elementary schools, Kerbow found that African American students were the most frequent movers. In addition, he found a higher mobility rate among students who received subsidized meals and those who lived in mother-only households or where the child was living with neither the mother nor the father. Offenberg (2004) further supported these findings. His research showed that the odds of a student with average ability exiting from a school that serviced students with an average poverty level were low. These odds increased if a student attended a low-poverty level school.

A study by Alexander, Entwisle, and Dauber (1996) examined ethnicity, economic level, and mother's level of education in relation to mobility. Their study of 20 Baltimore City Schools began with first grade students and followed them for five years. They found that students from a higher socio-economic status and white students most often left the system, while poor students and minorities shifted within the system. Of those students who moved within the school system two or more times, 79% were African American, 88% received subsidized meals, and the typical parent was a high school drop out (p. 6).

Wright (1999) studied the economic status of mobile third and fourth grade students in a large Midwestern school district. By looking at free versus paid lunches, he found that no mobility or mobility into or out of the school district was associated with a higher economic status, while those students who moved within the school district had a lower income status. Most students entering or leaving the district were white, while most of those moving within the district were ethnic minorities.

In Chicago elementary schools, Kerbow (1996) discovered that the majority of students, approximately 58%, changed schools due to residential changes. The remaining students moved to another school due to school-related reasons (p. 9). Kerbow found that schools were tied through the students that they exchanged. Movement was bound by achievement level, racial composition, and economic resources. Therefore, schools considered at-risk lost and received transfers of students who were deemed at-risk, while those schools which performed better academically lost fewer students, and those who entered tended to come from similar higher performing schools.

Nelson, Simoni, and Adelman (1996) found similar results in their longitudinal study of a large urban school district. Students living with a single parent or other relatives were more likely to move than those living in a two-parent household. Schools with the highest population of low-income families had significantly higher ($p < .02$) mobility rates (p. 367). When examining adjustment to school, Nelson et. al found that students who moved two or more times over a three year period had a more difficult time adjusting to school than those who did not move or moved only once.

Commonalities are seen throughout these various studies. Pertaining to ethnicity, African American students were more likely to move than white students. Many of these white students moved out of or into a district, while minorities moved within the district. Socio-economic status was a factor in each of the studies. Low income students were more likely to move than high income students. These demographics reflect students in urban areas. Few studies have been conducted on the mobility of students in rural areas.

Causes of Mobility

Students may change schools for several reasons. Often these reasons add insight into student performance and must be recognized when examining the achievement of mobile students. Fowler-Finn (2001) cited several reasons for families to move from one school district to another including conditions of residence, job availability, weather-related issues, homelessness, and crime. Children of migrant workers were another population that contributed to a high incidence of student mobility in specialized regions of the United States.

Schaft (2003) found that students changed schools for additional reasons, as well as housing related issues. He identified a variety of economic and social crises which contribute to high student attrition. These included what he referred to as pulls and pushes which lead to mobility among low income movers (p. 29). Factors that might pull a family into a new school district included access to low cost housing, availability of social services, reputation of the district, and services, such as special education, provided by the district. Those factors that could pull a family from a district included eviction or inability to pay bills, economic decline or a loss of job, poor housing, legal issues, lack of inexpensive housing, student behavior issues, and dissatisfaction with the school district. Other causal factors included poverty and impoverishment, family issues and crises, kinship, proximity to another school district, foster child placement, single parent families, domestic violence, and lack of community connections. Schaft argued that many of these factors were directly linked to each other. For example, a family crisis may lead to the loss of a job and the inability to pay bills, resulting in eviction of the family from the home.

When examining the performance of mobile students, it is important to remember the various causes of mobility and that mobility alone may not effect achievement, but may compound the effect of these causal factors.

Student Mobility in Maryland

The Maryland State Board of Education (Rogers, 2004) conducted an extensive study of mobility in Maryland schools. The study looked at non-promotional transfers and mobility at state, school, classroom, and individual student level. The researchers examined mobility among ethnic and socio-economic groups of students from the twenty four state school systems, as well as interventions that were provided to lessen the impact of mobility.

The study revealed that most students transferred to a school within the same school system. Of the 671,170 transfers that occurred between 1998 and 2002, 46.3% were transfers to schools within the same school district. The remaining 53.7% were transfers to other districts within the state (18.5%), to other states (19.8%), to private schools (7%), and to alternative education programs (8.3%). Most student transfers occurred during the elementary school years. In fact, 79.9% of schools considered to have highly mobile populations were elementary schools (p. 2). When studying the academic performance of mobile students, it is important to consider that one third of all transfers took place during the school year.

The study found a strong negative relationship ($r = -.77$, $p < .0001$) between school mobility and family income. Very little variance was accounted for by the percentage of minority students ($R^2 = .03$). Students from low income families contributed to most of the variance ($R^2 = -.60$) in mobility rates (p. 3). The academic affects for those students who were not considered as coming from a low income family were negative after simply one transfer. The negative effect increased as the number of transfers increased.

Researchers provided recommendations to reduce the negative effects of mobility. Three of these recommendations referred to a more standardized curriculum. They suggested that school systems develop a standardized curriculum with monthly benchmark assessments and goals to ensure that students who transfer within a school district will be at the same stage of instruction as the school from which they came. At the state level, they suggested a state curriculum, as well as standardization of methods within school systems. Finally, they recommended that the state department of education work to coordinate learning goals and standards with private schools and neighboring states and school systems.

Academic Performance

Various studies have been conducted to compare the performance of mobile and stable students. These results cannot be regarded in terms of the effects of mobility on student performance due to the wide range of variables effecting student performance, yet they can provide an insight into the challenges facing highly mobile students.

Mao, Whitsett, and Mellor (1997) studied mobility in Texas public schools. They found that mobile students performed 5 to 7 points below stable students on the Texas Assessment of Academic Skills in both mathematics and reading (p. 27). These gaps tended to increase as the students' grade level increased. The greatest difference occurred on the mathematics standards for eighth grade students. Only 37% of mobile students passed, while 58% of stable students passed.

Upon examining the relationship between special education referrals and mobile students, Gottieb and Weinberg (1999) found a positive correlation with a weak to moderate effect size (p. 194). These researchers speculated that transience had a debilitating effect on children due to the lack of continuity in their education as well as the disruption of friendships, resulting in heightened anxiety.

Paredes (1993) examined the effects of mobility on urban students' achievement.

He found various predictors of student mobility, including grade level, income status, and ethnicity. The longer a student was enrolled in school, the higher the chances were that they would move. Therefore it was not surprising that students in higher grade levels had moved more often. Paredes' results indicated higher mobility rates from low-income, Black, and Hispanic students. He used the Iowa Tests of Basic Skills and the Norm-Referenced Assessment Program for Texas to measure student achievement in reading. Findings suggested that students with higher numbers of moves had lower mean grade equivalents. F tests were significant at $p < .001$.

Heinlein and Shinn (2000) conducted a longitudinal study which examined sixth grade math and reading achievement tests, controlling for parallel math and reading achievement tests in third grade. They found no association for mobility and achievement. Students' performance on sixth grade achievement tests was largely predicted by their performance in third grade ($p < .001$), and not by mobility. When the multiple regression analysis controlled for earlier achievement, they found a strong association between mobility and sixth-grade performance on achievement tests. Upon examining third grade achievement, Heinlin and Shinn found a strong association between student achievement and mobility before grade 3. As the number of moves increased, student scores in math and reading decreased and the odds of being retained increased. Mobility before grade three was a strong predictor in all measures of achievement in sixth grade.

Applegate (2003) examined the test scores of students in grades 7 through 12 on the Missouri Assessment Program Communication Arts assessment. She identified students who attended one school in a two year period as having a low mobility rate, students who attended two schools in a two year period as having a medium mobility rate, and students who attended three or more schools in a two year period as having a high mobility rate. Applegate found a significant difference in test scores between low mobility and high mobility and low mobility and medium mobility. Further findings indicated that those students considered to belong to a high socio-economic group had lower mobility rates while those in the lower socio-economic group had higher mobility rates.

Over a five year period, Alexander et al. (1996) studied 767 students who began first grade in twenty Baltimore City Public Schools. They found that frequent movers had the lowest average on the California Achievement Test (CAT) for reading and mathematics. More moves were associated with poorer adjustment. Students who moved often had lower test scores, lower report card grades, an elevated risk of retention, and received more intensive special education services. When controlling for academic predictors from grade one, they found significantly lower scores for mobile students on the following academic measurements: CAT Reading ($p < .01$), CAT Mathematics ($p < .01$) and Reading report card grades ($p < .05$).

Wasserman (2001) examined mobility in relation to achievement among third, sixth, and ninth grade students in Alberta, Canada. He found a negative relationship between academic achievement and the number of school changes. Schools with higher mobility rates had a lower percentage of students meeting standards. The strongest relationship occurred where school mobility indices were above the median.

Alexander et al. (1996) had similar findings to those of the Minneapolis Kids Mobility Project (Family Housing Fund, 1998) and Sewell (1982). The Kids Mobility

Project was a study of mobility in Minneapolis schools. Results showed that the greater the number of moves a student had made, the lower the average reading score was on the CAT. In fact, students who had moved three or more times scored nearly 20 points lower than those who did not move. Sewell studied student mobility in Brooklyn, New York and found a consistent decrease in math and reading scores as the number of times a student moved increased.

Smith's (2003) study of an Ohio school district found significant negative correlations between mobility rate and the districts accountability rating, attendance rate, graduation rate, and district median income. Prospects for graduation were shown to diminish as a result of mobility in a study by Rumberger, Larson, Ream, and Palardy (1999). They found that students who changed high school once were less than half as likely as stable students to graduate. Demie (2002) studied achievement in relation to mobility in English primary and secondary schools. The average performance of mobile students was substantially lower than non-mobile students. The shorter the time spent in a school, the more that performance declined. The gap further widened when free meals, fluency, and ethnic background were factored into the data.

Studies have found that students from low-income families are more likely to change schools and these changes usually occur within the school district (Alexander et al., 1996; Kerbow, 1996; Wright, 1999). In understanding the impact of mobility on students, we must examine the achievement of these with-in-school district transient students. A study by Audette and Algonzzine (2000) looked at elementary schools in a large metropolitan system and the relationship between with-in-district transfers and achievement. Moderate to high negative correlations were found. Mao et al. (1997)

looked at the achievement of both with-in-district transfer students and new arrivals to the school system. They found that those who moved between districts scored significantly higher on standardized tests than those who changed schools within the district.

From the research that has been conducted, it is evident that mobility has a negative effect on student achievement. Negative relationships have been shown between mobility and test scores, retention rates, and special education identification. Statistics show that many of these transient students come from poverty. These impoverished students are already deemed at-risk due to their socio-economic level. This risk may be compounded by a move to a new school. Educators must be aware of this problem and work to assist these students as they move from school to school.

Limiting the Negative Effects of Mobility

Several studies support the idea that mobility contributes to a decline in student performance (Alexander et al., 1996; Applegate, 2003; Demie, 2002; Gottieb & Weinberg, 1999; Heinlin & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Rumberger, et al., 1999; Sewell, 1982; Smith, 2003; Wasserman, 2001). A number of researchers have offered suggestions for schools, which may contribute to improving school performance. While some of these suggestions were directly linked to attempting to lessen the academic gaps lost or promote more efficient record keeping, others examined more closely the relationship of families and schools.

Hodgkinson (2006) illustrated the disjointed educational system's impact on mobility in his report to the Commission on the Whole Child. Transfer of student records is extremely difficult for students moving from state to state since there is no tracking system in place in the United Stated. Hodgkinson noted that although one is “asking for a miracle” (p. 10) when trying to attain student records from another state, in that same state, a police officer can have the complete driving record of any United States citizen in about 25 seconds.

Researchers examined steps that schools can take to aid students in the transition into a new school, as well as prepare teachers for these incoming students. The development of a longitudinal student database would allow schools to accurately place incoming students according to their abilities and academic needs (Dougherty, 2002; Staresina, 2004). Effective record keeping between schools and districts would assist in the appropriate placement of students (Audette & Algonzzine, 2000; Staresina, 2004). Kerbow (1996) suggested that more information than that found in school records should be collected from students. He argued that portfolios containing samples of student work and portfolio assessment would offer more information to teachers than simply the standardized test scores often found in student records. Once arriving at the new school, further assessments could then be given to find weaknesses and gaps, followed by individual tutoring.

Other suggestions have been offered for ways districts can help schools limit the negative effects of mobility on students. Districts can be flexible with boundaries (Kerbow, 1996; Rumberger, 2003) and provide transportation to students who remain within close proximity to their school (Audette & Algozzine, 2000; Fowler-Finn, 2001; Kerbow, 1996). Rumberger (2003) suggested avoiding redistricting when possible and improving the quality of schools through meaningful reforms. He identified other supports for students including district cooperation with schools, counseling students to remain in school if possible, establishing activities and procedures for incoming students, and monitoring highly mobile students' progress. Staresina (2004) argued for a district-wide standardized curricula, as well as professional development for teachers to assist them in dealing with the various challenges that a new student arriving can face, and how to deal with those challenges in an already established classroom.

State departments of education can also take measures to limit the negative effects of mobility on students (Rumberger et al., 1999). Suggestions for improvement included requiring schools to report mobility and completion rates to the state department of education and including mobility rates as a measure of school effectiveness in accountability and performance reports. Districts can be held accountable to monitor exiting students to ensure they enroll in a new school promptly and be required to transfer records to new schools in a timely manner. Guidebooks can be offered to transferring students and parents outlining the advantages and disadvantages of transferring to a new school. Additional guidebooks may also be offered to districts with information on reducing transfers and meeting student needs. Finally, state departments can offer funding to schools with high mobility rates to improve new student integration.

Families of mobile students also need support to assist in students' transitions. Schools must work to establish relationships with families and provide outreach to educate parents (Kerbow, 1996; Rumberger, 2003; Staresina, 2004). These supports may include assisting families in meeting their basic needs through food banks, breakfast and lunch programs, clothing banks, and assistance in finding affordable housing. Educational development classes for parents could also be offered (Fisher, Matthews, Stafford, Nakagawa, & Durante, 2002).

Rumberger (2003) provided suggestions for parents to ease their child's transition to a new school. Parents can try to delay the move until the end of the school year or between semesters. Once students have arrived at their new school, parents should make personal contact with the school and ensure that records are transferred in a timely manner. Finally, parents and students should meet with the school counselor shortly after entrance into the new school to access the transition and make necessary adjustments or changes.

The Ohio State Department of Education, Urban Schools Initiative (1998) suggested a standardized curriculum for elementary schools. This curriculum would provide timelines for specific skills taught in reading and mathematics. The negative effects of mobility would be reduced as curriculum and instruction were coordinated across mobility clusters and instructional materials remained consistent and standardized. Finally, the study suggested that mobility indices be used to determine resources and student-teacher ratio for these schools.

A wide range of ideas have been proposed to aid students who change schools. These students experience not only a change in instruction, but various emotional and social adjustments as well. Educators must consider all of these factors and provide various resources and supports for their transient students.

Accountability and No Child Left Behind

In 1983, *A Nation at Risk* (United States Department of Education) was published. It called for higher academic standards and a focus on student achievement in the nation's schools. *A Nation at Risk* sparked efforts of educational reform in the late 1980's and early 1990's. Congress created a National Assessment Governing Board and the

National Education Summit was convened to develop education goals for the year 2000. Upon the signing of the Goals 2000 program into law, the Elementary and Secondary Education Act and Title I program were revised and states were required to develop content standards and assessments to measure those standards. By 1998, thirty-eight states had adopted state standards in core curricular areas (Walberg, 2003). In 2002, President George W. Bush signed the *No Child Left Behind Act* (NCLB), requiring states to develop demanding standards for all students to meet within 12 years.

NCLB (United States Department of Education, 2002) required states to implement testing and accountability procedures resulting in higher achievement for students. States were to acquire or develop tests that aligned with the state's academic standards and provided information that would assist teachers in diagnosing the academic needs of students. Test scores were compared from year to year to determine if schools had made Adequate Yearly Progress (AYP). Scores were disaggregated in order to identify disparities among certain groups and hold schools accountable for the achievement of all of groups. These groups included race and ethnicity, income, students with disabilities, and limited English proficiency. Consequences to low performing schools began after the second year of failure in meeting AYP and continued to increase from year to year. Schools received technical assistance from the district and students were given the option to transfer to another public school in the district after two consecutive years of failure. After the third consecutive year, school choice continued and students were offered Title I funds to pay for tutoring or supplemental educational services. To these provisions, a change of staff or another fundamental change was required after the fourth consecutive year. After failing to meet AYP for a fifth consecutive year, a school was changed. For example, schools could become charter schools, turned over to a private management company, or taken over by the state (Center on Education Policy, 2002).

The Center on Education Policy's 2006 report on the fourth year of NCLB revealed that scores on state tests were rising, as well as the percent of students scoring proficient or above. The Center reported that effects of NCLB were holding steady. The number of schools identified for improvement remained steady since the previous year. NCLB accountability provisions also stabilized. For the prior 2 years, 2% of those eligible took advantage of the school choice option, while 20% took advantage of the tutoring option. Greater impact was found in urban districts, where 90% of those schools in the restructuring phase of NCLB were in urban districts. The report stated that one factor contributing to this high percentage was poverty. Poverty affected achievement and urban districts where there were a high number of low-income students.

Problems arose with this accountability system when data from mobile students was included in test results. Hall (2001) warned of holding schools accountable when, due to mobility, students being tested differ from year to year. He noted that NCLB did not make that distinction, and in low performing schools with a highly mobile population principals may get unfairly blamed, parents of stable students may get a distorted view of the school's performance, and otherwise competent schools could be shut down, causing more moves. Hall also argued that schools with a high turnover of students often have a high turnover of teachers, resulting in tests measuring different teachers each year. In order to account for these discrepancies, he maintained that mobility be included as a disaggregated group.

Hodgkinson (2006) discussed the quality of educational data when transience is a major factor. He noted that while a teacher may begin the school year with 24 students and end the school year with 24 students, they may not be the same 24 students. If only 2 of the original students remain at the end of the year, with 22 having transferred in and out of the classroom, then that teacher actually taught at least 46 students. NCLB assumes that students tested in 4^{th} grade will be the same students four years later when tested as 8^{th} graders. The error can be 15% in states and up to 50% in schools (p. 10). The impact of this error should be mentioned, as school data is the primary testing unit for NCLB.

Weckstein (2003) identified three risks for mobile students as a result of NCLB. The first risk was "that students will not be assessed or counted for school accountability" (p. 117). He feared that students' academic needs may not be identified and addressed if they were not assessed. NCLB required results to be shared with teachers and parents in order to improve instruction and meet the needs of individual students. If there was no assessment data to share, then these measures could not be taken. Schools were required to assess 95% of their student population. This specification was included in NCLB to encourage assessment of all students. Weckstein described a misinterpretation that could lead to schools choosing the 5% that would not be tested, either innocently or purposefully. Finally, he illustrated how schools may have less incentive to help mobile students since their scores were counted differently. The scores of a student moving from one school to another within a district over the course of one school year would only count toward district data, and not the individual school data. Similarly, the scores of a student moving from one district in the state to another district would only be counted in state data.

The second risk that Weinsteck identified was “the risk that schools will push low-achieving students to other schools in order to avoid accountability for their achievement” (p. 121). Schools may transfer low achieving students to other schools so scores are counted only in the district data and not in their school data. Examples of this practice included placing students in temporary schools or learning centers for less than a full year, assigning students with disabilities to settings outside of the school for part of the year, having limited English proficient students sent to a language center for a brief time, and expelling or suspending students for a substantial length of time. These tactics could work in some states and not others, as each state developed its own definition of *full academic year*.

Finally, Weinsteck explained the “risk of limited access to the educational benefits of Title I” (p. 123). Mobile students entered a school after the start of the school year. This means they had not been considered in the school’s needs assessment and program planning. Since Title I eligibility was usually determined in the fall, those students not enrolled in a school with a school-wide Title I program could miss the identification process and not receive Title I assistance. Parents of mobile students may not have obtained adequate information and assistance for parent involvement due to late entry, and teachers may have found it difficult to provide timely and effective academic assistance and develop instructional strategies to support students.

Offenberg (2004) presented four approaches to evaluating student achievement that would reduce or eliminate the effects of mobility. The first approach was multiple program effectiveness measures. Offenberg suggested that state departments of education require that schools provide a direct assessment of their delivery of educational reforms and additional measures of program outcomes. Program effectiveness would be measured through specific standards for instructional strategies, evidence of implementation, outcomes, and AYP. He argued that more valid actions must be implemented than those outlined in NCLB. He further suggested an aggregation of scores. When a high number of transfers occurred within districts where the population was divided among many small schools, an AYP that reflected regional performance rather than individual school performance would be more accurate in representing actual effectiveness of instruction and student achievement. Another approach Offenberg suggested was student mobility weighting. This involved weighting scores by the amount of time a student was on the school roster. Finally, he offered value-added approaches. This entailed taking social factors and early achievement into account. Each student would be examined over the course of a year to determine achievement, taking into account growth, history, and background. A difference between projected achievement and actual achievement would then be determined.

With the nation's focus on educational accountability ever increasing, the debate over how mobile students should be measured continues. The mobile student population is a group which must be examined, as their history of achievement on standardized tests proves. As data is disaggregated, educators can better focus on those students who may need intervention or remediation. This is especially important to school districts where the mobility rate is high and test scores may reflect an inconsistency in instruction.

Curriculum Alignment and High-Stakes Tests

Since Adequate Yearly Progress in schools is determined by student achievement on standardized tests, aligning what is taught in the classroom with what will be measured on these tests has become paramount in curriculum planning and development. In many schools, test content has become the basis of the curriculum.

The use of high-stakes test scores as measures of accountability has brought curriculum alignment to the forefront of educational development. Curriculum alignment is "the 'match' or overlap between the content and format of the test and the content and format of the curriculum" (English, 2000, p. 63). Glatthorn (1994) maintained that the two purposes for curriculum alignment were to check on the congruence of the curriculum guide, text, and test and to provide teachers with a tool for planning.

The Center for Education Policy's fourth annual report, *From the Capital to the Classroom* (2006), described the impact of NCLB on curriculum. The report claimed that 96% of the school districts surveyed reported that one strategy used to improve schools identified for improvement was aligning the curriculum and instruction with standards and assessment. Examples of implementation of this strategy included a more prescriptive curriculum, pacing guides, and instructional coaches. Of those districts surveyed, 71% reported reduced instruction in one elementary content area in order to give more time to mathematics and reading instruction. Some schools doubled instructional periods, resulting in some subjects being missed all together.

English (2000) described two ways that alignment can be established. Frontloading occurred when the test was developed based on a curriculum. The test always followed the development of the curriculum and did not establish the curriculum.

Backloading occurred when curriculum was developed from items and concepts on the test. While frontloading may seem to be the purest way to align curriculum, English identified various problems with this process. Frontloading required much time and money. An entire curriculum had to be written before it could be aligned. This curriculum could never be considered purely localized due to the mobility of students. Finally, frontloading only worked if local educators designed their own curriculum and selected their own tests.

According to English, backloading ensured 100% alignment. The curriculum was developed based on the test. Essentially, the test became the curriculum. English identified two repercussions of backloading. First, local control may be sacrificed unless the test writers are local. Second, teaching to the test may be considered unethical or unwise. Teaching to the test may result in students only learning the test item and not the concept, process, or idea from which the test item was developed. He warned that using tests to develop curriculum may result in narrowing learning to what can be measured on a paper and pencil test.

Jacobs (2004) discussed the challenge of keeping curriculum consistent, yet flexible through curriculum mapping. She addressed educators who suggested that students in a particular grade level should be doing the same thing at the same time by asking them to determine what was in the students' best interest. She described a consensus curriculum map as one that "reflects the policy agreed on by the professional staff that targets those specific areas in each discipline that are to be addressed with consistency and flexibility in a school or district" (p. 25), resulting in an essential map. Jacobs reminded readers that consensus is derived from a Latin term meaning to feel the same, not to act the same way. Professionals developing a curriculum map should not impinge upon classroom creativity, yet provide a level plan for the learner. She suggested that schools provide benchmark assessment tasks to reflect specific curriculum standards. While schools may vary in methods and materials for instruction, benchmark assessment tasks provide a consistent focus on the same standard throughout the district.

As educators debate over appropriate curriculum development, one notion remains clear. The curriculum must reflect the test in order for students to be successful on the test. This coordination should provide a focus for educators, without narrowing or limiting instruction.

Curriculum Reform

Various researchers have suggested ways to structure curriculum which would lessen instructional gaps for mobile students. These suggestions ranged from pre-packaged content specific programs to a national curriculum. While studies have been conducted to measure the impact of pre-packaged programs on student achievement, studies involving curriculum structure are lacking. One should be cautioned when discussing such fundamental beliefs as a state or national curriculum. Such a debate reaches far beyond the parameters of empirical research.

Ornstein and Hunkins (1993) described a core curriculum as a common curriculum for all students. It defined what is essential for all students throughout the nation. This common curriculum consisted of core subjects including English, math, science, foreign language, and social studies. Ornstein (2003) felt that the implementation of a core academic curriculum was a response to national concerns about the American education system. While past concerns had been prompted by Sputnik and the Cold War, current feelings of urgency were created by international economic competition and test scores. He and Hunkins (1993) questioned whether there should be such a common curriculum in the United States when there are 50 departments of education and approximately 15,000 local school districts, each with their own curriculum ideals.

In order to lessen the negative impact of mobility on student achievement, many school districts adopted a district-wide curriculum. This curriculum allowed students who transfer schools within a district to remain at approximately the same instructional point as the classroom they left. Lash and Kirkpatrick (1990) reported various problems that teachers faced when new students arrived in the classroom. Teachers felt the need to re-teach or backtrack for new students in order to bring them as close to the stable students as possible. They often used class time to review material, which slowed the progress of the rest of the class. Teachers described how moving created gaps in students' instruction. If a student arrived in the middle of an instructional unit there was no way for that child to make up the work that he or she missed. Finally, due to varied scope and sequence, in-coming students may lack prerequisite skills needed for future instruction. The Minneapolis Kids Mobility Project Report (Family Housing Fund, 1998) recommended that districts implement a core curriculum and consistent standards. These would allow students to know what is expected of them at a new school. Strategies for developing this synchronous curriculum included aligning the core curriculum with state standards and developing diagnostic exams.

A national curriculum has been proposed by some researchers and educators. While this would establish continuity among schools, there is a fear that it would diminish the autonomy of local school districts. Allen and Brinton (1996) argued that without a national curriculum, local school systems have no real ability to address issues such as student mobility. They recognized a hidden national curriculum, the result of national standards. This curriculum was defined by textbook companies and testing services. Allen and Brinton suggested that a legitimate national curriculum be developed. They identified mobility as being one reason for this development. A national curriculum would provide curricular continuity for students and lessen learning gaps of mobile students. English and Steffy (2001) also expressed a need for a national curriculum. They believed a national curriculum was needed in order to have a true national assessment. A national curriculum would reverse the common practice of testing first and developing the curriculum second. Finally, they described how a child living in a global society requires a global education.

Schmidt (2004) maintained that content standards should be the same across states. He argued that this continuity would challenge the idea of local control in only a limited way, as states and districts would still control textbook selection and learning activities. This common structure among states would impact mathematics instruction more than any other subject area. Due to its cumulative nature, mathematics topics must often be taught in sequence. Mobile students would experience the greatest impact, as transfer to and from schools may result in missing instruction of one of these major elements.

Skandera and Sousa (2002) believed that a national curriculum would jeopardize local control, but in order to close achievement gaps, they suggested a basic core-curriculum with a coordinated sequence. A standards-based curriculum was recommended by Burger (2002). He suggested that curriculum be aligned with standards by using "policy to align, integrate, and connect components of schools as systems" (p. 3). Those components included assessments, curriculum, instruction, and accountability.

Biernat and Jax (1999) contended that varied curriculum was a significant problem for a new student and his or her teacher. Skills taught at different rates, the use of different teaching methods, and perhaps different curriculum resulted in students being far ahead or far behind their peers. Alignment of curriculum helped teachers know what curriculum had been taught to incoming transfer students and allowed students to adjust quickly to the new classroom (Fisher et al., 2002). Upon examining the impact of mobility on classrooms, Mao et al. (1997) recommended uniform curriculum within and between school districts.

English (2000) warned against rigid uniformity. He described curriculum coordination as "the extent of the focus and connectivity present laterally within a school or school district" (p. 3). He argued that the three essential characteristics of effective curriculum were consistency, continuity, and flexibility. A curriculum must provide focus and connectivity without leading to mindless conformity. The concept of the same lesson on the same day, from the same text was unproductive and ineffective (p. 17).

Kerbow (1996) contended that problems may develop if local schools adopt a standardized curriculum. Uniformity may be difficult to obtain in a large district. The management of these schools would be difficult to coordinate given that directives from higher levels of the school district are not always reflected in classroom instruction. Another factor that must be considered is the diversity from school to school. A standard curriculum may not meet the needs of all students at all schools.

In the quest to improve test scores, many districts have turned to scientifically researched based prepackaged programs. While this may create the continuity suggested by researchers, caution should be taken. Fang, Fu, and Lamme (2004) warned of schools resorting to prepackaged commercial programs for a “quick fix” (p. 58). They claimed that these programs weakened teacher morale, impeded professional development, and increased student disengagement.

Cornish and Tipton (2003) examined Pennsylvania System of School Assessment (PSSA) scores of 10 elementary schools that used marketed programs or text series for reading and mathematics instruction. Publishers of reading textbooks included Harcourt, Houghton-Mifflin, McMillan-McGraw Hill, and Scott Foresman. While textbook choice varied among high scoring schools, all five low scoring schools used Harcourt for reading instruction. Marketed supplemental programs included Reading Recovery, Guided Reading, Waterford, Mondo, Accelerated Reader, and Earobics. Sixty percent of the high scoring schools used Reading Recovery to supplement the basal (p. 235). No prominent program or text was used by schools that performed well in mathematics, however Chicago Math, also referred to as Everyday Math, was used by all five low scoring schools.

Brent and Diobilda (1993) found that continuity of instruction had a major effect on the reading achievement of stable students when teachers used a more traditional basal approach to reading instruction. However, a direct-instruction program, which was highly scripted and promoted positive reinforcement and immediate feedback, showed more promising results for highly mobile students. Brent and Diobilda’s results showed basal reader groups needing two years of continuous instruction in order to attain the same reading level as mobile students who were taught using a direct-instruction model.

MacGillivray, Ardell, Curwen, and Palma (2004) looked at teachers' interactions with program mandates. They claimed that use of basal programs resulted in "generic, externally imposed solutions" (p. 131) as opposed to responding to the individual needs of students. In their report on the Los Angeles Unified School District, they described the districts approach to dealing with public skepticism and demands for improved student performance through accountability. The district developed a reading plan with specific grade level curriculum and a minimum number of hours committed to language arts instruction. While schools could choose between three programs, Reading Mastery, Success for All, or Open Court, 80% chose Open Court, a program offering scripted, pre-determined timed lessons with a specific sequence (p. 132). The researchers described the districts approach to implementing these programs as neocolonialism. The district was the colonizer, with close monitoring and control, while the teachers were the colonized. According to the researchers, Open Court dictated bulletin board content, furniture arrangement, and the display of program materials. Teachers reported conflict between the scripted program and the instructional needs of their students. Teachers' identities were redefined as they relied more on the program components and less on their own professional competence. MacGillivray et al., (2004) concluded with a concern for the instruction of diverse learners, arguing that an automated approach to instruction does not meet all students' needs. Smagorinsky, Lakly, and Johnson (2002) discovered that some teachers preferred a prepackaged program for instruction, as this approach meant less instructional planning and less time taken for professional development.

Many factors must be weighed when examining the type of curriculum that would benefit mobile students. Perhaps the most important factor is that the curriculum meets the needs of all students, not just mobile students. A balance must also be met between curricular structure and teacher autonomy. As districts continue to develop curriculum, they must consider how to meet standards and maintain accountability by giving teachers the curricular support and framework that they require, while allowing them the freedom to make professional decisions about how to deliver the instruction.

Summary

Many efforts have been made to address the concerns and recommendations brought forth by the 1994 USGAO report. As studies have shown, low income students and African American students were the most likely to change schools, reasons for moves were often linked to problems associated with poverty, and there was a negative relationship between mobility and student achievement. Recommendations have been made to lessen the impact of mobility on student performance and aid in assimilating students to a new school. These recommendations ranged from meeting the basic needs of families to establishing efficient record keeping systems. School systems are closely examining these recommendations as they are accountable for the achievement of these mobile students. NCLB underscores this accountability by affording educators with demanding standards and strong consequences if students do not meet those standards.

Curriculum becomes a factor in student performance when it is aligned with the state test, the tool used to measure student performance. Arguments have been made for and against a uniform standard curriculum. Standard curriculum can be examined on varying gradations of control. These range from a national curriculum from which all students in all states are taught, to a school district-specific curriculum. Either extreme has been shown to have limitations. A national curriculum may not meet the needs of all students, as those students in a Connecticut elementary school may have very different instructional needs than those students in a New Mexico elementary school. Conversely, with 15,000 local school boards in the United States, some guidelines are needed to ensure that all students are being taught similar concepts and skills at similar times so that students do not fall far behind or far ahead of their peers.

In addressing the needs of mobile students, curriculum structure may play an important role. A uniform standardized curriculum prescribing when content and skills should be taught may support the needs of mobile students within a district. As these students move from school to school within a district, there would be few gaps in instruction. While this continuity may ensure exposure to the entire curriculum, it may not meet the needs of a mobile student. When looking at the demographics of mobile students, more in-depth measures may need to be taken. Many mobile students live in poverty or are ethnic minorities. Diagnostic assessment of these students may be needed, resulting in various instructional aids and modifications such as tutoring, special education, and remediation. Often factors other than academic ability play a role in student achievement. Issues such as housing, food, and assimilating into a new social structure may impact student success. Test scores should not overshadow development of the whole child. Schools should focus on “developing students who are academically proficient and physically and emotionally healthy and respectful, responsible, and caring” (Hodgkinson, 2006, p.i).

CHAPTER 3

METHODS

To test whether differences in Maryland School Assessment scores existed among population means categorized by curriculum structure and mobility status, the following were considered: target population, method of sampling, description of independent and dependent variables, data collection method, statistical method, research design, and procedure and time schedule.

Target Population

The target population for this study included all students from two Maryland public school districts in grades 3 and 5 for the 2003-2004 school year. This population included students who received no outside educational support, students who received intervention or special education services, and students who received enrichment services. Those students not included in the population were administered the Alt-MSA, as specified in Individual Education Programs. The target population above was administered the Maryland School Assessment in Mathematics and Reading in late February through early March, 2004.

The school districts that participated in this study differed slightly on some demographical aspects, yet had many commonalities. Maryland Public Schools are assigned school districts based on county lines, with the exception of Baltimore City, which is a school district within itself. For the purpose of anonymity, the two school districts in this study were referred to as District S and District N, where District S had a synchronous elementary curriculum and District N had a non-synchronous elementary curriculum. Counties were referred to as County S and County N, respectively.

Similarities were found among the two counties in terms of demographics. Comparisons of racial composition of the counties' populations revealed similar percentages for persons of white, African American, and Hispanic origin. White persons composed 89% of the population in both counties, while African Americans composed 6.4% of the population in County N and 7.8% of the population in County S (United States Census Bureau, n.d.). Persons of Hispanic origin represented 2.4% of County N's population and 1.2% of County S's population. Persons per square mile were 294.6 compared to 288, respectively. Finally, both counties were located in a metropolitan area. In terms of mobility over a 5 year period, the percentage of persons age 5 or older living in the same house from 1995 to 2000 in County N was 55.3% and in County S, 57.4%.

The United States Census Bureau (2003) provided net migration statistics for the population 5 years and over for all counties in the United States. The population moving into County N from 1995 to 2000 was 40,679, while the population of those moving out of the county was 31,525. This resulted in a net migration from 1995-2000 of 9,154. Of those persons moving into the county, 53% were from Maryland, while 47% came from another state. Of those persons moving out of the county, 39% moved to another Maryland county, while 61% moved to a different state. In County S, 23,243 persons moved into the county from 1995 to 2000, while 17,151 moved out. The net migration from 1995-2000 was 6,092. Of those persons moving into County S, 61% came from another county in Maryland, while 39% came from another state. The percentage of those leaving County S for another county in the state of Maryland was 28%, while 72% moved to another state.

Additional statistics revealed patterns of movement for each population. Each county bordered or was very close to three of Maryland's neighboring states and the District of Columbia. States included Pennsylvania, Virginia, and West Virginia. When examining movement to and from surrounding areas, 33% of those persons moving into County N from elsewhere came from a contiguous state or the District of Columbia, while 42% moved from County N to a contiguous state or the District. In County S, 56% of those from elsewhere came from a bordering state or the District of Columbia, while 53% moved to one of these states or the District. Movement to and from adjacent counties was also examined. Of those persons moving into County N from a different county in Maryland, 72% were from an adjacent county. Among those moving out of County N into another county in Maryland, 68% moved to an adjacent county. Movement to an adjacent county was somewhat lower in County S. Of those moving into County S from another county in Maryland, 25% were from an adjacent county. Of those moving out of County S into another county in Maryland, 35% moved to an adjacent county.

Movement between the two counties was also examined in relation to movement within the state. When examining movement into each County, 7% of those persons moving from within the state into County S were from County N, while 22% of those persons moving from within the state into County N were from County S. Data relative to movement out of each county revealed that 30% of persons in County S moving within the state moved to County N, while 25% of persons in County N moving within the state moved to County S.

Demographic differences occurred between the counties in respect to total population, education attainment, and economic status. County N had a population of 217,653, while the other county's population was 139,624 (United States Census Bureau, n.d.). Other differences are found in the level of education attained and economic status. In terms of educational attainment, high school graduate statistics of persons aged 25 or older were 87.1% in the County N compared to 77.8% in County S, while those persons 25 years old or older acquiring a bachelor's degree or higher were 30.0% compared to 14.6%, respectively. Median household income differed by almost $20,000, where County N earned $60,276 compared to $40,617 in County S. Finally, persons below the poverty level were 4.5% in County N compared to 9.5% in County S.

Several characteristics were examined when comparing the populations of the school districts. These characteristics included total enrollment of the school districts and elementary entrants and withdrawals. Wealth, expenditures, staffing, and length of year were also examined. Additional information was examined for the testing populations of grades 3 and 5. These characteristics included total students taking the assessment, ethnicity, gender, free and reduced meal status (FARMS), special education, and regular education. School district comparisons are shown in Table 1. Grade level comparisons are shown in Table 2 (Maryland State Department of Education, 2004a).

Table 1

Population Characteristics of School Districts, 2004

	District S	District N
Characteristic		
Total Enrollment	20,338	38,950
Wealth Per Pupil	$240,263	$256,351
Per Pupil Expenditures	$7,910	$7,930
Instructional Staff per 1,000 Pupils	85.9	82.7
Professional Staff per 1,000 Pupils	29.4	31.1
Instructional Assistants Staff per 1,000 Pupils	11.0	11.2
Average Length of School day for Pupils	6.6 hours	7.0 hours
Length of School Year for Pupils	179 days	179 days
Elementary Mobility Rate		
Entrant	11.3%	9.15%
Withdrawal	10.3%	8.1%

Table 2

Population Characteristics of School Districts by Grade Level, 2004

	Grade 3		Grade 5	
	District S	District N	District S	District N
Characteristic				
Students Administered Test (n)				
Reading	1439	2930	1480	2936
Math	1440	2930	1480	2937
Ethnicity (%)				
American Indian	0	0.2	0.4	0.2
Asian	1	3	0.9	3
African American	11	11	9	10
White	85	82	87	83
Hispanic	2	5	2	4
Gender (%)				
Male	52	50	51	52
Female	48	50	49	48
FARMS students (%)	40	16	37	15
Special Education Services (%)	14	14	13	13
Regular Education (%)	86	86	87	87

Method of Sampling

Proportional stratified random sampling was used to determine the sample population. This was necessary due to the large discrepancy in total district population and free and reduced meal status, as well as the population size of key subgroups which were relatively small in both districts. This type of sampling allowed more precision than simple stratified random sampling. The percentage of students receiving free and reduced meals in District S was 40% in grade 3 and 37% in grade 5, compared to District N, which were 16% and 15%, respectively. Based on various research pertaining to mobility and economic status (Alexander et al., 1996, Kerbow, 1996, Nelson, et al., 1996, & Wright, 1999), District S, which had a higher percentage of impoverished students, would most likely have a higher percentage of mobile students. By using proportional stratified random sampling, subgroups of the populations were represented in the sample in the same proportion that they existed in the population (Gay, 1996). This guaranteed equal representation of each subgroup. Key subgroups included mobility status, ethnicity, and socio-economic status. Socio-economic status was determined by free and reduced meal status. With homogeneous strata, the variability within groups should be lower than the variability for the population as a whole. By stratifying the population, more meaningful subgroup inferences could be made.

Sample sizes for each population were determined using the table generated by Krejcie and Morgan (as cited in Gay, 1996). District S had a population of 1,439 students in grade 3 and 1,480 in grade 5. Sample size, based on the table and population proportions, was 300 for mathematics grade 3 and 301 for mathematics grade 5. Sample size for reading was 299 for grade 3 and 301 for grade 5. District N had a population of

2,930 students in grade 3 and 2,936 in grade 5. Sample size, based on the table and population proportions, was 337 for mathematics grades 3 and 5 and reading grade 3. Sample size for reading grade 5 was 335. Proportions for each subgroup were determined by the percentage found in each population.

Independent (Attribute) Variables

The independent variables were curriculum structure and mobility status. Curriculum structure was divided into two categories: synchronous and non-synchronous. Mobility status was divided into three categories: with-in-school district transfer, out-of-school district transfer, and non-mobile.

Synchronous curriculum referred to that curriculum which was developed and presented so that, given their grade level, students within a school district were receiving the same content and skills based on a highly structured timeline. These content and skills were measured through regular benchmark assessments to ensure that the timeline was closely followed. This is the type of curricula employed by District S. Teachers in District S were given a grid which outlined monthly benchmark assessment dates as well as themes, units, and chapters required to be taught prior to assessment dates. Specific content and skills were aligned with the Voluntary State Curriculum and were required to be taught prior to assessment dates.

Detailed sequence, skills, and content were given to teachers for reading instruction. Teachers were provided with instructional windows in which to teach specific Houghton Mifflin reading series themes. There were six themes for grades 3 and 5. Students were administered Houghton Mifflin assessments each month. Assessment windows were provided for teachers, which required assessments to be administered within a specific three day period. Leveled passages and Informal Reading Inventories were administered in October and May. A vocabulary cumulative assessment was given to students in January.

For mathematics instruction, content maps showing specific grade level curriculum to be taught were available to teachers. Teachers were provided with instructional windows in which to teach Mathematics units. There were six units for grades 3 and 5. Assessment windows were provided for teachers, which required assessments to be administered within a three day period. Math fact assessments were administered to students each month from September through May, except for the month of March, during which students took MSA. Assessments to measure brief constructed responses were given six times throughout the year. Instructional windows, as well as assessment windows, were given for both math fact and brief constructed response assessments. Instructional windows varied from 4 to 8 weeks per unit. The main resource for teaching students was the Scott Foresman textbook.

Non-synchronous curriculum referred to curriculum that was developed and presented so that, given their grade level, students within a school district received the same content and skills over a much broader timeline, such as quarterly, or over the course of a school year. The instructional timeline was flexible and at the discretion of the classroom teacher. This was the curriculum structure used by District N. Teachers in District N were provided with a Quarterly Sequence for teaching reading and mathematics. Skills and content to be taught and assessed each quarter were also provided. Teachers were given a list of curriculum indicators to be taught per quarter. Quarters were approximately 9 weeks in length. Quarterly assessments were administered to students and measured mastery of those indicators. Reading assessments were required, while mathematics assessments were optional, at the discretion of the school principal. No formal textbook was required for either content subject.

Curriculum and assessments in both school districts were aligned with the Voluntary State Curriculum. Both types of curricula in this study were standardized, as they were developed to reflect Maryland's Voluntary State Curriculum. Assessment limits embedded within the Maryland Voluntary State Curriculum helped control for specific content taught. Assessment Limits stipulated the topics of each concept that must be covered to ensure that students have been taught the material that will be tested on MSA. Teachers were permitted to go as far beyond the Assessment Limits as time, their level of expertise, and ability levels of the students they were teaching would allow. For example, one Assessment Limit for the grade 3 Mathematics VSC stated, under the objective *Represent and analyze numeric patterns using skip counting*, "Use 2, 5, 10, or 100 starting with any whole number (0-1000)" (Maryland State Department of Education, 2004b). This was the minimum required to be taught. Teachers were permitted to extend this concept at their discretion, but students would only be assessed on the minimum requirement.

The major differences in the two types of curriculum were length of instructional windows and number and frequency of assessments. District S administered district-wide assessments monthly, while District N administered district-wide assessments quarterly, or did not require any type of assessment. This meant that students in District S were assessed on the instruction they received every 4 weeks, while those students in District N were assessed every 9 weeks. Looking at daily instruction, students were assessed on content taught every 20 days in District S as opposed to every 45 days in District N. More frequent assessment helped to control when content was taught and allowed for more frequent evaluation of students for reteaching or remediation. Students were more likely to miss less content when changing schools where instructional windows were changed every 20 days than where instructional windows were changed every 45 days.

Mobility was determined for the 2003-2004 school year. In order for a student to be considered enrolled in a school for the entire school year, or non-mobile, that student must have attended that school from September 30 to the time the MSA was taken. With-in-school district transfers were those transfers that occurred when students moved into a school from another school in the same district anytime between October 1 and the first day of MSA testing. These students' scores were used in determining district AYP, but not school AYP. Out-of school district transfers occurred when students moved into a school from another school outside of the school district anytime between October 1 and the first day of MSA testing. These students' scores were not used to determine school or county AYP and were only used to determine state AYP if the student was enrolled in Maryland schools from September 30 to administration of MSA.

Dependent Variables

In 2003, the Maryland State Department of Education (MDSE) implemented the MSA in order to meet the mandates of *No Child Left Behind* (CTB/McGraw-Hill, 2004). This assessment replaced the existing Maryland Students Performance Assessment Program (MSPAP), which had been administered from 1992 to 2002. In 2003, students in grades 3, 5, 8, and 10 were administered the MSA in both Reading and Mathematics. The following year, students in grades 4, 6, and 7 also received both assessments.

Student achievement in Mathematics for grades 3 through 8 was measured using CTB/McGraw Hill's *TerraNova* survey, custom selected response items, student-produced response items, and constructed-response items. The *TerraNova* survey provided schools with norm-referenced test scores, while the remaining response items, which reflected the Maryland content standards, combined with a subset of *TerraNova* items aligned with Maryland content standards, provided criterion referenced test scores.

Student achievement in Reading for grades 3 through 8 was measured using the Stanford Achievement Test (SAT 10), Tenth edition, custom selected response items (SR), student-produced response items, and constructed-response items (CR). The SAT 10 provided schools with norm-referenced test scores, while the remaining response items, which reflected the Maryland content standards, combined with a subset of SAT 10 items aligned with Maryland content standards, provided criterion referenced test scores.

The Bookmark Standard Setting Procedure, developed by The McGraw-Hill Company, was used for setting standards at or above the proficient level (p. 71). The percent of students performing at or above the proficient level were reported to the federal government under the No Child Left Behind act. This proficiency was also referred to as percent at or above cut (PAC). Three levels of performance were recognized on MSA. These levels were basic, proficient, and advanced.

The Maryland Standard Setting Technical Report (CTB McGraw-Hill, 2003) outlined how the Bookmark Standard Setting Procedure was used to set PAC on MSA. The target student was identified first (p. D2-13). This was a student who held skills common with just proficient students, mid-level proficient students, and high achieving proficient students. Next, the Bookmark placement was determined for content, based on difficulty of the test items. Items preceding the Bookmark reflected content that all proficient students should master. For SR items, proficient students should know the correct answer and for CR items, proficient students should most likely obtain that score point. The test scale reflected items ordered by difficulty and students ordered by ability. A Bookmark was placed to separate items, while a cut score was placed to separate students. Mastery was shown when students had at least a 2/3 chance of answering an item correctly. Location of an item was placed relative to difficulty. Location represented the ability level necessary to have a .67 chance of answering the item correctly (p. D2-17). The target student was then the student right at the cut score who had at least a 2/3 chance of answering the items at and below the cut score correctly.

MSA Mathematics

Test items on the Maryland School Assessment for Mathematics were developed from the MSA Statewide Academic Learning Standards for Maryland. A targeted test design was developed for each grade level, identifying the percent of test items for each specific content standard (CTB/McGraw-Hill, 2004, p. 7). Table 3 displays the percent of test items on each test for each content standard per grade level.

Table 3

2004 MSA Mathematics Test Designs by Grade & Content

	Percent of Test Items that Contribute to Score	
Content Standard	Grade 3	Grade 5
1 Algebra, Patterns, and Functions	18	20
2 Geometry	11	8
3 Measurements	10	11
4 Statistics	17	12
5 Probability	3	5
6 Number Relationships and Computation	22	20
7 Process of Mathematics	19	23
Total Score Points	100	99

Each test item was assigned to a reporting category and assessment limit. Because content standards had changed since the test forms had been constructed, if items no longer measured an assessment standard they were marked “do not use” (p. 19). Five different test forms were administered to students in grades 3 and 5. Most third and fifth grade students taking the test were white (49%-50%), while 37%-40% of the students were African American and 6%-7% were Hispanic (p. 20). There were slightly fewer females (48%-50%) than males (50%-52%). Ratios of ethnicity and gender were similar across grade level test forms A, B, C, D and E due to spiraling of test forms within the classroom (p. 20). Local Accountability Coordinators randomly assigned test forms, or clusters to randomly selected testing groups. This ensured that the numbers of each form administered within each school system and across the state would be nearly equivalent, and that schools with only three testing groups would always be assigned each of the three forms.

Mathematics norm-referenced test design.

TerraNova Survey Form C was administered to students in grades 3, 4, 5, 7, 8, and 10, while Form D was administered to students in grade 6. The author and publisher of *TerraNova* Survey was CTB/McGraw Hill. This test consisted of selected response items and provided educators with norm-referenced scores. These scores included national or custom percentile ranks, grade equivalency scores, norm curve equivalents, and developmental scale scores (CTB/McGraw-Hill, 2004). According to Cizek (2005), test items underwent a degree of scrutiny before being included in the test. Items and tasks were developed to meet content specifications, examined by content, editorial, and sensitivity reviewers, and field-tested to determine difficulty and ensure construct-relevant discrimination.

Norms were updated from the 1999-2000 school year. A sample of 280,000 students was tested for standardization purposes. A stratified sampling of schools was used including type of school, region, community type, and socio-economic status. Alpha coefficients were calculated to express internal consistency reliability. Alphas for the total test ranged from .95 at Level 12, Kindergarten, to .96 at level 21/22, twelfth grade. All internal consistency estimates for sub-areas were in the mid to low .90s. CTB/McGraw-Hill did not provide test-retest reliability. A moderate degree of validity evidence was provided. In order to minimize the influence of construct irrelevant variables on students' performance, CTB/McGraw-Hill reported speededness, extensive editorial review, sensitivity review, item-to-model fit, and differential item functioning (Cizek, 2005). The evidence of validity in relation to content sources from which test items are drawn was plentiful. Cizek (2005) found minimal evidence on construct validity. The publisher claimed alignment with the National Council of Teachers of Mathematics Principles and Standards for School Mathematics, but no documentation was provided.

Mathematics criterion-referenced test design.

The criterion-referenced test was composed of three types of test items. These included *Terra Nova* items which closely aligned with Maryland Content Standards, custom selected response items (SR) and constructed response (CR) items. SR and CR items were written to measure performance on Maryland Content Standards. The number of test items and score points for each of the Mathematics standards were similar across all forms of the test. Forms A, C, and E contained the same operational items and were designated Form 1. They differed only in the field test items. Operational items were identical and in the same operational item positions. Forms B and D contained the same operational items and were designated Form 2. They, too, differed only in the field test items. Operational items were identical and in the same operational item positions (CTB/McGraw-Hill, 2004).

Item-level descriptive statistics for each test form included the proportion of students who answered the SR item correctly, the proportion of the obtained mean raw score for each item to the number of points possible for that item, the point-biserial correlation between item score and total score for SR items, and a Pearson correlation between item score and total score for the CR items. For the item analysis, the studied item was excluded from the total score so that it did not inflate the correlation. SR items with a *p*-value below 0.30 and CR items with a *p*-value below 0.20 were flagged and further reviewed by content specialists to ensure the item measured the intended construct(s), that the scoring key or rubric was correct, and for SR items, that there was only one correct answer to the item (p. 41).

Measures were taken to assess rater agreement. CR items were scored by at least two readers. If the scores differed by one point, the student received the higher score. If the scores differed by more than one point, a third expert rater resolved the discrepancy. Rater agreement was assessed only by the first two readers' scores. The maximum score for part A of a CR was 1, while the maximum score for part B of a CR was more than 1. Rater agreement was defined as the "percent of same scores plus adjacent scores" (p. 42). Rater agreement for Mathematics items across all grade levels was 96.9%-100%.

Items were flagged for differential item functioning (DIF) if the item was more difficult for a group of students, referred to as a focal group, than expected based on the group's total test scores compared to the performance of another group, referred to as a reference group. Focal groups were identified for ethnicity and gender. African American and Hispanic focal groups were compared to the white reference group, while a female focal group was compared to the male reference group. Items that favored the focal group as well as those items that disadvantaged the focal group were reported.

Two IRT models were used to calibrate item responses. The tree-parameter logistic (3PL) model was used to scale SR items, while the two-parameter partial credit

(2PPC) model was used to scale CR items. SR items were defined in terms of item difficulty or location, item discrimination, and the probability of a correct response to the item by a very low-scoring student. CR items were defined in terms of item discrimination and location parameter for each score point (p. 45). Common items that appeared across all alternate forms of the test were used for form-to-form equating, while anchor items were used for year-to-year equating. Stability of anchor items was checked. Grade 3 test items 16 and 34 deviated from the regression line and were dropped as anchor items. There were no deviations for grade 5 anchor items.

Distributions of raw scores and scale scores were similar across forms. Reliability (Cronbach's alpha) for both third and fifth grade was high. Reliability coefficients for both third grade forms were 0.92, while reliability coefficients for both fifth grade forms were 0.94 (p. 50). White students performed better than African American or Hispanic students. The scale score difference ranged between 30 and 40 points. No difference existed between male and female scale scores.

Each 2004 MSA contained norm-referenced test (NRT) and criterion-referenced test (CRT) items. Correlations between scale scores of NRT and scale scores of CRT were produced to examine how much the two tests measured the same performance. Correlations were relatively high and similar across test forms for each grade. Correlation coefficients for grade 3 were 0.81 for Form A and 0.80 for Form B. Correlation coefficients for grade 5 forms A and B were 0.83 and 0.85, respectively (p. 56).

Scale scores based on content distribution were reported to the Maryland State Department of Education. Content standard scale scores were estimated from a maximum-likelihood IRT pattern procedure. Parameters were determined by using scores from the total test (p. 57). Raw score and scale score Pearson product-moment correlations were computed for each content standard in each grade. In every instance raw score correlations were higher than scale score correlations, reflecting the differences among score distributions. Because scale score distributions differ substantially among content standards, a nonparametric Spearman rho correlation was computed and scale score intercorrelations increased substantially.

Exploratory factor analysis was conducted to examine validity and structure. Principal factor analysis was applied at the item level and at the content standard level. Results were similar on each test form. At both item and content standard level one dominate trait existed for each form. Most items and objectives had large loading values in the first factor.

MSA Reading

The 2004 MSA Reading measured student performance using norm-referenced and criterion-referenced information. Norm-referenced information was provided by items on the abbreviated form of the Stanford Achievement Test Series, Tenth Edition (SAT 10). Third grade students were administered Word Study, Reading Vocabulary, and Reading Comprehension items, while fifth grade students completed Reading Vocabulary and Reading Comprehension items. Criterion-referenced information was provided by augmented items written from the Maryland Reading Standards. These items were organized under General Reading, Literary Reading, and Informational Reading (Harcourt Assessment Incorporated, 2004). Norm-referenced and criterion referenced scores were produced for each student. Norm-referenced scores were generated from only SAT10 items, while criterion-referenced scores were generated from both SAT10 and augmented items. Four test forms were generated for grades 3 and 5. Forms 1 and 3 were identical in terms of operational items and considered Form A, while Forms 2 and 4 were identical in terms of operational items and considered Form B. Table 4 displays the number of operational items for each strand per grade level.

Table 4

2004 MSA Reading Test Designs by Grade & Strand (p. 7)

	Number of Operational Items on Each Form (F1-F4)	
Strand Title	Grade 3	Grade 5
Word Study	20	0
Reading Vocabulary	20	20
Reading Comprehension	30	30
Total NRT	70	50
General Reading	16	15
Literary Reading	10	11
Informational Reading	21	21
Total CRT	47	47

The 2004 MSA Reading provided two main purposes. The assessment was designed to inform parents, teachers, and educators of what students actually learned in schools and as an “accountability tool to measure performance levels of individual students, schools, and districts against the new academic standards" (p. 4). Test development committees consisted of representatives from Harcourt Assessment Incorporated, Maryland State Department of Education, and teachers, administrators, and content specialists from local school systems.

Reading norm-referenced test design.

The Stanford Achievement Test, Tenth edition (SAT 10), was administered to students in grades 3-8. The test consisted of Word Study, Reading Vocabulary, and Reading Comprehension items (Harcourt Assessment, Incorporated, 2004, p. 2). The author and publisher was Harcourt Assessment, Incorporated.

Norms were updated in 2002 and reflected a Kindergarten through grade 12 population. Standardization in both the spring and fall of 2002 was provided. The spring population consisted of 250,000 students, while the fall population consisted of 110,000 students. School districts were chosen based on a stratified cluster sampling design, which included geographic, region, socio-economic status, urbanicity, and ethnicity. Scores reported included raw scores, scaled scores, individual percentile ranks, stanines, grade equivalents, norm curve equivalents, achievement/ability comparisons, group percentile ranks and stanines, content cluster and process cluster performance categories, and performance standards.

There was a high degree of internal consistency reliability. The KR20 coefficients for full length tests were in the mid .80's to .90's. The KR20 coefficients for the abbreviated tests were in the .80's. Content validity was built into the test through test blueprint and development process. Convergent validity was reported through correlations between the SAT 10 and SAT 9 in the .70's to .80's. Carney (2005) suggested educators determine content validity based on their goals and curricula.

Reading criterion-referenced test design.

The criterion-referenced test for Reading was composed of three types of test items. These included SAT10 items which closely aligned with Maryland Reading Standards, custom selected response items (SR) and brief constructed response (BCR) items (Harcourt Assessment, Incorporated, 2004). SR and BCR items were written to measure performance on Maryland Reading Standards. SR items required students to select the correct answer from four alternatives. These items were scored as either right or wrong. BCR items required students to answer a question using words, sentences, or a more elaborated way. These items were scored with a general rubric of maximum values between 0 and 3.

Operational test analyses were performed to determine whether the two operational test forms, A and B, generated statistical discrepancy. Descriptive statistics, reliability, and standard error of measurement were calculated for the SAT 10 common items. Statistical results were almost identical.

In order to investigate validity, data was examined for contend-related evidence, internal structure evidence, and unidimensionality evidence. Blueprints aligning the content of the MSA Reading and the Maryland Voluntary State Curriculum were provided as evidence of content validity. Intercorrelations among the three reading processes, general reading, literary reading, and informational reading, were calculated for internal structure validity. Moderately strong intercorrelations existed among the three processes, ranging from 0.67 to 0.73. Principal component analysis was conducted to determine unidimensionality. Eigenvalues of the first factor were at least three times larger than the second factor, meeting the assumption of unidimensionality.

The same measures used to assess inter-rater reliability on MSA Mathematics were used for MSA Reading where rater agreement was assessed only by the first two readers' scores. Rater agreement for Reading items across all grade levels was 95% for adjacent agreement rates.

Items were flagged for differential item functioning (DIF) if the item was more difficult for a group of students. Both SR and BCR items were analyzed. Focal groups were identified as female or African-American. The reference group was either male or Caucasian.

Data Collection Methods

MSA Reading and Mathematics tests were administered between February 25 and March 12. Each test consisted of two parts. Part 1 was given on Day 1 while Part 2 was given on Day 2. Make-up testing days were included in this timeline. All students in a tested grade were required to participate except those with severe cognitive disabilities. Those students were assessed by the Alt-MSA. Accommodations for Special Education students, English Language Learners, and students with disabilities under Section 504 had to be approved and documented. Testing accommodations were provided based on individual needs and a master list was made available to the Maryland State Department of Education (Harcourt Assessment, Incorporated, 2004).

Each student received a Test Book and Answer Book. Test Books and Answer Books were confidential and kept secure at all times. When not being used in testing, these materials were kept in locked areas. Manuals were provided to Local Accountability Coordinators in each school district and building level School Test

Coordinators describing administration, packaging, and return of test materials.

Testing materials were sent to publishers for scoring. CTB scored mathematics assessments and Harcourt scored reading assessments. Selected response items were scored by machine, while constructed response items and brief constructed response items were hand-scored by trained staff. Test results and data were reported to MSDE who then shared them with school districts. Data for this study was provided by the two school districts involved in the study. To ensure anonymity, names of students were replaced with an arbitrary number by the school district before data was provided to the researcher.

Statistical Methods

Data available were from the 2003-2004 school year. The MSA was administered to students in the spring of 2004. No pre-test was available to determine population means prior to the test. Therefore, an independent sample *t* was conducted on the mean scores of 2004 MSA for each sample population to determine if there was a significant difference in sample mean MSA scores.

A two-way analysis of variance (ANOVA) was used in this study. Two-way ANOVA is a type of "analysis that tests whether differences exist among population means categorized by two factors or independent variables" (Witte & Witte, 1997). This type of study was chosen because it permits the assessment of two independent variables in a single study, as well as the assessment of interactions.

Due to the unequal *n* in each cell, the homogeneity of variance assumption was tested using Hartley's *F*-Max test prior to conducting the two-way ANOVA. The independent variables, curriculum and mobility status, were examined as between-subject factors, in order to determine their effect on Maryland School Assessment reading and mathematics scores. This between-participant design was used since each student had a score for only one level of a factor. The interaction between curriculum and mobility status was also examined. MSA scores were analyzed in a 2 (curriculum: synchronous, non-synchronous) x 3 (mobility status: non-mobile, with-in-district, out-of-district) analysis of variance, which yielded 6 cells. Post hoc Tukey-Kramer's tests were used to detect significant differences between pairs of groups.

Research Design and Procedures

A causal-comparative analysis was conducted. In causal-comparative analysis, the researcher does not manipulate the independent variable in order to observe its effect on the dependent variable. While strong cause-and-effect conclusions cannot be made through this type of research design, they are useful in exploratory investigations where it is impossible to manipulate the independent variable (Gall, Gall, & Borg, 2003). Causal-comparative research, which is a type of nonexperimental investigation, searches for cause-effect relationships by forming groups of individuals in whom the independent variable is present, absent, or present at various levels. Groups are measured on whether they differ on the dependent variable. Causal-comparative research design is sometimes preferred to correlational studies in educational research when either could be conducted. This method is often chosen because the formation of groups to measure the independent variable is more consistent with the philosophy of educators and the results are usually easier to understand and interpret.

There were several reasons for performing this type of research. The sample population was selected from two already existing populations, those students in District

S and District N. Proportional stratified random sampling allowed for groups to be as similar as possible on all relevant variables except the independent variables. Independent variables of curriculum structure and mobility could not be manipulated by the researcher; therefore a causal-comparative research design was used rather than an experimental research design. Data were available ex-post facto from tests taken in 2004.

Cautions exist when conducting causal comparative research. Researchers must be aware of the weaknesses of this research including lack of randomization, manipulation, and control. The degree of control was not sufficient to establish cause-effect relationships.

Time Schedule

The researcher utilized the following time schedule for the administration and completion of this project:

March 2006 – Dissertation Proposal approved by committee.

May 2006 – Transmittal Form for Human Subjects Research submitted to Institutional Review Board

July 2006 – Data collected from County Testing Coordinators

August 2006 – Statistical analysis conducted. Results entered into the SPSS statistical package for analysis and evaluation

September 2006 –February 2007 – Final two chapters of dissertation drafted.

March 2007 – Dissertation defense

CHAPTER 4

RESULTS

The purpose of this research was to determine the effects of curriculum on the achievement of mobile students, should any exist. Data sets from two Maryland school districts were examined. The curriculums from these school districts were identified as synchronous and non-synchronous. Student data was examined based on mobility status. Students were identified as non-mobile students, with-in-district mobile students, and out-of-district mobile students using the enrollment date criteria for determining Adequate Yearly Progress. Grade 3 and 5 Mathematics and Reading scores were used from the Maryland School Assessment.

The following null hypotheses were examined for this study:

7. There is no significant difference in MSA mean mathematics scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) ($\alpha = .01$).
8. There is no significant difference in MSA mean mathematics scores according to curriculum structure (synchronous or non-synchronous) ($\alpha = .01$).
9. There is no significant interaction in MSA mean mathematics scores between mobility status and curriculum structure ($\alpha = .01$).
10. There is no significant difference in MSA mean reading scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) ($\alpha = .01$).
11. There is no significant difference in MSA mean reading scores according to curriculum structure (synchronous or non-synchronous) ($\alpha = .01$).

12. There is no significant interaction in MSA mean reading scores between mobility status and curriculum structure ($\alpha = .01$).

Data were collected from District N and District S. An SPSS 13.0 data file was provided by District N, while a Microsoft Excel spreadsheet was provided by District S. Both data sets were formatted for SPSS 13.0 for ease in comparisons.

MSA Mathematics Results

The following categories were identified and placed into SPSS for analysis of the MSA Mathematics data:

1. District
2. Grade
3. Race
4. Free and Reduced Meals (FARM)
5. Adequate Yearly Progress Entry Code
6. Criterion Reference Test Mathematics Scale Score
    a. Math Objective 1 Scale Score (Algebra, Patterns, and Functions)
    b. Math Objective 2 Scale Score (Geometry and Measurement)
    c. Math Objective 3 Scale Score (Statistics and Probability)
    d. Math Objective 4 Scale Score (Number and Relationships Computation)
    e. Math Objective 5 Scale Score (Processes of Mathematics)
7. Norm Reference Test Mathematics Scale Score
8. Norm Reference Test Mathematics National Percentile

A descriptive statistical analysis and independent sample *t* test were conducted on the mean mathematics scores for the total population. The results are in the following Tables 5 and 6.

Table 5

Descriptive Statistics MSA Mathematics Scores

Assessment Source	Curriculum Structure	N	Standard Mean	Deviation
CRT Math Scale Score	Non-synchronous	674	406.46	45.11
	Synchronous	601	407.92	44.06
Objective 1	Non-synchronous	674	428.04	97.58
	Synchronous	601	433.20	99.50
Objective 2	Non-synchronous	674	412.37	70.26
	Synchronous	601	429.08	88.25
Objective 3	Non-synchronous	674	416.56	73.59
	Synchronous	601	417.93	72.57
Objective 4	Non-synchronous	674	436.14	100.53
	Synchronous	601	429.95	99.79
Objective 5	Non-synchronous	674	402.65	64.84
	Synchronous	601	403.70	58.46
NRT Math Scale Score	Non-synchronous	674	641.42	56.09
	Synchronous	601	637.52	50.45
NRT Math National Percentile	Non-synchronous	674	61.53	29.24
	Synchronous	601	59.66	28.83

Table 6

Independent Sample t Tests for Mathematics Mean Scores

Assessment Source	*t*	*df*	Sig. (2-tailed)	SE
CRT Math Scale Score	-.583	1273	.560	2.50
Objective 1	-.933	1273	.351	5.53
Objective 2	-3.759**	1273	.000	4.45
Objective 3	-.334	1273	.739	4.10
Objective 4	1.102	1273	.271	5.62
Objective 5	-.303	1273	.762	3.47
NRT Math Scale Score	1.299	1273	.194	3.00
NRT Math National Percentile	1.147	1273	.251	1.63

** $p < .01$.

No significant difference was found in CRT Math Scale Score means, NRT Math Scale Score means or NRT Math National Percentile. Within Mathematics subgroup objective scores, no significant difference was found in Objectives 1, 3, 4, and 5. A significant difference was found in Objective 2 Scale Score Means, Geometry and Measurement (p = .000).

SPSS 13.0 was used to conduct the 2-way ANOVA. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 2, Geometry and Measurement, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective. When a significance difference was found, it was further examined with the Tukey-Kramer. If the Tukey-Kramer test did not show significance, the more liberal Fisher Least Significant

Difference (LSD) test was conducted to gain further insight. The total population, including both grade 3 and grade 5 students was examined first, followed by individual analyses of each grade level independent of the other.

Total CRT Mathematics Scale Scores were examined. These results can be seen in Tables 7 and 8. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 5.45 between scores based on mobility status, which was significant ($p = .004$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores ($p = .031$).

Table 7

CRT Mathematics Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	408.08	44.35
	With-in-district	37	391.00	44.16
	Out-of-district	23	388.13	58.52
Synchronous	Non-mobile	517	408.92	43.89
	With-in-district	60	404.32	41.89
	Out-of-district	24	395.21	51.86

Table 8

Analysis of Variance for CRT Mathematics Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	1.72	.190
Mobility Status	2	5.45**	.004
Curriculum Structure x Mobility Status	2	.91	.402

** $p < .01$.

Individual Mathematics objective scale scores were examined next. Mean scores for each of the cells were examined and a 2-way ANOVA conducted. Results for Objective 1, Algebra, Patterns, and Functions, are shown in Tables 9 and 10. No significant differences were found in mean scale scores.

Table 9

Algebra, Patterns, Functions Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	429.13	96.37
	With-in-district	37	415.46	115.71
	Out-of-district	23	419.39	100.93
Synchronous	Non-mobile	517	433.32	99.34
	With-in-district	60	437.15	98.00
	Out-of-district	24	420.83	109.55

Table 10

Analysis of Variance for Algebra, Patterns, Functions Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.58	.446
Mobility Status	2	.37	.688
Curriculum Structure x Mobility Status	2	.34	.710

No ANOVAs were conducted on Objective 2, Geometry and Measurement due to the significant difference found between the two mean scores using the independent sample *t* test.

Results for Objective 3, Statistics and Probability, are shown in Tables 11 and 12. Tests of between-subjects effects yielded an *F*-ratio of 8.77 between scores based on mobility status, which was significant ($p = .000$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .031$), as well as between non-mobile student scores and out-of-district student scores ($p = .002$).

Table 11

Statistics and Probability Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	419.03	73.99
	With-in-district	37	394.30	73.72
	Out-of-district	23	386.35	47.47
Synchronous	Non-mobile	517	421.24	72.27
	With-in-district	60	404.42	70.41
	Out-of-district	24	380.33	72.57

Table 12

Analysis of Variance for Statistics and Probability Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.06	.811
Mobility Status	2	8.77**	.000
Curriculum Structure x Mobility Status	2	.21	.812

** $p < .01$.

Results for Objective 4, Number and Relationships Computation, are shown in Tables 13 and 14. No significant differences were found in mean scale scores.

Table 13

Number and Relationships Computation Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	438.17	99.18
	With-in-district	37	419.97	115.10
	Out-of-district	23	408.09	109.46
Synchronous	Non-mobile	517	430.19	99.22
	With-in-district	60	430.73	94.25
	Out-of-district	24	422.95	126.76

Table 14

Analysis of Variance for Number and Relationships Computation Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.23	.630
Mobility Status	2	1.06	.347
Curriculum Structure x Mobility Status	2	.63	.534

Results for Objective 5, Processes of Mathematics, are shown in Tables 15 and 16. Tests of between-subjects effects yielded an *F*-ratio of 4.90 between scores based on mobility status, which was significant ($p = .008$). Using a Tukey-Kramer test for multiple comparisons, no significant differences were found between the means based on mobility. Further examination using the LSD test showed significance between non-mobile students and with-in-district mobile students (p = .027) and non-mobile students and out-of-district mobile students (p = .022).

Table 15

Processes of Mathematics Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	404.77	64.18
	With-in-district	37	388.78	58.53
	Out-of-district	23	368.26	80.89
Synchronous	Non-mobile	517	405.32	56.25
	With-in-district	60	391.72	62.12
	Out-of-district	24	398.88	88.34

Table 16

Analysis of Variance for Processes of Mathematics Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	2.31	.129
Mobility Status	2	4.90**	.008
Curriculum Structure x Mobility Status	2	1.34	.262

** $p < .01$.

NRT Mathematics Scale Scores were examined using a 2-way ANOVA. Results are shown in Tables 17 and 18. Tests of between-subjects effects yielded an F-ratio of 4.99 between scores based on mobility status, which was significant (p = .007). Using a

Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores (p = .027).

Table 17

Norm Referenced Test Mathematics Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	643.58	55.61
	With-in-district	37	619.03	50.46
	Out-of-district	23	619.70	66.77
Synchronous	Non-mobile	517	638.05	50.11
	With-in-district	60	639.35	48.98
	Out-of-district	24	621.50	60.30

Table 18

Analysis of Variance for Norm Referenced Test Mathematics Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.73	.392
Mobility Status	2	4.99**	.007
Curriculum Structure x Mobility Status	2	2.55	.079

** $p < .01$.

NRT Mathematics National Percentiles were examined. Results are shown in Tables 19 and 20. Tests of between-subjects effects yielded an *F*-ratio of 5.33 between scores based on mobility status, which was significant ($p = .005$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores ($p = .043$)

Table 19

Norm Referenced Test Mathematics National Percentile Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	614	62.62	28.78
	With-in-district	37	50.11	30.73
	Out-of-district	23	50.65	33.96
Synchronous	Non-mobile	517	60.23	28.77
	With-in-district	60	57.92	28.33
	Out-of-district	24	51.63	31.01

Table 20

Analysis of Variance for Norm Referenced Test Mathematics National Percentile

Source	*df*	*F*	*p*
Curriculum Structure	1	.37	.511
Mobility Status	2	5.33**	.005
Curriculum Structure x Mobility Status	2	1.36	.257

** $p < .01$.

Grade 3 MSA Mathematics Results

To gain further insight into student test data, scores for grades 3 and 5 were examined separately. Individual analyses of each grade level population follow. SPSS 13.0 was used to conduct the 2-way ANOVA of grade 3 mathematics scores. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 2, Geometry and Measurement, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective.

Results for CRT Mathematic Scale Scores are shown in Tables 21 and 22. No significant differences were found in mean scale scores.

Table 21

CRT Mathematics Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	402.43	40.68
	With-in-district	22	401.27	42.86
	Out-of-district	11	391.55	42.49
Synchronous	Non-mobile	262	412.70	44.37
	With-in-district	24	416.21	41.14
	Out-of-district	14	405.93	49.23

Table 22

Analysis of Variance for CRT Mathematics Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	3.37	.067
Mobility Status	2	.54	.585
Curriculum Structure x Mobility Status	2	.09	.917

Individual Mathematics objective scale scores were examined next. Mean scores for each of the cells were examined and a 2-way ANOVA conducted. Results for Objective 1, Algebra, Patterns, and Functions, are shown in Tables 23 and 24. No significant differences were found in mean scale scores.

Table 23

Algebra, Patterns, Functions Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	437.98	108.74
	With-in-district	22	449.09	116.25
	Out-of-district	11	447.91	120.84
Synchronous	Non-mobile	262	461.35	115.48
	With-in-district	24	487.25	126.75
	Out-of-district	14	452.21	122.75

Table 24

Analysis of Variance for Algebra, Patterns, Functions Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	1.32	.251
Mobility Status	2	.57	.566
Curriculum Structure x Mobility Status	2	.19	.831

No tests were conducted on Objective 2, Geometry and Measurement due to the significant difference found between the two mean scores.

Results for Objective 3, Statistics and Probability, are shown in Tables 25 and 26. No significant differences were found in mean scale scores.

Table 25

Statistics and Probability Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	412.11	66.04
	With-in-district	22	407.86	61.93
	Out-of-district	11	390.82	46.48
Synchronous	Non-mobile	262	431.35	72.67
	With-in-district	24	435.50	71.51
	Out-of-district	14	397.36	45.21

Table 26

Analysis of Variance for Statistics and Probability Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	2.49	.115
Mobility Status	2	1.96	.142
Curriculum Structure x Mobility Status	2	.22	.806

Results for Objective 4, Number and Relationships Computation, are shown in Tables 27 and 28. No significant differences were found in mean scale scores.

Table 27

Number and Relationships Computation Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	449.03	109.73
	With-in-district	22	449.18	123.24
	Out-of-district	11	432.36	105.56
Synchronous	Non-mobile	262	455.40	110.85
	With-in-district	24	477.08	114.00
	Out-of-district	14	471.21	129.67

Table 28

Analysis of Variance for Number and Relationships Computation Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	1.69	.195
Mobility Status	2	.21	.814
Curriculum Structure x Mobility Status	2	.43	.653

Scale score means for Objective 5, Processes of Mathematics, were examined. Results are shown in Tables 29 and 30. Tests of between-subjects effects yielded an *F*-ratio of 4.37 between scores based on curriculum structure, which was significant (p = .360).

Table 29

Processes of Mathematics Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	403.48	61.87
	With-in-district	22	403.77	64.40
	Out-of-district	11	360.09	69.87
Synchronous	Non-mobile	262	409.18	53.66
	With-in-district	24	402.92	63.27
	Out-of-district	14	418.14	81.79

Table 30

Analysis of Variance for Processes of Mathematics Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	4.37*	.037
Mobility Status	2	1.02	.360
Curriculum Structure x Mobility Status	2	2.41	.091

* $p < .05$.

NRT Mathematics National Percentiles were examined. Results are shown in Tables 31 and 32. No significant differences were found in mean scale scores.

Table 31

Norm Referenced Test Mathematics Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	616.05	44.51
	With-in-district	22	607.00	57.36
	Out-of-district	11	608.09	54.06
Synchronous	Non-mobile	262	619.43	42.01
	With-in-district	24	614.54	39.34
	Out-of-district	14	615.21	69.49

Table 32

Analysis of Variance for Norm Referenced Test Mathematics Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.64	.425
Mobility Status	2	.70	.496
Curriculum Structure x Mobility Status	2	.06	.938

NRT Mathematics National Percentiles were examined. Results are shown in Tables 33 and 34. No significant differences were found in mean scores.

Table 33

Norm Referenced Test Mathematics National Percentile Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	59.74	28.60
	With-in-district	22	54.41	34.52
	Out-of-district	11	49.27	49.27
Synchronous	Non-mobile	262	62.48	27.41
	With-in-district	24	59.21	26.47
	Out-of-district	14	58.29	29.17

Table 34

Analysis of Variance for Norm Referenced Test Mathematics National Percentile Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	1.33	.249
Mobility Status	2	1.21	.298
Curriculum Structure x Mobility Status	2	.17	.847

Grade 5 MSA Mathematics Results

SPSS 13.0 was used to conduct the 2-way ANOVA of grade 5 mathematics scores. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 2, Geometry and Measurement, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective.

Grade 5 CRT Mathematics Scale Scores were examined. These results can be seen in Tables 35 and 36. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 8.19 between scores based on mobility status, which was significant ($p = .000$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .011$), as well as between non-mobile student scores and out-of-district student scores ($p = .019$).

Table 35

CRT Mathematics Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	413.61	47.09
	With-in-district	15	375.93	43.00
	Out-of-district	12	385.00	72.01
Synchronous	Non-mobile	255	405.03	43.13
	With-in-district	36	396.39	41.04
	Out-of-district	10	380.20	54.24

Table 36

Analysis of Variance for CRT Mathematics Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.08	.772
Mobility Status	2	8.19**	.000
Curriculum Structure x Mobility Status	2	1.99	.139

** $p < .01$.

Individual Mathematics objective scale scores were examined next. Mean scores for each of the cells were examined and a 2-way ANOVA conducted. Results for Objective 1, Algebra, Patterns, and Functions, are shown in Tables 37 and 38. Tests of between-subjects effects yielded an *F*-ratio of 3.82 between scores based on mobility status, which was significant ($p = .022$). Neither a Tukey-Kramer test for multiple comparisons nor the LSD showed where the significance occurred. A separate *t* test was conducted between each of the mean scores for further insight. No significant differences were found. Upon further examination of a visual graphic of the range of means, a quantity of both positive and negative outliers was discovered, contributing to the .05 probability level.

Table 37

Algebra, Patterns, Functions Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	420.45	81.72
	With-in-district	15	366.13	98.87
	Out-of-district	12	393.25	74.44
Synchronous	Non-mobile	255	404.51	68.57
	With-in-district	36	403.75	52.38
	Out-of-district	10	376.90	72.32

Table 38

Analysis of Variance for Algebra, Patterns, Functions Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.02	.895
Mobility Status	2	3.82*	.022
Curriculum Structure x Mobility Status	2	2.49	.084

* $p < .05$.

No tests were conducted on Objective 2, Geometry and Measurement due to the significant difference found between the two mean scores.

Results for Objective 3, Statistics and Probability, were examined. These results can be seen in Tables 39 and 40. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 9.27 between scores based on mobility status, which was significant (p = .000). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .002), as well as between non-mobile student scores and out-of-district student scores (p = .009).

Table 39

Statistics and Probability Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	425.83	80.57
	With-in-district	15	374.40	86.65
	Out-of-district	12	382.25	50.05
Synchronous	Non-mobile	255	410.86	71.02
	With-in-district	36	383.03	61.81
	Out-of-district	10	356.50	97.40

Table 40

Analysis of Variance for Statistics and Probability Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.63	.429
Mobility Status	2	9.27**	.000
Curriculum Structure x Mobility Status	2	.55	.579

** $p < .01$.

Results for Objective 4, Number and Relationship Computations, are shown in Tables 41 and 42. Tests of between-subjects effects yielded an *F*-ratio of 5.09 between scores based on mobility status, which was significant ($p = .006$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores ($p = .033$).

Table 41

Number and Relationships Computation Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	427.52	86.48
	With-in-district	15	377.13	89.31
	Out-of-district	12	385.83	112.71
Synchronous	Non-mobile	255	404.29	77.75
	With-in-district	36	399.83	63.06
	Out-of-district	10	355.20	89.75

Table 42

Analysis of Variance for Number and Relationships Computation Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.50	.480
Mobility Status	2	5.09**	.006
Curriculum Structure x Mobility Status	2	1.57	.210

** $p < .01$.

Results for Objective 5, Processes of Mathematics, are shown in Tables 43 and 44. Tests of between-subjects effects yielded an F-ratio of 5.87 between scores based on mobility status, which was significant ($p = .003$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .022).

Table 43

Processes of Mathematics Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	406.05	66.45
	With-in-district	15	366.80	41.44
	Out-of-district	12	375.75	92.32
Synchronous	Non-mobile	255	401.35	58.63
	With-in-district	36	384.25	61.08
	Out-of-district	10	371.90	94.30

Table 44

Analysis of Variance for Processes of Mathematics Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.07	.794
Mobility Status	2	5.87**	.003
Curriculum Structure x Mobility Status	2	.60	.552

** $p < .01$.

Grade 5 NRT Mathematics Scale Scores were examined. These results can be seen in Tables 45 and 46. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 6.47 between scores based on mobility status, which was significant (p = .002). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores (p = .006).

Table 45

Norm Referenced Test Mathematics Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	670.58	52.10
	With-in-district	15	636.67	32.40
	Out-of-district	12	630.33	77.48
Synchronous	Non-mobile	255	657.18	50.62
	With-in-district	36	655.89	48.21
	Out-of-district	10	630.30	46.57

Table 46

Analysis of Variance for Norm Referenced Test Mathematics Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.05	.833
Mobility Status	2	6.47**	.002
Curriculum Structure x Mobility Status	2	2.10	.123

** $p < .01$.

NRT Mathematics National Percentiles were examined. Results are shown in Tables 47 and 48. Tests of between-subjects effects yielded an *F*-ratio of 5.19 between scores based on mobility status, which was significant ($p = .006$). Using a Tukey-Kramer test for multiple comparisons, no significant differences were found between the means based on mobility. Further examination using the LSD test showed significance between non-mobile students and with-in-district mobile students ($p = .039$) and non-mobile students and out-of-district mobile students ($p = .024$).

Table 47

Norm Referenced Test Mathematics National Percentile Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	310	65.46	28.72
	With-in-district	15	43.80	23.88
	Out-of-district	12	51.92	37.38
Synchronous	Non-mobile	255	57.92	29.99
	With-in-district	36	57.06	29.84
	Out-of-district	10	42.30	32.60

Table 48

Analysis of Variance for Norm Referenced Test Mathematics National Percentile Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.06	.804
Mobility Status	2	5.19**	.006
Curriculum Structure x Mobility Status	2	2.49	.083

** $p < .01$.

MSA Reading Results

The following categories were identified and placed into SPSS for analysis of the MSA Reading data:

1. District
2. Grade
3. Race
4. Free and Reduced Meals (FARM)
5. Adequate Yearly Progress Entry Code
6. Criterion Reference Test Reading Scale Score
    a. Reading Objective 1 Scale Score (General Reading Processes)
    b. Reading Objective 2 Scale Score (Informational Reading Processes)
    c. Reading Objective 3 Scale Score (Literary Reading Processes)
7. Norm Reference Test Reading Scores
    a. Total Reading Scale Score
    b. Total Reading National Percentile Rank
    c. Word Study Skills Scale Score (Grade 3 only)
    d. Word Study Skills National Percentile Rank (Grade 3 only)
    e. Reading Vocabulary Scale Score
    f. Reading Vocabulary National Percentile Rank
    g. Reading Comprehension Scale Score
    h. Reading Comprehension National Percentile Rank

A descriptive statistical analysis and an independent sample *t* were conducted on the mean reading scores for the total population. The results are in the following Tables 49 and 50.

Table 49

Descriptive Statistics MSA Reading Scores

Assessment Source	Curriculum Structure	N	Mean	Standard Deviation
CRT Reading Scale Score	Non-synchronous	672	408.73	37.30
	Synchronous	600	409.95	35.74
Objective 1	Non-synchronous	672	414.96	54.62
	Synchronous	600	410.42	55.46
Objective 2	Non-synchronous	672	406.88	41.83
	Synchronous	600	409.51	40.95
Objective 3	Non-synchronous	672	408.31	44.28
	Synchronous	600	413.40	42.53
Total Reading Scale Score	Non-synchronous	672	636.04	78.38
	Synchronous	600	634.02	80.88
Total Reading NPR	Non-synchronous	672	56.59	29.92
	Synchronous	600	55.20	29.73
Reading Vocabulary Scale Score	Non-synchronous	672	633.49	81.81
	Synchronous	600	629.68	84.29
Reading Vocabulary NPR	Non-synchronous	672	54.53	29.46
	Synchronous	600	52.03	29.90
Reading Comprehension Scale Score	Non-synchronous	672	643.38	63.66
	Synchronous	600	642.76	68.97
Reading Comprehension NPR	Non-synchronous	672	58.90	29.46
	Synchronous	600	59.22	28.21

Table 50

Independent Sample t Tests for Reading Mean Scores

Assessment Source	*t*	*df*	Sig. (2-tailed)	SE
CRT Reading Scale Score	.595	1270	.552	2.05
Objective 1	1.471	1270	.141	3.09
Objective 2	-1.129	1270	.259	2.33
Objective 3	-2.084*	1270	.037	2.44
Total Reading Scale Score	.452	1270	.651	4.47
Total Reading NPR	8.300	1270	.407	1.68
Reading Vocabulary Scale Score	.818	1270	.414	4.66
Reading Vocabulary NPR	1.499	1270	.134	1.67
Reading Comprehension Scale Score	.166	1270	.868	3.72
Reading Comprehension NPR	-.199	1270	.842	1.62

* $p < .05$.

There was no significant difference in CRT Reading Scale Score means, NRT Reading Scale Scores, or NRT Reading National Percentile Ranks. Within Reading subgroup objective scores, there was no significant difference in scale score means of Objectives 1 and 2. A significant difference was found in Objective 3 Scale Score Means, Literary Reading Processes ($p = .037$).

SPSS 13.0 was used to conduct the 2-way ANOVA. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 3, Literary Reading Processes, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective. Word Study Skills were assessed in grade 3 only. Mean scores for Word Study Skills scale scores and Word Study Skills National Percentile Ranks were analyzed separately from the total grade 3 and grade 5 population and reported in the grade 3 results. When a significance difference was found, it was further examined with the Tukey-Kramer. If the Tukey-Kramer test did not show significance, the more liberal Fisher Least Significant Difference (LSD) test was conducted to gain further insight. The total population, including both grade 3 and grade 5 students was examined first, followed by individual analyses of each grade level independent of the other.

Total CRT Reading Scale Scores were examined. These results can be seen in Tables 51 and 52. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 5.20 between scores based on mobility status, which was significant (p = .006). Using a Tukey-Kramer test for multiple comparisons, no significant differences were found between the means based on mobility. Further examination using the LSD test showed significance between non-mobile students and with-in-district mobile students (p = .027) and non-mobile students and out-of-district mobile students (p = .024).

Table 51

CRT Reading Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	409.72	37.56
	With-in-district	36	396.61	35.67
	Out-of-district	23	401.04	28.81
Synchronous	Non-mobile	516	411.21	35.88
	With-in-district	60	404.92	30.65
	Out-of-district	24	395.42	41.36

Table 52

Analysis of Variance for CRT Reading Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.10	.755
Mobility Status	2	5.20**	.006
Curriculum Structure x Mobility Status	2	.61	.543

** $p < .01$.

Individual reading objective scale scores were examined next. Mean scores for each of the cells were examined and a 2-way ANOVA conducted. Results for Objective 1, General Reading Processes, are shown in Tables 53 and 54. Tests of between-subjects effects yielded an *F*-ratio of 6.38 between scores based on mobility status, which was significant (p = .002). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .010), as well as between non-mobile student scores and out-of-district student scores (p = .048).

Table 53

General Reading Processes Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	416.42	55.58
	With-in-district	36	396.69	41.58
	Out-of-district	23	404.78	39.79
Synchronous	Non-mobile	516	412.90	50.87
	With-in-district	60	398.55	64.64
	Out-of-district	24	386.67	101.68

Table 54

Analysis of Variance for General Reading Processes Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.98	.323
Mobility Status	2	6.38**	.002
Curriculum Structure x Mobility Status	2	.52	.593

** $p < .01$.

Results for Objective 2, Informational Reading Processes are shown in Tables 55 and 56. Tests of between-subjects effects yielded an *F*-ratio of 4.01 between scores based on mobility status, which was significant ($p = .018$). Using a Tukey-Kramer test for multiple comparisons, no significant differences were found between the means based on mobility. Further examination using the LSD test showed significance between non-mobile students and out-of-district mobile students ($p = .024$).

Table 55

Informational Reading Processes Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	407.87	42.39
	With-in-district	36	396.22	36.20
	Out-of-district	23	397.17	31.32
Synchronous	Non-mobile	516	410.68	40.90
	With-in-district	60	405.83	38.05
	Out-of-district	24	393.46	46.59

Table 56

Analysis of Variance for Informational Reading Processes Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.33	.564
Mobility Status	2	4.01*	.018
Curriculum Structure x Mobility Status	2	.45	.641

* $p < .05$.

No tests were conducted on Objective 3, Literary Reading Processes due to the significant difference found between the district mean scores.

Results of the Norm Referenced portion of the assessment were examined. Scale Scores and National Percentile Rank were reported for each sub-test. Results for Total

Reading Scale Score are displayed in Tables 57 and 58. No significant differences were found in mean scores.

Table 57

Total Reading Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	636.89	81.14
	With-in-district	36	620.28	37.29
	Out-of-district	23	638.09	39.87
Synchronous	Non-mobile	516	637.33	70.74
	With-in-district	60	616.87	121.51
	Out-of-district	24	605.75	136.34

Table 58

Analysis of Variance for Total Reading Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	1.48	.223
Mobility Status	2	2.95	.053
Curriculum Structure x Mobility Status	2	.97	.379

Mean scores and comparisons for Total Reading National Percentile Rank are shown in Tables 59 and 60. Tests of between-subjects effects yielded an *F*-ratio of 5.32 between scores based on mobility status, which was significant ($p = .005$). Using a

Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .012).

Table 59

Total Reading National Percentile Rank Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	57.42	29.84
	With-in-district	36	43.53	29.49
	Out-of-district	23	55.04	29.02
Synchronous	Non-mobile	516	56.18	29.42
	With-in-district	60	50.43	29.65
	Out-of-district	24	46.08	34.94

Table 60

Analysis of Variance for Total Reading National Percentile Rank

Source	*df*	*F*	*p*
Curriculum Structure	1	.09	.762
Mobility Status	2	5.32**	.005
Curriculum Structure x Mobility Status	2	1.22	.294

** $p < .01$.

Results for Reading Vocabulary Scale Score are displayed in Tables 61 and 62. Tests of between-subjects effects yielded an *F*-ratio of 3.48 between scores based on mobility status, which was significant (p = .031). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .043).

Table 61

Reading Vocabulary Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	634.58	84.49
	With-in-district	36	614.86	42.74
	Out-of-district	23	633.61	45.22
Synchronous	Non-mobile	516	633.24	74.79
	With-in-district	60	611.60	123.68
	Out-of-district	24	598.42	135.56

Table 62

Analysis of Variance for Reading Vocabulary Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	1.73	.188
Mobility Status	2	3.48*	.031
Curriculum Structure x Mobility Status	2	.94	.390

* $p < .05$.

Results for Reading Vocabulary National Percentile Rank are displayed in Tables 63 and 64. Tests of between-subjects effects yielded an *F*-ratio of 3.48 between scores based on mobility status, which was significant ($p = .002$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .003$).

Table 63

Reading Vocabulary National Percentile Rank Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	55.43	29.34
	With-in-district	36	41.64	29.23
	Out-of-district	23	50.65	29.234
Synchronous	Non-mobile	516	53.17	29.65
	With-in-district	60	45.62	29.86
	Out-of-district	24	43.58	33.28

Table 64

Analysis of Variance for Reading Vocabulary National Percentile Rank Descriptive Statistics

Source	*df*	*F*	*p*
Curriculum Structure	1	.25	.620
Mobility Status	2	6.49**	.002
Curriculum Structure x Mobility Status	2	.64	.526

* $p < .05$.

Finally, scale scores and national percentile Rank for Reading Comprehension were examined. Results for Reading Comprehension Scale Scores are shown in Tables 65 and 66. Tests of between-subjects effects yielded an *F*-ratio of 3.57 between scores based on mobility status, which was significant ($p = .029$). Using a Tukey-Kramer test for multiple comparisons, no significant differences were found between the means based on mobility. Further examination using the LSD test showed significance between non-mobile students and out-of-district mobile students (p = .035).

Table 65

Reading Comprehension Scale Score Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	644.48	65.27
	With-in-district	36	626.81	42.04
	Out-of-district	23	640.09	42.16
Synchronous	Non-mobile	516	645.04	60.06
	With-in-district	60	636.83	93.03
	Out-of-district	24	608.54	139.50

Table 66

Analysis of Variance for Reading Comprehension Scale Score

Source	*df*	*F*	*p*
Curriculum Structure	1	.755	.385
Mobility Status	2	3.57*	.029
Curriculum Structure x Mobility Status	2	1.61	.201

* p < .05.

Mean scores and comparisons for Reading Comprehension National Percentile Rank are shown in Tables 67 and 68. Tests of between-subjects effects yielded an *F*-ratio of 3.34 between scores based on mobility status, which was significant (p = .036). Post hoc analysis using the Tukey-Kramer and the LSD yielded no significant differences between any two of the three categories for mobility status.

The explanation for the finding of significance of the ANOVA, yet no significance when the post-hoc tests were conducted can be found in the unequal sample sizes of 1129, 96, and 47. The Tukey-Kramer is the alternative when the n-sizes of groups under consideration are unequal. The equation for the Tukey-Kramer demonstrates this:

Replace $\sqrt{MS_{error} / n}$

With $\sqrt{MS_{error} / n_L + MS_{error} / n_S) / 2}$

Where L = larger n; S = smaller n

The Tukey-Kramer ". . . is a modification of the Tukey A. The Tukey-Kramer, uses the harmonic mean of the samples sizes of the two groups being contrasted, rather than the harmonic mean of all sample sizes. It is the default in SPSS when (one) runs the Tukey A" (Ware, 1997).

Table 67

Reading Comprehension National Percentile Rank Descriptive Statistics

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	613	59.57	29.34
	With-in-district	36	48.67	30.33
	Out-of-district	23	57.00	28.50
Synchronous	Non-mobile	516	59.91	27.96
	With-in-district	60	57.77	27.79
	Out-of-district	24	48.21	33.11

Table 68

Analysis of Variance for Reading Comprehension National Percentile Rank

Source	*df*	*F*	*p*
Curriculum Structure	1	.00	.951
Mobility Status	2	3.34*	.036
Curriculum Structure x Mobility Status	2	1.62	.199

* $p < .05$.

Grade 3 MSA Reading Results

To gain further insight into student test data, scores for grades 3 and 5 were examined separately. Individual analyses of each grade level population follow. SPSS 13.0 was used to conduct the 2-way ANOVA of grade 3 reading scores. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 3, Literary Reading

Processes, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective. When a significant difference was found, it was further examined with the Tukey-Kramer. If the Tukey-Kramer test did not show significance, the more liberal Fisher Least Significant Difference (LSD) test was conducted to gain further insight.

Grade 3 CRT Reading Scale Scores were examined. These results can be seen in Tables 69 and 70. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. No significant difference was found in mean scale scores.

Table 69

CRT Reading Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	412.76	37.43
	With-in-district	22	404.95	34.14
	Out-of-district	11	408.27	35.16
Synchronous	Non-mobile	261	411.98	36.23
	With-in-district	24	405.63	28.55
	Out-of-district	14	404.43	42.30

Table 70

Analysis of Variance for CRT Reading Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.05	.831
Mobility Status	2	1.06	.347
Curriculum Structure x Mobility Status	2	.03	.970

Results for Objective 1, General Reading Processes, are displayed in Tables 71and 72. No significant differences were found in mean scale scores.

Table 71

General Reading Processes Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	415.46	63.00
	With-in-district	22	409.36	39.23
	Out-of-district	11	418.00	39.09
Synchronous	Non-mobile	261	410.64	55.52
	With-in-district	24	387.29	89.77
	Out-of-district	14	392.21	125.75

Table 72

Analysis of Variance for General Reading Processes Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	2.79	.095
Mobility Status	2	1.33	.265
Curriculum Structure x Mobility Status	2	.70	.496

Mean scores and comparisons for Objective 2, Informational Reading Processes are shown in Tables 73 and 74. No significant differences were found in mean scale scores.

Table 73

Informational Reading Processes Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	413.08	41.02
	With-in-district	22	403.82	32.95
	Out-of-district	11	410.09	36.56
Synchronous	Non-mobile	261	413.11	41.74
	With-in-district	24	407.75	37.53
	Out-of-district	14	393.64	52.86

Table 74

Analysis of Variance for Informational Reading Processes Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.36	.550
Mobility Status	2	1.47	.232
Curriculum Structure x Mobility Status	2	.54	.584

No tests were conducted on Objective 3, Literary Reading Processes due to the significant difference found between the district mean scores.

Results of the Norm Referenced portion of the assessment were examined. Scale Scores and National Percentile Rank were reported for each sub-test. Results for Total Reading Scale Score are displayed in Tables 75 and 76. No significant differences were found in mean scores.

Table 75

Total Reading Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	618.96	82.33
	With-in-district	22	615.32	36.17
	Out-of-district	11	627.82	44.90
Synchronous	Non-mobile	261	619.71	66.55
	With-in-district	24	592.29	130.32
	Out-of-district	14	586.14	175.01

Table 76

Analysis of Variance for Total Reading Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	2.49	.115
Mobility Status	2	1.03	.358
Curriculum Structure x Mobility Status	2	1.23	.293

Mean scores and comparisons for Total Reading National Percentile Rank are shown in Tables 77 and 78. No significant differences were found in mean scores.

Table 77

Total Reading National Percentile Rank Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	53.74	30.03
	With-in-district	22	46.41	29.53
	Out-of-district	11	58.55	30.52
Synchronous	Non-mobile	261	52.03	28.69
	With-in-district	24	45.42	27.77
	Out-of-district	14	51.14	36.39

Table 78

Analysis of Variance for Total Reading National Percentile Rank Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.26	.500
Mobility Status	2	1.27	.282
Curriculum Structure x Mobility Status	2	.115	.891

Grade 3 students were administered a Word Study Skills sub-test. This sub-test was not administered to grade 5 students. An independent sample *t* test was conducted on the mean scores. Results are shown in Table 79. No significant difference was found in mean scores.

Table 79

Independent Sample t Test for Word Study Skills Grade 3

Assessment Source	*t*	*df*	Sig. (2-tailed)	SE
Word Study Skills Scale Score	1.158	634	.247	6.30
Word Study Skills NPR	1.582	634	.114	2.35

Results of Word Study Skills Scale Scores are displayed in Tables 80 and 81. Tests of between-subjects effects yielded an *F*-ratio of 3.95 between scores based on curriculum structure, which was significant (p = .047). The mean score of District N (M = 623.53) was significantly higher than the mean score of District S (M = 616.23).

Table 80

Word Study Skills Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	623.34	77.04
	With-in-district	22	616.05	49.93
	Out-of-district	11	643.73	57.24
Synchronous	Non-mobile	261	620.15	69.90
	With-in-district	24	582.79	129.87
	Out-of-district	14	600.43	180.43

Table 81

Analysis of Variance for Word Study Skills Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	3.95*	.047
Mobility Status	2	1.69	.185
Curriculum Structure x Mobility Status	2	1.44	.238

* $p < .05$.

Results for Word Study Skills National Percentile Rank are displayed in Tables 82 and 83. Tests of between-subjects effects yielded an *F*-ratio of 3.77 between scores based on mobility status, which was significant ($p = .024$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .042$).

Table 82

Word Study Skills National Percentile Rank Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	49.70	29.25
	With-in-district	22	39.77	29.62
	Out-of-district	11	58.45	35.82
Synchronous	Non-mobile	261	46.23	29.42
	With-in-district	24	34.83	24.30
	Out-of-district	14	52.86	36.53

Table 83

Analysis of Variance for Word Study Skills National Percentile Rank Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.88	.348
Mobility Status	2	3.77*	.024
Curriculum Structure x Mobility Status	2	.03	.973

* $p < .05$.

Mean scores and comparisons for Reading Vocabulary Scale Scores are shown in Tables 84 and 85. No significant differences were found in mean scores.

Table 84

Reading Vocabulary Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	614.51	85.77
	With-in-district	22	613.82	44.86
	Out-of-district	11	622.00	51.36
Synchronous	Non-mobile	261	613.08	70.28
	With-in-district	24	584.96	132.75
	Out-of-district	14	583.86	173.99

Table 85

Analysis of Variance for Reading Vocabulary Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	2.62	.106
Mobility Status	2	.796	.451
Curriculum Structure x Mobility Status	2	1.09	.338

Mean scores and comparisons for Reading Vocabulary National Percentile Rank are shown in Tables 86 and 87. No significant differences were found in mean scores.

Table 86

Reading Vocabulary National Percentile Rank Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	53.99	29.66
	With-in-district	22	49.45	29.55
	Out-of-district	11	56.27	30.57
Synchronous	Non-mobile	261	51.28	28.77
	With-in-district	24	45.58	30.85
	Out-of-district	14	53.50	31.54

Table 87

Analysis of Variance for Reading Vocabulary National Percentile Rank Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.39	.534
Mobility Status	2	.75	.474
Curriculum Structure x Mobility Status	2	.01	.990

Mean scores and comparisons for Reading Comprehension Scale Scores are shown in Tables 88 and 89. No significant differences were found in mean scores.

Table 88

Reading Comprehension Scale Score Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	626.23	78.54
	With-in-district	22	619.86	43.02
	Out-of-district	11	628.18	48.99
Synchronous	Non-mobile	261	627.15	70.18
	With-in-district	24	606.83	135.02
	Out-of-district	14	582.57	177.58

Table 89

Analysis of Variance for Reading Comprehension Scale Score Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	2.02	.155
Mobility Status	2	1.35	.260
Curriculum Structure x Mobility Status	2	1.12	.328

Mean scores and comparisons for Reading Comprehension National Percentile Rank are shown in Tables 90 and 91. No significant differences were found in mean scores.

Table 90

Reading Comprehension National Percentile Rank Descriptive Statistics Grade 3

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	304	56.22	30.36
	With-in-district	22	49.59	30.74
	Out-of-district	11	57.45	32.14
Synchronous	Non-mobile	261	56.48	28.21
	With-in-district	24	54.42	26.74
	Out-of-district	14	47.57	36.41

Table 91

Analysis of Variance for Reading Comprehension National Percentile Rank Grade 3

Source	*df*	*F*	*p*
Curriculum Structure	1	.10	.149
Mobility Status	2	.63	.536
Curriculum Structure x Mobility Status	2	.50	.607

Grade 5 MSA Reading Results

SPSS 13.0 was used to conduct the 2-way ANOVA of grade 5 reading scores. All Scale Score means were analyzed using the 2-way ANOVA except for Objective 3, Literary Reading Processes, as the independent sample *t* test found that there was a significant difference in the district mean scores for that particular subgroup objective.

When a significant difference was found, it was further examined with the Tukey-Kramer. If the Tukey-Kramer test did not show significance, the more liberal Fisher Least Significant Difference (LSD) test was conducted to gain further insight.

Grade 5 CRT Reading Scale Scores were examined. These results can be seen in Tables 92 and 93. The mean and standard deviation were calculated for each cell in the 2-way ANOVA. Tests of between-subjects effects yielded an *F*-ratio of 5.96 between scores based on mobility status, which was significant (p = .003). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and with-in-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and out-of-district mobile student scores (p = .039).

Table 92

CRT Reading Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	406.75	37.50
	With-in-district	14	383.50	35.20
	Out-of-district	12	394.42	20.89
Synchronous	Non-mobile	255	410.41	35.58
	With-in-district	36	404.44	32.36
	Out-of-district	10	382.80	38.55

Table 93

Analysis of Variance for CRT Reading Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.45	.505
Mobility Status	2	5.96**	.003
Curriculum Structure x Mobility Status	2	1.61	.200

** $p < .01$.

Individual reading objective scale scores were examined next. Mean scores for each of the cells were examined and a 2-way ANOVA conducted. Results for Objective 1, General Reading Processes, are shown in Tables 94 and 95. Tests of between-subjects effects yielded an *F*-ratio of 9.59 between scores based on mobility status, which was significant ($p = .000$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .018$), as well as between non-mobile student scores and out-of-district student scores ($p = .008$).

Table 94

General Reading Processes Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	417.36	47.25
	With-in-district	14	376.79	38.33
	Out-of-district	12	392.67	37.99
Synchronous	Non-mobile	255	415.22	45.62
	With-in-district	36	406.06	40.04
	Out-of-district	10	378.90	58.88

Table 95

Analysis of Variance for General Reading Processes Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.29	.590
Mobility Status	2	9.59**	.000
Curriculum Structure x Mobility Status	2	2.42	.090

** $p < .01$.

Mean scores and comparisons for Objective 2, Informational Reading Processes are shown in Tables 96 and 97. No significant differences were found in mean scale scores.

Table 96

Informational Reading Processes Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	402.74	43.15
	With-in-district	14	384.29	39.02
	Out-of-district	12	385.33	20.68
Synchronous	Non-mobile	255	408.19	39.95
	With-in-district	36	404.56	38.87
	Out-of-district	10	393.20	38.89

Table 97

Analysis of Variance for Informational Reading Processes Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	2.29	.131
Mobility Status	2	2.83	.060
Curriculum Structure x Mobility Status	2	.61	.543

Results of the Norm Referenced portion of the assessment were examined. Scale Scores and National Percentile Rank were reported for each sub-test. Results for Total Reading Scale Score are displayed in Tables 98 and 99. No significant differences were found in mean scores.

Table 98

Total Reading Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	654.52	76.07
	With-in-district	14	628.07	39.03
	Out-of-district	12	647.50	33.82
Synchronous	Non-mobile	255	655.36	70.49
	With-in-district	36	633.25	114.18
	Out-of-district	10	633.20	42.74

Table 99

Analysis of Variance for Total Reading Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.04	.838
Mobility Status	2	2.28	.103
Curriculum Structure x Mobility Status	2	.13	.881

Results for Total Reading National Percentile Rank are displayed in Tables 100 and 101. Tests of between-subjects effects yielded an *F*-ratio of 6.91 between scores based on mobility status, which was significant (p = .001). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .030).

Table 100

Total Reading National Percentile Rank Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	61.04	29.25
	With-in-district	14	39.00	29.95
	Out-of-district	12	51.83	28.52
Synchronous	Non-mobile	255	60.43	29.61
	With-in-district	36	53.78	30.77
	Out-of-district	10	39.00	33.41

Table 101

Analysis of Variance for Total Reading National Percentile Rank Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.01	.933
Mobility Status	2	6.91**	.001
Curriculum Structure x Mobility Status	2	1.81	.165

** $p < .01$.

Results for Reading Vocabulary Scale Scores are displayed in Tables 102 and 103. Tests of between-subjects effects yielded an *F*-ratio of 3.75 between scores based on mobility status, which was significant (p = .024). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between non-mobile student scores and out-of-district mobile student scores, nor was there any difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores (p = .036).

Table 102

Reading Vocabulary Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	654.33	78.47
	With-in-district	14	616.50	40.76
	Out-of-district	12	644.25	37.86
Synchronous	Non-mobile	255	653.86	73.77
	With-in-district	36	629.36	115.74
	Out-of-district	10	618.80	49.45

Table 103

Analysis of Variance for Reading Vocabulary Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.10	.755
Mobility Status	2	3.75*	.024
Curriculum Structure x Mobility Status	2	.43	.651

* $p < .05$.

Results for Reading Vocabulary National Percentile Rank were examined. These results can be seen in Tables 104 and 105. Tests of between-subjects effects yielded an *F*-ratio of 10.80 between scores based on mobility status, which was significant ($p = .000$). Using a Tukey-Kramer test for multiple comparisons, it was determined that there was no significant difference between with-in-district mobile student scores and out-of-district mobile student scores. A significant difference was found between non-mobile student scores and with-in-district mobile student scores ($p = .002$), as well as between non-mobile student scores and out-of-district student scores ($p = .017$).

Table 104

Reading Vocabulary National Percentile Rank Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	56.85	29.00
	With-in-district	14	29.36	24.99
	Out-of-district	12	45.50	28.27
Synchronous	Non-mobile	255	55.00	30.47
	With-in-district	36	45.64	29.62
	Out-of-district	10	29.70	32.04

Table 105

Analysis of Variance for Reading Vocabulary National Percentile Rank Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.01	.932
Mobility Status	2	10.80**	.000
Curriculum Structure x Mobility Status	2	2.46	.087

** $p < .01$.

Results for Reading Comprehension Scale Scores are displayed in Tables 106 and 107. Tests of between-subjects effects yielded an *F*-ratio of 3.98 between scores based on mobility status, which was significant ($p = .019$). Post hoc analysis using the Tukey-

Kramer and the LSD yielded no significant differences between any two of the three categories for mobility status.

The explanation for the finding of significance of the ANOVA, yet no significance when the post-hoc tests were conducted can be found in the unequal sample sizes of 564, 50, and 22. The Tukey-Kramer is the alternative when the n-sizes of groups under consideration are unequal. The equation for the Tukey-Kramer demonstrates this:

Replace $\sqrt{MS_{error} / n}$

With $\sqrt{MS_{error} / n_L + MS_{error} / n_S) / 2}$

Where L = larger n; S = smaller n

The Tukey-Kramer ". . . is a modification of the Tukey A. The Tukey-Kramer, uses the harmonic mean of the samples sizes of the two groups being contrasted, rather than the harmonic mean of all sample sizes. It is the default in SPSS when (one) runs the Tukey A" (Ware, 1997).

Table 106

Reading Comprehension Scale Score Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	662.43	41.78
	With-in-district	14	637.71	39.48
	Out-of-district	12	651.00	33.18
Synchronous	Non-mobile	255	663.36	40.09
	With-in-district	36	656.83	39.77
	Out-of-district	10	644.90	40.77

Table 107

Analysis of Variance for Reading Comprehension Scale Score Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.40	.525
Mobility Status	2	3.98*	.019
Curriculum Structure x Mobility Status	2	1.04	.353

* $p < .05$.

Results for Reading Comprehension National Percentile Rank are displayed in Tables 108 and 109. Tests of between-subjects effects yielded an *F*-ratio of 3.49 between scores based on mobility status, which was significant ($p = .031$). Post hoc analysis using the Tukey-Kramer and the LSD yielded no significant differences between any two of the three categories for mobility status.

The explanation for the finding of significance of the ANOVA, yet no significance when the post-hoc tests were conducted can be found in the unequal sample sizes of 564, 50, and 22. The Tukey-Kramer is the alternative when the n-sizes of groups under consideration are unequal. The equation for the Tukey-Kramer demonstrates this:

Replace $\sqrt{MS_{error} / n}$

With $\sqrt{MS_{error} / n_L + MS_{error} / n_S) / 2}$

Where L = larger n; S = smaller n

The Tukey-Kramer ". . . is a modification of the Tukey A. The Tukey-Kramer, uses the harmonic mean of the samples sizes of the two groups being contrasted, rather than the harmonic mean of all sample sizes. It is the default in SPSS when (one) runs the Tukey A" (Ware, 1997).

Table 108

Reading Comprehension National Percentile Rank Descriptive Statistics Grade 5

Curriculum Structure	Mobility Status	N	Mean	Standard Deviation
Non-synchronous	Non-mobile	309	62.87	27.96
	With-in-district	14	47.21	30.77
	Out-of-district	12	56.58	26.17
Synchronous	Non-mobile	255	63.42	27.32
	With-in-district	36	60.00	28.62
	Out-of-district	10	49.10	29.76

Table 109

Analysis of Variance for Reading Comprehension National Percentile Rank Grade 5

Source	*df*	*F*	*p*
Curriculum Structure	1	.15	.696
Mobility Status	2	3.49*	.031
Curriculum Structure x Mobility Status	2	1.18	.308

* $p < .05$.

Summary

The statistical analysis of this research suggests that the variable with the greatest number of significant differences was mobility status. More specifically, when examining Tables 110 - 115, non-mobile students scored significantly higher than their mobile peers on the majority of sub-tests.

Table 110 summarizes the significant differences found in Grade 3 and 5 Mathematics scores. For the curriculum structure variable, the hypothesis stated that there would be no significant difference in test scores based on synchronous and non-synchronous curriculums. None were found among Grade 3 and 5 Mathematics scores. For the mobility status variable, the hypothesis stated that there would be no significant difference in test scores of non-mobile, with-in-district mobile, and out-of-district mobile students. When a significant difference was found between mobility groups, the highest mean value was examined. SPSS reports the true mean value of the total number of non-mobile, with-in-district mobile, and out-of-district mobile students, disregarding curriculum structure. Significant differences were found, with non-mobile students having the highest mean score in five of the eight sub-tests. Finally, the hypothesis stated that there would be no significant interaction between curriculum structure and mobility. None were found among Grade 3 and 5 Mathematics scores.

Table 110

Mathematics Grades 3 & 5 Summary of Significant Differences

Source	F	Highest Mean Value
CRT Math		
Mobility Status	F (2, 1272) = 5.45, $p < .01$	Non-mobile (M = 408.46)
Statistics and Probability		
Mobility Status	F (2, 1272) = 8.77, $p < .01$	Non-mobile (M = 420.04)
Processes of Math		
Mobility Status	F (2, 1272) = 4.90, $p < .01$	Non-mobile (M = 405.02)
NRT Math Scale Score		
Mobility Status	F (2, 1272) = 4.99, $p < .01$	Non-mobile (M = 641.05)
NRT Math NPR		
Mobility Status	F (2, 1272) = 5.33, $p < .01$	Non-mobile (M = 61.53)

Tables 111 and 112 summarize significant differences in Grade 3 and Grade 5 Mathematics scores separately. The only significant difference found in Grade 3 Mathematics scores was a difference in the Objective 5, Processes of Mathematics. Students from District S scored significantly higher than students from District N. For Grade 5 Mathematics, significant differences were found in test scores of non-mobile, with-in-district mobile, and out-of-district mobile student, with non-mobile students having the highest mean score in seven of the eight sub-tests .

Table 111

Mathematics Grade 3 Summary of Significant Differences

Source	F	Highest Mean Value
Processes of Math		
Curriculum Structure	F (2, 634) = 4.37, $p < .05$	Synchronous (M = 409.10)

Table 112

Mathematics Grade 5 Summary of Significant Differences

Source	*F*	Highest Mean Value
CRT Math Mobility Status	F (2, 635) = 8.19, p < .01	Non-mobile (M = 409.74)
Algebra, Patterns, and Functions Mobility Status	F (2, 635) = 3.82, p < .05	Non-mobile (M = 413.25)
Statistics and Probability Mobility Status	F (2, 635) = 9.27, p < .01	Non-mobile (M = 419.07)
Number & Relationships Computation Mobility Status	F (2, 635) = 5.09, p < .01	Non-mobile (M = 417.03)
Processes of Math Mobility Status	F (2, 635) = 5.87, p < .01	Non-mobile (M = 403.93)
NRT Math Scale Score Mobility Status	F (2, 635) = 6.47, p < .01	Non-mobile (M = 664.53)
NRT Math NPR Mobility Status	F (2, 635) = 5.19, p < .01	Non-mobile (M = 62.05)

Table 113 summarizes the significant differences found in Grade 3 and 5 Reading scores. For the curriculum structure variable, the hypothesis stated that there would be no significant difference in test scores based on synchronous and non-synchronous curriculums. None were found among Grade 3 and 5 Reading scores. For the mobility status variable, the hypothesis stated that there would be no significant difference in test scores of non-mobile, with-in-district mobile, and out-of-district mobile students. When a significant difference was found between mobility groups, the highest mean value was examined. SPSS reports the true mean value of the total number of non-mobile, with-in-district mobile, and out-of-district mobile students, disregarding curriculum structure. Significant differences were found, with non-mobile students having the highest mean score in eight of the ten sub-tests. Finally, the hypothesis stated that there would be no significant interaction between curriculum structure and mobility. None were found among Grade 3 and 5 Reading scores.

Table 113

Reading Grades 3 & 5 Summary of Significant Differences

Source	*F*	Highest Mean Value
CRT Reading Mobility Status	F (2, 1269) = 5.20, $p < .01$	Non-mobile (M = 410.40)
General Reading Processes Mobility Status	F (2, 1269) = 6.38, $p < .01$	Non-mobile (M = 414.81)
Informational Reading Processes Mobility Status	F (2, 1269) = 4.01, $p < .05$	Non-mobile (M = 409.15)
Total Reading NPR Mobility Status	F (2, 1269) = 5.32, $p < .01$	Non-mobile (M = 56.85)
Reading Vocabulary Mobility Status	F (2, 1269) = 3.48, $p < .05$	Non-mobile (M = 633.97)
Reading Vocabulary NPR Mobility Status	F (2, 1269) = 6.49, $p < .01$	Non-mobile (M = 54.40)
Reading Comprehension Mobility Status	F (2, 1269) = 3.57, $p < .05$	Non-mobile (M = 644.74)
Reading Comprehension NPR Mobility Status	F (2, 1269) = 3.34, $p < .05$	Non-mobile (M = 59.72)

Tables 114 and 115 summarize significant differences in Grade 3 and Grade 5 Reading scores separately. Significant differences found in Grade 3 Reading scores were in Word Study Skills. Students from District N scored significantly higher than students from District S on Word Study Skills Scale Score, while out-of-district students outranked non-mobile and with-in-district mobile students on Word Study Skills National Percentile Rank. For Grade 5 Mathematics, significant differences were found in test scores of non-mobile, with-in-district mobile, and out-of-district mobile student, with non-mobile students having the highest mean score in seven of the ten sub-tests .

Table 114

Reading Grade 3 Summary of Significant Differences

Source	*F*	Highest Mean Value
Word Study Skills Curriculum Structure	F (2, 633) = 3.95, p < .05	Non-Synchronous (M = 623.53)
Word Study Skills NPR Mobility Status	F (2, 633) = 3.77, p < .05	Out-of-District (M = 55.32)

Table 115

Reading Grade 5 Summary of Significant Differences

Source	*F*	Highest Mean Value
CRT Reading Mobility Status	F (2, 633) = 5.96, $p < .01$	Non-mobile (M = 408.40)
General Reading Processes Mobility Status	F (2, 633) = 9.59, $p < .01$	Non-mobile (M = 416.39)
Total Reading NPR Mobility Status	F (2, 633) = 6.91, $p < .01$	Non-mobile (M = 60.76)
Reading Vocabulary Mobility Status	F (2, 633) = 3.75, $p < .05$	Non-mobile (M = 654.12)
Reading Vocabulary NPR Mobility Status	F (2, 633) = 10.80, $p < .01$	Non-mobile (M = 56.01)
Reading Comprehension Mobility Status	F (2, 633) = 3.98, $p < .05$	Non-mobile (M = 662.85)
Reading Comprehension NPR Mobility Status	F (2, 633) = 3.49, $p < .05$	Non-mobile (M = 63.12)

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CHAPTER 5

DISCUSSION

Since 2002, a primary focus of education in the United States has been the *No Child Left Behind* (United States Department of Education, 2002) mandate. As school districts attempt to reach the goal of all students meeting Adequate Yearly Progress (AYP) by 2014, questions remain about the effects this legislation has on current curriculum, instructional practices, assessment, and student achievement. In its fifth year, 2007, *No Child Left Behind* (NCLB) will be reauthorized. Issues being addressed by legislature include funding, testing of special education and limited-English speaking students, giving credit to schools which make some progress, but do not reach their annual target, and providing more student access to free high-quality tutoring. Curricular standards will be addressed, including voluntary national standards (eSchool News Online, 2007). Decisions made about the revision of this law undoubtedly will have a considerable impact on the education of all students, including mobile students.

Various research shows that mobility contributes to a decline in student performance (Alexander et al., 1996; Applegate, 2003; Demie, 2002; Gottieb & Weinberg, 1999; Heinlin & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Rumberger, et al., 1999; Sewell, 1982; Smith, 2003; Wasserman, 2001). By identifying strategies to assist these mobile students, educators hoped to increase student learning, and, as a result, raise test scores. In the process of identifying such strategies, research focused on lessening academic gaps through more efficient record keeping and transfers of records (Audettet & Algonzzine, 2000; Dougherty, 2002; Staresina, 2004). Additional literature suggested measures which allowed students to remain in schools. These measures included being flexible with school boundaries (Kerbow, 1996; Rumberger, 2003), and providing transportation to students who remain in close proximity to their schools (Audette & Algozzine, 2000; Fowler-Finn, 2001; Kerbow, 1996). Other researchers have examined the relationships of families and schools and recommended ways of providing outreach to assist mobile families (Fisher, Matthews, Stafford, Nakagawa, & Durante, 2002; Kerbow, 1996; Rumberger, 2003; Staresina, 2004). Finally, studies have offered the use of standardized curriculum as a means of improving the consistency of education for mobile students (Ohio State Department of Education, Urban Schools Initiative, 1998; Staresina, 2004).

Statement of the Problem

School systems are under continual pressure to increase student achievement on high-stakes tests. As educators target specific populations that may struggle to achieve, one that emerges is the mobile student population. Recent studies have shown that these students do not typically score as high on these standardized tests as the stable student population (Alexander et al., 1996; Applegate, 2003; Heinlein & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Sewell, 1982). Much of the research focused on such attributes as ethnicity and socio-economic status to further identify which students were at greatest risk (Alexander et al., 1996; Fowler-Fin, 2001; Kerbow, 1996; Nelson, Simoni, & Adelman, 1996; Offenberg, 2004; Shaft, 2003; US Department of Commerce, Economics, and Statistics Administration, 2004; USGAO, 1994; Wright, 1999). From these studies, researchers and educators have recommended ways to assist mobile students and lessen the impact of their transition. Little research has been conducted in relation to the effects of curriculum structure within states and school districts on student performance. When the flexibility of a curriculum allows individual teachers to decide when they will teach concepts throughout the year, there is the risk of gaps of instruction occurring as students transfer in and out of schools. When a curriculum has more structure based on when concepts are to be taught during the school year, more continuity in instruction may result in fewer instructional gaps. This study was conducted to determine if a system-wide synchronous standardized curriculum has a significant impact on achievement of students in a school district as measured by the Maryland School Assessment. Comparisons were made between the achievement of mobile students who had been taught with this synchronous curriculum and those who had been taught with a curriculum that is standardized, yet not synchronous throughout the system.

Procedures and Methods

Data for this study were provided by two Maryland public school districts. Data sets included MSA scores from all grade 3 and grade 5 students from the 2003-2004 school year. A proportional stratified random sample was developed based on mobility status, race, and socio-economic status.

A causal-comparative analysis was conducted. There were several reasons for performing this type of research. The sample population was selected from two already existing populations, those students in District S and District N, data were available ex-post facto, and the independent variables of curriculum structure and mobility could not be manipulated by the researcher.

No pre-test was available to determine population means prior to the test. Therefore, an independent sample *t* test was conducted on the mean scores of 2004 MSA for each sample population to determine if there was a significant difference in sample mean MSA scores. A 2-way analysis of variance determined if there was a significant difference in mean MSA scores based on student mobility, curriculum structure, and the interaction of these two independent variables.

Significance was set at the .01 alpha level. Significance at the .05 alpha level was noted when it occurred in order to provide additional information pertaining to the data and to serve as a basis for further research. Post hoc Tukey-Kramer tests were used to detect significant differences between pairs of groups. If no significance was found using the Tukey-Kramer, a more liberal Fisher Least Significant Difference (LSD) test was conducted to gain further insight.

Evaluation of Hypotheses

Six null hypotheses were examined in this study. Maryland School Assessment scores were examined to determine if there were significant differences in mean scores of grade 3 and 5 students based on the independent variables, mobility status and curriculum structure, and the interaction of these two variables. Significance was set at the .01 alpha level. Each null hypothesis is discussed below.

Null Hypothesis One

There is no significant difference in MSA mean mathematics scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) ($\alpha = .01$). Reject the null hypothesis at the .01 level of significance for the sub-tests CRT Mathematics Scale Score, Statistics and Probability, Processes of Mathematics, Norm-Referenced Test Mathematics Scale Score, and Norm-Referenced Test Mathematics National Percentile Rank. Retain the null hypothesis at the .01 level of significance for the sub-tests Algebra, Patterns, and Functions and Number and Relationships Computation.

Null Hypothesis Two

There is no significant difference in MSA mean mathematics scores according to curriculum structure (synchronous or non-synchronous) (α = .01). Retain the null hypothesis at the .01 level of significance for all mathematics sub-tests.

Null Hypothesis Three

There is no significant interaction in MSA mean mathematics scores between mobility status and curriculum structure (α = .01). Retain the null hypothesis at the .01 level of significance for all mathematics sub-tests.

Null Hypothesis Four

There is no significant difference in MSA mean reading scores according to mobility status (with-in-district mobile students, out-of-district mobile students, or non-mobile students) (α = .01). Reject the null hypothesis at the .01 level of significance for the sub-tests Criterion Referenced Test Reading, General Reading Processes, Total Reading National Percentile Rank, and Reading Vocabulary National Percentile Rank. Retain the null hypothesis at the .01 level of significance for the sub-tests Informational Reading Processes, Literary Reading Processes, Total Reading Scale Score, Reading Vocabulary Scale Score, Reading Comprehension Scale Score, and Reading Comprehension National Percentile Rank.

Null Hypothesis Five

There is no significant difference in MSA mean reading scores according to curriculum structure (synchronous or non-synchronous) ($\alpha = .01$). Retain the null hypothesis at the .01 level of significance for all reading sub-tests.

Null Hypothesis Six

There is no significant interaction in MSA mean reading scores between mobility status and curriculum structure ($\alpha = .01$). Retain the null hypothesis at the .01 level of significance for all reading sub-tests.

Summary of Findings and Interpretations

This study is based on the six null hypotheses previously discussed. A summary of the findings and interpretations of the data follow. Included in this discussion is additional research conducted on data from each grade level separately. While these additional data do not impact examination of the null hypotheses, it does offer supplementary information in regards to understanding the results and the potential for further research.

Grades 3 & 5 Mathematics

Significant differences were found between the mean mathematics scores of students based on mobility status for five of the eight sub-tests, with non-mobile students having the highest mean value each time. This data supports past research pertaining to non-mobile students outperforming mobile students on standardized assessments (Alexander et al., 1996; Applegate, 2003; Heinlein & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Sewell, 1982).

Grade 3 Mathematics

No differences were found in test scores of grade 3 students at the .01 level of significance. However, upon further examination, a difference was found at the .05 level of significance. While this data does not impact the results of this particular study, it does offer insight for further studies. Students in the district where a sequential curriculum was implemented scored significantly higher than students from the district where the curriculum was non-sequential on Objective 5, Processes of Mathematics. This finding may point to some differences in grade 3 mathematics curriculum or instructional practices between these two districts. Although this finding considers curricular structure, a conclusion cannot be made that curricular structure is what caused this difference in mean scores. While Objectives 1 through 4 can be taught and measured specifically, Processes of Mathematics runs through every mathematics strand. The four processes include problem solving, reasoning, connecting and communicating. They are not to be taught in isolation and therefore are much more difficult to analyze.

Grade 5 Mathematics

In Grade 5 Mathematics, differences were found between the mean scores of students based on mobility status for six of the sub-tests at the .01 level of significance, with non-mobile students having the highest mean value each time. A difference was also found in mean scores for Algebra, Patterns, and Functions at the .05 level of significance. This grade 5 data had a direct impact on null hypotheses one, as no grade 3 data indicated significant differences in relation to mobility status.

Grades 3 & 5 Reading

Significant differences were found between the mean reading scores of students based on mobility status for four of the ten sub-tests, with non-mobile students having the highest mean value each time. The data again support past research pertaining to non-mobile students outperforming mobile students on standardized assessments (Alexander et al., 1996; Applegate, 2003; Heinlein & Shinn, 2000; Mao et al., 1997; Paredes, 1993; Sewell, 1982).

Grade 3 Reading

No differences were found in test scores of grade 3 students at the .01 level of significance. However, upon further examination, a difference was found in two sub-tests at the .05 level of significance. While this data does not impact the results of this particular study, it does offer insight for further studies. Word Study Skills were only assessed in Grade 3 on the MSA. Students from the district where a non-sequential curriculum was implemented outscored students from the district where curriculum was sequential on Word Study Skills Scale Score. A difference was also found in Word Study Skills National Percentile Rank in relation to mobility status with out-of-district students having the highest mean value.

Grade 5 Reading

In Grade 5 Reading, differences were found between the mean scores of students based on mobility status for four of the sub-tests at the .01 level of significance, with non-mobile students having the highest mean value each time. Differences were also found in mean scores for Reading Vocabulary, Reading Comprehension Scale Score, and Reading Comprehension National Percentile Rank at the .05 level of significance. These grade 5 data had a direct impact on null hypotheses four, as no grade 3 data indicated significant differences in relation to mobility status.

Implications and Conclusions

This study examined test scores in relation to curriculum structure, mobility status, and their interaction. Data from the study supported past research pertaining to the achievement of mobile students. No significant differences were found in achievement based on curriculum structure or the interaction of these two variables. This does not mean that nothing has been gained from this study. Implications can be drawn about curriculum, intervention and remediation, as well as the possibilities of future studies investigating ways to lessen the negative impact that mobility has on students.

Curriculum

Based on the results of this study, one can surmise that curricular sequence does not have an impact on the achievement of mobile students given the period of one school year. In addition to sequence, consistency of textbooks within a district also does not seem to play a major role in mobile student achievement. While classes across District S were provided with common textbooks for Reading and Mathematics, there were no common textbooks provided for classes across District N. Regardless of these differences, students still performed well on standardized tests and each school district made Adequate Yearly Progress for the 2003-2004 school year.

What were commonalities among these two school districts that contributed to student success? Each school district assessed students periodically throughout the year. While these assessments occurred more frequently in one district, both districts aligned their curriculum and assessments with the Voluntary State Curriculum, resulting in standardized curriculum and assessment. Control of specific content taught at each grade level was achieved through assessment limits. Assessment Limits stipulated the topics of each concept that must be covered to ensure that students had been taught the material that would be tested on MSA. This type of standardization and alignment has been supported by various research (Family Housing Fund, 1998; Fisher, Matthews, Stafford, Nakagawa, & Durante, 2002; Mao, Whitsett, and Mellor, 1997; Ohio State Department of Education, Urban Schools Initiative, 1998; Staresina, 2004).

In addition to standardization and alignment, quality of instruction must also be addressed. Simply having a standardized curriculum and aligning it with instruction and assessment does not ensure student success. The classroom teacher plays a key role in the delivery of this curriculum and the use of assessment in analyzing student achievement, reteaching, intervention, and remediation. Information about teacher training in the use of curriculum and resources available for intervention and remediation in each district merits further investigation.

Mobile Students

Low achievement of mobile students is an issue that continues to trouble educators. School districts with large populations of transient students continue to look for ways to close the achievement gap. While curricular structure failed to influence the achievement of mobile students in this study, several studies have been conducted that suggest proactive measures that districts can take. Efficient record keeping and speed of record transfers can have a considerable impact on a student’s transition to a new school (Audettet & Algonzzine, 2000; Dougherty, 2002; Staresina, 2004). Student records supply schools with information about student placement, academic needs, and behavioral needs.

Classroom teachers may have the most impact on and the most to gain from this proactive approach. Time is a critical factor in the placement of transient students, as they have probably already missed some instructional time during the transition to a new school. Teachers may wish to contact the student's former school to discuss the student's cognitive and behavioral needs as well as curriculum. Teachers may also use the internet to find information about the student's past educational experience, as many state and district curriculums are available online. Teachers have a large amount of assessments at their disposal from textbook companies competing to prove they have the resources to help students meet AYP. These resources could be used to assess mobile students to determine previously taught concepts, similar to curriculum compacting. Some may argue that this places a great deal of responsibility on the classroom teacher. While true, with this information the teacher can make an informed decision about placement and instruction for the student.

Further Studies

As our society becomes more and more transient, educators must continue to search for ways to assist transient students. The search for some type of uniformity seems to rest at a standardized curriculum. While some researchers have suggested a national standardized curriculum, the responsibility currently falls to each state. Within that state, assessments are developed to measure student progress based on the curriculum. School districts align curriculum and assessments with these state standards. Looking at the commonalities of the two school districts in this study, one might conclude that this alignment contributes to the success of non-mobile students on standardized tests.

Arguments for national academic standards and tests continue to gain advocates. In a September 2006 article for the Washington Post, former Secretaries of Education William J. Bennett and Rodney Paige urged law makers to set standards nationally and administer high quality national tests, but allow daily decisions to be made locally. They argued that NCLB gives states too much discretion over standards and tests while giving federal officials too much control over the operation of schools. Finally, they cautioned that national standards and assessments should be carefully and competently prepared to avoid federal micromanagement of the nation's schools.

Questions still remain concerning how best to meet the needs of the mobile student population. This study was limited to mobile students within the time frame of one school year. While curriculum sequence did not have an effect on the mobile students in this study, perhaps a longitudinal study would offer different results. The MSA test is given each year in grades 3 through 8. If the researcher followed one population of grade level students, this would provide six years of data. Of course one must consider the constant transformation of curriculum. As research continues, trends in education influence a range of curriculum revisions from subtle changes complete rewritings. The curriculum which was taught in the first year of the study might look very different from the curriculum taught in the sixth year of the study.

Further research on mobile student achievement is needed. This research could develop from recommendations in the literature including student portfolios, tutoring, counseling, guidebooks, record keeping systems, and family outreach. Additional research about the effects of curriculum structure should also be further studied. There is little empirical data available at this moment pertaining specifically to sequential and non-sequential delivery of instruction. More in-depth analysis of curriculum structure, the instructional delivery of such curriculum, and the effects on various student populations in relation to academic achievements warrant further investigation.

References

Alexander, K. L., Entwisle, D. R., & Dauber, S. L. (1996). Children in motion: School transfers and elementary school performance. *Journal of Educational Research*, *90*(1), 3-12.

Allen, D. W. & Brinton, R. C. (1996). Improving our unacknowledged national curriculum. *Clearing House, 69*(3), 140-143.

Applegate, K. D. (2003). The relationship of attendance, socio-economic status, and mobility and the achievement of seventh graders. *Dissertation Abstracts International, 64*(08), 2711. (UMI No. 3102868)

Audette, R. & Algozzine, B. (2000). Within district transfers and student achievement: Moving ahead by staying in one place. *Special Services in Schools, 16*(1-2), 73-83.

Bennett, W.J. & Paige, R. (2006, September 21). Why we need a national school test. *The Washington Post.* Retrieved January 18, 2007, from http://washingtonpost.com

Biernat, L. & Jax, C. (1999). Limiting mobility and improving student achievement. *Hamline Law Review, 223*(1), 1-37.

Brent, G., & Diobilda, N. (1993). Effects of curriculum alignment versus direct instruction on urban children. *Journal of Educational Research, 86*(6), 333-338.

Burger, D. (2002). *Using standards-led policy to align assessment and accountability systems.* Honolulu, HI: Pacific Resources for Education and Learning. (ERIC Document Reproduction Service No. ED473564)

Carney, R. N. (2005). Test review of the Stanford Achievement Test, Tenth Edition. From R. A. Spies & B. S. Plake (Eds.), *The sixteenth mental measurements* *yearbook* [Electronic version]. Retrieved August 19, 2005**,** from the Buros Institute's *Test Reviews Online* website: http://www.unl.edu/buros

Center on Education Policy. (2002, September). *A new federal role in education.* Retrieved May 4, 2005 from http://www.ctredpd.org/ fedprograms/ newfedrolefeb2002.pdf

Center on Education Policy. (2006, March). *From the capital to the classroom: Year 4 of the No Child Left Behind Act.* Retrieved May 2, 2006 from http://www.cep-dc.org/nclb/Year4/CEP-NCLB-Report-4.pdf

Cizek, G. J. (2005). Test review of the TerraNova, The Second Edition. From R. A. Spies & B. S. Plake (Eds.), *The sixteenth mental measurements yearbook* [Electronic version]. Retrieved August 19, 2005**,** from the Buros Institute's *Test Reviews Online* website: http://www.unl.edu/buros

Cornish, C. S. & Tipton, R. K. (2003). The relationship between teachers' theoretical orientations and student achievement in mathematics and reading as measured by the Pennsylvania System of School Assessment. *Dissertation Abstracts International, 64*(08), 2783. (UMI No. 3101157)

CTB/McGraw-Hill. (2003, August). *Maryland standard setting technical report* (Tech Rep. 2003). Baltimore, MD: Maryland State Department of Education.

CTB/McGraw-Hill. (2004, September). *Maryland school assessment, 2004* (Tech Rep. 2004). Baltimore, MD: Maryland State Department of Education.

Demie, F. (2002). Pupil mobility and educational achievement in schools: An emperical analysis. *Educational Research, 44*(2), 197-115.

Dougherty, C. (2002). *Getting smart about data: Satisfying federal reporting requirements while helping schools improve.* Retrieved February 4, 2005 from http://www.nc4ea.org/files/2-GettingSmartaboutData.pdf

English, F.W. (2000). *Deciding what to teach and test: Developing, aligning, and auditing the curriculum.* Thousand Oaks, CA: Corwin Press Incorporated.

English, F. W. & Steffy, B. E. (2001). *Deep curriculum alignment: Creating a level playing field for all children on high-stakes tests of educational accountability.* Lanham, MD: Scarecrow Press Incorporated.

eSchool News Online. (2007, January 9). *Bush, lawmakers meet over NCLB: Administration lays groundwork for renewal of education law.* Retrieved January 18, 2007, from http://eschoolnews.com/news/showStory.cfm?Article ID=6790&page=1

Family Housing Fund. (1998). *Minneapolis Kids Mobility Project.* Retrieved February 4, 2005, from www.fhfund.org/_dnld/reports/kids.doc

Fang, Z., Fu, D., & Lamme, L. L. (2004). From scripted instruction to teacher empowerment: Supporting literacy teachers to make pedagogical transitions. *Reading, 38*(1), 58-64.

Fisher, T. A., Matthews, L., Stafford, M. E., Nakagawa, K., & Durante, K. (2002). School personnel's perceptions of effective programs for working with mobile students and families. *Elementary School Journal, 102*(4), 317-333.

Fowler-Finn, T. (August, 2001). Student stability vs. mobility. *The School Administrator Web Edition.* Retrieved February 7, 2005, from http://www.aasa.org/publications/sa/2001_8/fowler-fin.htm

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). New York, NY: Allyn and Bacon.

Gay, L. R. (1996). *Educational research: Competencies for analysis and application* (5th ed.). Englewood Cliffs, NJ: Prentice-Hall Incorporated.

Glatthorn, A. A. (1994). *Developing a quality curriculum.* Long Grove, IL: Waveland Press Incorporated.

Gottlieb, J. & Weinberg, S. (1999). Comparison of students referred and not referred for special education. *Elementary School Journal*, *99*(3), 187-199.

Hall, T. (2001). Student movement. *Washington Monthly*, *33*(9), 23-25.

Harcourt Assessment Incorporated. (2004). *Maryland school assessment: Reading: Grades 3 through 8* (Tech Rep. 2004). Baltimore, MD: Maryland State Department of Education.

Heinlin, L. M. & Shinn, M. (2000). School mobility and student achievement in an urban setting. *Psychology in the Schools*, *37*(4), 349-358.

Hodgkinson, H. (2006). *The whole child in a fractured world.* Washington, DC: Commission on the Whole Child convened by the Association for Supervision and Curriculum Development.

Jacobs, H. H. (Ed.) (2004). *Getting results with curriculum mapping.* Alexandria, VA: Association for Supervision and Curriculum Development.

Kerbow, D. (1996). *Patterns of urban student mobility and local school reform* (Rep. No. 5). Washington, D.C.: Center for Research on the Education of Students Placed at Risk.

Lash, A.A. & Kirkpatrick, S.L. (1990). A classroom perspective on student mobility. *Elementary School Journal, 91*(2), 176-191.

Ligon, G. & Paredes, V. (1992). *Student mobility rate: A moving target.* San Francisco, CA: Annual Meeting of the American Educational Research Association. (ERIC Document Reproduction Service No. ED349335)

MacGillivry, L., Ardell, A. L. , Curwen, M. S., & Palma, J. (2004). Colonized teachers: Examining the implementation of a scripted reading program. *Teaching Education, 15*(2), 131-144.

Mao, M. X., Whitsett, M. D., & Mellor, L. T. (1997). *Student mobility, academic performance, and school accountability.* Chicago, IL: Annual Meeting of the American Educational Research Association. (ERIC Document Reproduction Service No. ED409380)

Maryland State Department of Education. (2003). *Maryland school assessment – Reading: Grades 3, 5, and 8* (Tech Rep. 2003). Baltimore, MD: Maryland State Department of Education.

Maryland State Department of Education. (2004a). *2004 Maryland report card.* Retrieved March 7, 2006 from http://msp2004.msde.state.md.us/

Maryland State Department of Education. (2004b). *Maryland voluntary state curriculum.* Baltimore, MD: Maryland State Department of Education.

Maryland State Department of Education. (2005). *Maryland school assessment (MSA): Fact sheet.* Baltimore, MD: Maryland State Department of Education.

Marzano, R. J. (2002). In search of the standardized curriculum. *Principal, 8*(3), 6-9.

Montgomery County Public Schools. (2003, September). *Understanding adequate yearly progress in Maryland in 2003*. Retrieved October 6, 2005, from http://www.mcps.k12.md.us/departments/sharedaccountability/testing/guides/UnderstandingAYP.ppt#257,2,AYP Defined

National Conference of State Legislatures. (n.d.). *No Child Left Behind Act of 2001*. Retrieved October 28, 2005, from http://www.ncls.org/programs/educ/NCLB History.html

Nelson, P.S., Simoni, J.M., & Adelman, H.S. (1996). Mobility and school functioning in the early grades. *The Journal of Educational Research, 89*(6), 365-369.

Offenberg, R. M. (2004). Inferring adequate yearly progress of schools from student achievement in highly mobile communities. *Journal of Education for Students Placed at Risk, 9*(4), 337-335.

Ohio State Department of Education, Urban Schools Initiative. (1998). *Student mobility and academic achievement.* Columbus, OH: A Report of the Urban Schools Initiative Mobility Work/Study Group. (ERIC Document Reproduction Service No. ED443913)

Ornstein, A. C. (2003). *Pushing the envelope: Critical issues in education.* Columbus, OH: Merrill Prentice Hall.

Ornstein, A. C. & Hunkins, F. (1993). *Curriculum: Foundations, principles, and issues* (2nd ed.). Boston, MA: Allyn and Bacon.

Paredes, V. (1993). *A study of urban student mobility* (Publication. No. 92-91). Atlanta, GA: Annual Meeting of the American Educational Research Association. (ERIC Document Reproduction Service No. ED359282)

Rogers, L. (2004). *Student mobility in Maryland: A report to the Annie E. Casey Foundation.* Baltimore: The Maryland State Department of Education, Division of Student and School Services.

Rumberger, R.W., Larson, K. A., Ream, R. K., & Palardy, G.J. (1999). *The educational consequences of mobility for California students and schools: Research series.* Berkeley, CA: Policy Analysis for California Education. (ERIC Document Reproduction Service No. ED 441040)

Rumberger, R.W. (2003). The causes and consequences of student mobility. *The Journal of Negro Education, 72*(1), 6-21.

Schaft, K. A. (2003). *Low income student transiency and its effects on schools and school districts in upstate New York.* New Orleans, LA: A National Research Workshop sponsored by The Economic Research Service, The Southern Rural Development Center, and The Rural School and Community Trust. (ERIC Document Reproduction Service No. ED479993)

Schmidt, W. H. (2004). Improving achievement in math and science: A vision for mathematics. *Educational Leadership, 61*(5), 6-11.

Sewell, C. (1982). *The impact of pupil mobility on assessment of achievement and its implications for program planning.* Brooklyn, NY: Community School District 17. (ERIC Document Reproduction Service No. ED228322)

Skandera, H.& Sousa, R. (2002). Mobility and the achievement gap. *Hoover Digest: Research and Opinion on Public Policy, 3*, 1-5.

Smagorski, P., Lakly, A., & Johnson, T.S. (2002). Acquiescence, accommodation, and resistance in learning to teach with a prescribed curriculum. *English Education, 34*(3), 187-213.

Smith, A. M. (2003). The relationship between student mobility and school district performance accountability ratings in Ohio. *Dissertation Abstracts International, 64*(07), 2338. (UMI No. 3099423)

Staresina, L. N. (2004, May 20). Student mobility. *Education Week on the Web.* Retrieved February 4, 2005, from http://209.190.217.51/context/topics/issuespage.cfm?id=82

United States Census Bureau. (2003). *County to county migration flow files.* Retrieved April 28, 2006 from http://www.census.gov/population/www/cen2000/ctyoctyflow.html

United States Census Bureau. (n.d.). *People quick facts.* Retrieved March 7, 2006 from http://quickfacts.census.gov/qfd/states/24/.html

United States Department of Agriculture. (2005). *Nutrition program facts: Food and nutrition service.*

United States Department of Commerce, Economics and Statistics Adminstration, U.S. Census Bureau. (2004, March). *Geographical mobility: 2002 to 2003; Current Population Reports.* Retrieved March 5, 2005, from http://www.census.gov/prod/2004pubs/p20-549.pdf

United States Department of Education. (1983, April). *A nation at risk: The imperative for educational reform.* Retrieved May 28, 2005, from http://www.edgov/pubs/NatAtRisk/index.html

United States Department of Education. (2002). *No Child Left Behind.* Retrieved May 7, 2005, from http://nochildleftbehind.gov/next/stats/index.html

United States Department of Education. (n.d.). *Consolidated state application, May 1, 2003 submission.* Retrieved October 28, 2005, from http://msde.state.md.us/ Con_ Perform_Report_May1.doc

United States General Accounting Office. (1994). *Elementary school children: Many change schools frequently, harming their education* (GAO/HEHS-94-45). Gaithersburg, MD: Author.

Walberg, H. J. (2003). Accountability unplugged. *Education next, 3*(2), 76-79.

Ware, W.B. (1997). *How Tukey's is computed (SPSS).* Retrieved February 26, 2007 from http://www.pitt.edu/~wpilib/stats99.html

Wasserman, D. (2001). *Moving targets: Student mobility and school and student achievement.* Seattle, WA: Paper presented at the Annual Meeting of the American Educational Research Association. (ERIC Document Reproduction Service No. ED452267)

Weckstein, P. (2003). Accountability and student mobility under Title I of the No Child Left Behind Act. *The Journal of Negro Education*, *72*(1), 117-125.

Witte, R. S. & Witte, J. S. (1997). *Statistics* (5th ed.). New York, NY: Harcourt Brace College Publishers.

Wright, D. (1999). Student mobility: A negligible and confounded influence on student achievement. *Journal of Educational Research, 92*(6), 347-353.