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The Influence of Length of School Day on Percentage of Proficient and Advanced Proficient Scores on the New Jersey Assessment of Skills and Knowledge for Grade 3

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THE INFLUENCE OF THE LENGTH OF THE SCHOOL DAY ON THE PERCENTAGE OF PROFICIENT AND ADVANCED PROFICIENT SCORES ON THE NEW JERSEY ASSESSMENT OF SKILLS AND KNOWLEDGE FOR GRADE 3

By
Lydia Kaji Yikon’a

Submitted in fulfillment of the requirements for the degree of

Doctor of Education

Department of Education, Management, Leadership and Policy

Under the Supervision of Dr. Gerard Babo
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APPROVAL FOR SUCCESSFUL DEFENSE

Lydia Yikon’a has successfully defended and made the required modifications to the text of the doctoral dissertation for the Ed.D. during this Spring Semester 2017.

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The mentor and any other committee members who wish to review revisions will sign and date this document only when revisions have been completed. Please return this form to the Office of Graduate Studies, where it will be placed in the candidate’s file and submit a copy with your final dissertation to be bound as page number two.
ABSTRACT

This nonexperimental, cross-sectional, explanatory, quantitative study sought to analyze the influence of length of school day on student performance on the third-grade New Jersey Assessment of Skills and Knowledge Language Arts Literacy and Mathematics total percentage of Proficient and Advanced Proficient scores. The data were obtained from the 2011 New Jersey Department of Education Report Card. The independent variables included school, student, and faculty. The analyses of the data were completed using simultaneous and hierarchical regression models.

The results indicated that length of school day had no statistical significance as a predictor of student achievement on the NJ ASK 3. However, the results revealed that socioeconomic status had the strongest statistical significance as a predictor of student achievement, accounting for 28% of the explained variance in Language Arts Literacy and 9% of the explained variance in Mathematics Total Proficient and Advance Proficient scores.
DEDICATION

My dissertation is dedicated, first, to my nephews, nieces, and their children, who are scattered throughout the world and are too numerous to mention. To my cousins and their spouses, most especially Dr. Beatrice Chifwelu Amadi, this is for you. You are the new generation of the great patriarch and matriarch, my parents, Dryden and Yihemba Yikon’a. My late parents did not have the opportunities my siblings and I had. They emphasized the love and fear of God; by being humble, people would be able to see God in each one of us, to have love for each other and the seriousness with which each one of their 10 children had to take schooling and education. Both my late parents had a strong work ethic. My dad as a clinical officer and my stay-at-home mom, who raised children and grandchildren while planting and harvesting most of what we ate. All we children had to worry about was getting a good education.

I dedicate this work to and thank my late father for teaching me how to analyze what I read. He introduced me to *Animal Farm* long before it was assigned as a required “O-level” literature book. Dad always said that you do not have to like reading the book, but you must understand the story or message to expand your knowledge. I thank him and my late mother for instilling in us the strong Lunda values and mores and for caring for others because we were not lucky, but blessed. I applied this principle throughout the program.

To my late eldest sister Evah, thank you for raising me and for allowing me to follow your footsteps into teaching. Your story about Mom encouraging you to go to Chalimbana Teachers College to pave the way for your young sisters was unimaginable at the time but fulfilled today. Your compassion for those in need and for gender equity in education will always be an inspiration to me.
To my late young sister Abigail, I miss our discussion about the books we were reading or songs that were trending. Thank you for introducing me to Richard Wright, Langston Hughes, Maya Angelou, James Baldwin, Chinua Achebe, and many African writers and poets. Abby urged me to widen my scope of interest beyond Shakespeare, the Bronte sisters, John Steinbeck, James Hardley Chase, Chaucer, Charles Dickens, and so forth.

To late Joel and Richard, I miss our heated discussions on economics and marketing and Bob Marley and Elvis Presley; To my late eldest brother Stanley, thank you for demonstrating the value of Career Technical Education long before Zambian independence.

I give thanks also to my surviving brothers. Dr. Isaiah Yikon’a, thank you for registering me in elementary school in the stead of Dad or Mom. I now appreciate your grilling me with tongue twisters before I could speak English. Your love and support for your cash-strapped young sister who happened to be a lowly-paid secondary school teacher can never be repaid. To Dr. Joseph and Dr. Stuart, thank you for your support in every need, especially with daughter Camille. Dr. Joseph, your sharing popular yester-year Zambian songs and soul music from the 1960s via Facebook and WhatsApp provided much needed comic relief and memory-lane strolls while navigating through this program! Thank you.

To my surviving sister, Florence, thank you for demonstrating such compassion and love for me every single day. The phone calls from Nottingham, England, soothe my soul. I’m grateful that you are able to represent me when we have celebrations or bereavements. That’s what our parents wanted us to demonstrate to our own children. Your checking on the progress of this journey and overall support has been immeasurable.

To my daughter, Camille, and your young family (Luis and Eli), your unconditional love is a constant reminder of the showers of blessings. The phone calls of concern whenever I was
working in the library late at night and your phone calls during a regular workday whenever you
thought of me allowed me to successfully balance my professional duties and student
assignments. Your prayers and your comforting and encouraging words when things did not
seem to go as planned will endure. You have been my rock, especially when rallying all family
members to cheer me on. I will never say my situation didn’t work out when I see your
compassion for me, compassion for others, and what you’ve become. I hope you will consider
educational leadership because you are a great teacher.
ACKNOWLEDGEMENTS

My small steps on this journey started more than 35 years ago when I was accepted as a graduate student in the Seton Hall School of Education—a university I had never heard of when I was in Zambia. I was assigned Sister Rose Thering as my advisor. She and other professors, Dr. Barrett and Dr. Linnon, guided me to success by their firmness and caring. Circumstances at the time prevented me from pursuing education leadership. “To everything there is a season, and a time for every purpose” (Ecclesiastes 3:1).

This journey has not been easy, but the Seton Hall University family continues to be extremely supportive. Therefore, I would like to thank my dissertation committee, led by Dr. Babo, my mentor. I was one of the fortunate students who discovered that Dr. Babo’s patience exceeds that of a saint. He is the one who packed my parachute. Dr. Babo is not only dedicated to helping each and every one of his students, but he is very passionate about his profession. This was demonstrated in our Directed Research class, in our preparation for our statistics qualifying examination, and in his guidance through the mountains of simultaneous and hierarchical regression analyses. The countless hours spent reading my dissertation and the quick turnaround with feedback truly lifted me up to continue “plugging on,” as Dr. Babo liked to tell me.

To Dr. Stedrak, thank you for your sense of humor and sharing your expertise in researching and writing an acceptable dissertation. Your feedback throughout this process is appreciated, and I will forever be grateful.

To Dr. Sammarone, thank you for inspiring me to work hard and to enjoy being in the program. Your work is a tough act to follow but a good model to emulate. I appreciate the input, feedback, and encouragement.
Although I, and I think other students as well, have faced not only challenges but also tragedies while in the program, our excellent professors provided support that was second to none. I offer sincere thanks to Dr. Strobert who gave me a chance, as well as warmth and words of encouragement throughout the program. Thank you to Dr. Gutmore for lighting a fire under me; thank you Dr. Osnato, Dr. Kim, and Dr. Kuchar. To Dr. Tienken, I thank you for exposing me to your unforgettable line, “Show me the data.” My special thanks to Dr. Sattin-Bajaj for your patience and assistance with my stale writing in the early days of the program.

My returning to Seton Hall has been a blessing. I have made a lifelong friend in Simone Welcome, who sold me the idea of applying to the program. To you, Simone, thanks for being a faithful study buddy and cheerleader. Also, I had no idea I would meet a brother in Christ and a lay mentor in Dr. Kent Thompson. Your probing questions in our discussion helped “turn the light on.” Your hard work inspired me to put in extra effort to get what I desire. You referred me to John 15:7. The rest of my desire during this program has fallen into place. Dr. Thompson, thank you, and I believe God has a good plan for you in his own time.

Finally, to Dr. Lilly, Mrs. Baskerville, and Mrs. Rhodes—my former supervisors and definitely spiritual leaders—thank you for writing letters of recommendation and for believing in me. I am indebted to each of you.
# TABLE OF CONTENTS

ABSTRACT ................................................................................................................................. iv  
DEDICATION ............................................................................................................................... v  
ACKNOWLEDGEMENTS ............................................................................................................. viii  
LIST OF TABLES ........................................................................................................................ xii  
LIST OF FIGURES ....................................................................................................................... xiv  
LIST OF ABBREVIATIONS ....................................................................................................... xv  

## CHAPTER

### I. INTRODUCTION ................................................................................................................ 1  
Background ................................................................................................................................... 1  
Instructional Time ......................................................................................................................... 5  
Statement of the Problem ........................................................................................................... 10  
Purpose of Study ......................................................................................................................... 11  
Purpose of Study ......................................................................................................................... 11  
Research Questions .................................................................................................................... 12  
Null Hypothesis .......................................................................................................................... 12  
Independent Variables .............................................................................................................. 12  
Dependent Variable .................................................................................................................... 13  
Significance of the Study ............................................................................................................ 14  
Limitation/Delimitations of the Study ....................................................................................... 15  
Assumptions ............................................................................................................................... 15  
Definition of Terms .................................................................................................................... 16  
Organization of the Study .......................................................................................................... 19  

### II. LITERATURE REVIEW .................................................................................................... 21  
Introduction ............................................................................................................................... 21  
The Literature Review Research Procedures ........................................................................... 21  
Methodological Issues in Studies of Predictors ......................................................................... 22  
Inclusion Criteria ......................................................................................................................... 22  
Theoretical Framework ............................................................................................................... 23  
The New Jersey Report Card .................................................................................................... 24  
High-Stakes Testing ................................................................................................................... 26  
Student Variables ....................................................................................................................... 29  
Faculty/Staff Variables ............................................................................................................... 41  
School Variables ....................................................................................................................... 46  
Chapter Summary ..................................................................................................................... 58  

### III. METHODOLOGY ........................................................................................................... 60  

x
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and Research Design</td>
<td>60</td>
</tr>
<tr>
<td>Research Questions</td>
<td>61</td>
</tr>
<tr>
<td>Null Hypothesis</td>
<td>62</td>
</tr>
<tr>
<td>Sample Population and Data Source</td>
<td>62</td>
</tr>
<tr>
<td>Data Collection</td>
<td>63</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>66</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>69</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>71</td>
</tr>
<tr>
<td>IV. ANALYSIS OF THE DATA</td>
<td>72</td>
</tr>
<tr>
<td>Introduction</td>
<td>72</td>
</tr>
<tr>
<td>Overarching Research Question</td>
<td>72</td>
</tr>
<tr>
<td>Subsidiary Research Questions</td>
<td>72</td>
</tr>
<tr>
<td>Null Hypotheses</td>
<td>73</td>
</tr>
<tr>
<td>The Purpose of the Study</td>
<td>73</td>
</tr>
<tr>
<td>Organization of the Chapter</td>
<td>73</td>
</tr>
<tr>
<td>Description of the Sample, Power and the Variables</td>
<td>73</td>
</tr>
<tr>
<td>Procedure</td>
<td>77</td>
</tr>
<tr>
<td>Research Question 1: Statistical Analysis and Results</td>
<td>77</td>
</tr>
<tr>
<td>Research Question 2: Statistical Analysis and Results</td>
<td>89</td>
</tr>
<tr>
<td>Conclusion</td>
<td>99</td>
</tr>
<tr>
<td>V. CONCLUSIONS AND RECOMMENDATIONS</td>
<td>101</td>
</tr>
<tr>
<td>Introduction</td>
<td>101</td>
</tr>
<tr>
<td>The Purpose of the Research</td>
<td>102</td>
</tr>
<tr>
<td>Organization of the Chapter</td>
<td>103</td>
</tr>
<tr>
<td>Research Questions and Answers</td>
<td>103</td>
</tr>
<tr>
<td>Conclusions and Discussion</td>
<td>107</td>
</tr>
<tr>
<td>Recommendation for Policy and Practice</td>
<td>113</td>
</tr>
<tr>
<td>Recommendation for Future Research</td>
<td>118</td>
</tr>
<tr>
<td>Conclusion</td>
<td>119</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>120</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

1. Time line in the history of expanded learning time ............................................................ 9
2. Independent variables: School, Student, and Teacher/Staff Predictors .......................... 13
3. 2011 New Jersey Assessment of Skills and Knowledge for Grade 3 ............................. 25
4. Description of Downloaded Variables ............................................................................. 64
5. District Factor Group Classifications NJ ASK 3 Math and LAL Test Takers ............... 66
6. Power: Expected R for Random Data ............................................................................... 75
7. Independent and Dependent Variables Used in this Study Entered in IBM SPSS Software ............................................................................................................................ 76
8. Initial Simultaneous Regression for Language Arts Literacy: Dependent and Independent Variables .............................................................................................................................................. 78
9. Descriptive Statistics of the Language Arts Literacy Sample ............................................. 79
10. Simultaneous Multiple Regression with all the Independent Variables Entered .......... 80
11. Simultaneous Multiple Regression Model Summary For Language Arts Literacy ........ 80
12. Simultaneous Multiple Regression ANOVA Table for Language Arts Literacy .......... 81
13. Simultaneous Multiple Regression Coefficients Table for Language Arts Literacy ...... 83
14. Hierarchical Regression Variables Entered for Language Arts Literacy ..................... 84
15. Hierarchical Regression Model Summary for Language Arts Literacy ......................... 85
16. Hierarchical Regression ANOVA Table for Language Arts Literacy ........................... 86
17. Hierarchical Regression Coefficients Table for Language Arts Literacy ..................... 88
18. Initial Simultaneous Regression for Mathematics - Dependent and Independent Variables ......................................................................................................................................... 89
19. Descriptive Statistics of Mathematics ............................................................................. 90
20. Simultaneous Multiple Regression for Mathematics with all the Independent Variables Entered ................................................................................................................................. 90
21. Simultaneous Multiple Regression Model Summary for Mathematics .......................... 91
22 Simultaneous Multiple Regression ANOVA Table for Mathematics .............................. 92
23 Simultaneous Multiple Regression Coefficients Table for Mathematics ....................... 93
24 Hierarchical Regression Variables Entered for Mathematics ........................................ 94
25 Hierarchical Regression Model Summary for Mathematics ........................................... 95
26 Hierarchical Regression ANOVA Table for Mathematics ............................................. 96
27 Hierarchical Regression Coefficients Table for Mathematics ....................................... 98
LIST OF FIGURES

1 Simultaneous regression framework ................................................................................. 69
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AYP</td>
<td>adequate yearly progress</td>
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<tr>
<td>CCSS</td>
<td>Common Core State Standards</td>
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<td>ESSA</td>
<td>Every Student Succeeds Act</td>
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<td>HSPA</td>
<td>High School Proficiency Assessment</td>
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<tr>
<td>IEP</td>
<td>individualized education plan</td>
</tr>
<tr>
<td>LAL</td>
<td>language arts literacy</td>
</tr>
<tr>
<td>LEP</td>
<td>limited English proficient</td>
</tr>
<tr>
<td>MA</td>
<td>mathematics</td>
</tr>
<tr>
<td>NAEP</td>
<td>National Assessment for Education Progress</td>
</tr>
<tr>
<td>NCES</td>
<td>National Center on Education Statistics</td>
</tr>
<tr>
<td>NCLB</td>
<td>No Child Left Behind Act</td>
</tr>
<tr>
<td>NJ ASK</td>
<td>New Jersey Assessment of Skills and Knowledge</td>
</tr>
<tr>
<td>NJ DOE</td>
<td>New Jersey Department of Education</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<tr>
<td>PARCC</td>
<td>Partnership for Assessment of Readiness for College and Careers</td>
</tr>
<tr>
<td>PISA</td>
<td>Program for International Student Assessment</td>
</tr>
<tr>
<td>US DOE</td>
<td>United States Department of Education</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Background

The issue of American students not performing well in core subjects of mathematics and language arts compared to those in other developed countries has been debated since the early 1960s. During the past two decades, advocacy groups have been vocal enough to influence policy makers. In the 1980s, a report called *A Nation at Risk: Imperative for Education Reform* was published, detailing how public schools were failing their students (United States Department of Education [USDOE], United States National Commission on Excellence in Education, 1983). During Ronald Reagan’s presidency, then Secretary of Education T. H. Bell created the National Commission on Excellence in Education (USDOE, 1983). The members of this commission were directed to examining and recommending improvements to the American education system, particularly regarding how American children were performing compared to their peers in other industrialized countries. The scathing report highlighted the failure of public schools to adequately educate all children regardless of their background. The authors of the report went on to say that American schools were on the verge of being outperformed by other countries in almost all subject areas, especially in language arts literacy (LAL) and mathematics (MA).

The commission’s report found that time management was an issue in American schools. The time spent in the classroom and on schoolwork was not being used effectively, compared to other nations. The members of the commission recommended that time for learning be expanded to increase student achievement. Policy makers and other bureaucrats seized the opportunity to call for the restructuring of public schools. In 2001, under the George W. Bush administration,
the No Child Left Behind Act (USDOE, 2001) was passed. This legislation was an extension or reauthorization of the 1965 Elementary and Secondary Education Act (ESEA; USDOE, 2002). According to Tienken and Orlich (2013), the NCLB Act was an assessment-driven piece of legislation. *Accountability* became the term that was expected to be understood and applied practically in every section of the tested core subject areas of LAL and MA.

According to Perie, Park, and Klau (2007), the definition of accountability itself has evolved over time. The authors noted that the term’s definition is “focused primarily on the interactions of goals, performance indicators, decision rules, and consequences” (Perie, Park, & Klau, 2007, p. 3). With the advent of the NCLB, the definition has shifted to “capacity building and providing support” (Perie et al., 2007, p. 3). The main purpose of the NCLB is to close the achievement gaps between groups and subgroups of students as measured by high-stakes tests administered by their local school boards under the jurisdiction of their State Department of Education with the expectation the local authorities would emphasize rigor in the tests. Therefore, where the ESEA fell short, the NCLB legislation would remedy deficiencies in achievement.

The administration of high-stakes standardized testing, known as the New Jersey Assessment of Skills and Knowledge (NJ ASK 3) began with the third-grade students as the first benchmark. Standardized testing continued each year through eighth grade (NJ ASK 8). At the secondary level, the high-stakes assessment test was administered at the 11th-grade level as a requirement for graduation in states such as New Jersey (NJDOE, 2011). Recently, NCLB has been amended and renamed “Every Student Succeeds Act” (Klein, 2015). The new legislation scales down the role the federal government plays in education and the main function is reverted back to the state governments. The legislation has opted to keep the requirements of transparency
in accountability. The high-stakes testing would be expected to be administered yearly from third grade through eighth grade. The new law also gives the states more flexibility in developing peer-reviewed plans and accountability instruments. Although the NCLB waivers were valid through 2016, states were expected to develop an intervention plan if the high school graduation rate was less than 68% and focus on helping subgroups that have traditionally not performed well on proficiency tests (Klein, 2015, p. 17). Furthermore, the new law gives the states the authority to develop standards and indicators by which students would be classified as proficient. The new legislation will be effective in the 2017–2018 school year.

In June 2010, the State of New Jersey joined more than 40 other states in adopting the Common Core State Standards (CCSS) (NJDOE, 2011a). This change has resulted in a paradigm shift in assessing students because the CCSS emphasize college and workplace skills readiness. According to the NJDOE, the Partnership for Assessment of Readiness for College and Careers (PARCC) would be effective in the 2014–2015 school year and would be aligned to the CCSS (NJDOE, 2015, p. 3).

Recently, the outcry of American students performing below those of their peers in developed countries has been based on data from Trends in International Mathematics and Science Studies, and Program for International Student Assessment (PISA). The data from Trends in International Mathematics and Science Studies focuses on mathematics and science achievement. The most recent was data collected in in 2015. The organization examined data from 60 countries including the United States and a few other prominent countries such as Finland, Norway, and Sweden. On the other hand, PISA, under the auspices of the Organization for Economic Cooperation and Development (OECD), gathers and analyzes data from 15-year-old students in three subject areas. They gather data in mathematics, reading, and financial
literacy. Unlike Trends in International Mathematics and Science Studies, PISA collects data every 3 years. The latest data is from 2012. Policy makers who use these data hardly ever disaggregate into subgroups in interpretation of the results. In most cases, American schools’ diversity differs tremendously from its peers from other countries on which the comparison is based.

Parlapanides cites Bracey (2000) who reports that TIMMS data sample was not accurate when comparing students in other countries to those of the United States’ students. Bracey (2000) also notes that the international students were older by at least 3 years. Statistically speaking, the groups being studied should be comparable. The Obama administration’s education agenda called for reforming or restructuring of the American schools through the Race to the Top (RTTT) competitive grant. The report emphasizes curriculum rigor to prepare students to handle college material and career readiness skills that reflect 21st-century global competitiveness should students choose to enter the work force. The report encourages innovative teaching and learning strategies that increase student achievement in the tested areas of math, language arts, and science (USDOE, 2009).

The American public education system measures proficiency in core subjects by administering high stakes standards-based tests. Although education is locally controlled, each state education department sets minimum standards that school districts expect their students to achieve. In New Jersey, school districts must adhere to the CCSS as they implement the curriculum and prepare students to demonstrate proficiency through testing from third through 11th grade. The PARCC high-stakes test is administered solely online. Expected proficiency is a result of various inputs in school that affects student learning and subsequent achievement such
as attendance, teacher credentials, motivation and desire to learn, family structure, and length of school day.

The focus of this present study is to explore the influence of length of school day on NJ ASK prior to the adoption of PARCC. In the state of New Jersey, the achievement level on the NJ ASK has been categorized as follows:

- partially proficient, if a student scored 100 to 199
- proficient, if a student scored 200–249
- advanced proficient, if a student scored 250–300. (NJDOE, 2011a, p. 3, p. 64)

The purpose of this high stakes standardized test is supposed to measure criterion achievement by matching the skills with the New Jersey Core Content Curriculum Standards (NJCCCS). Studies on the impact of instructional time on student achievement have identified many variables or factors that influence achievement scores.

**Instructional Time**

The debate over the length of school day and school calendar did not begin with the 1983 report *A Nation at Risk*. Barrett (1990) analyzed a timeline for the advocacy of more school days. He explained that the American public awakened to the perception of losing its competitive edge when the Russian launched Sputnik in the late 1950s. Policymakers declared this as a crisis, implying that the American education system was not sufficiently competitive. On reviewing Barrett’s original work, Berliner (2013) concluded Sputnik was a manufactured crisis. In his work with Biddle (Berliner and Biddle, 1995) Berliner studied and presented their findings with data to show how policy makers, advocacy groups, and politician misuse data to advance their agenda.
The length of school day and the academic year has historical roots in compulsory education and attendance laws in America. In the late 19th century, Massachusetts was the first state that passed Compulsory and Attendance Laws in 1852. Katz (1976) reviews the history of compulsory education and cites various reformers such as Horace Mann and Henry Barnard who state that the purpose for these laws was to give equal education opportunity and access to diverse population of the time. In narrating the history of attendance laws, David Tyack (1974) recounts early 19th-century education reformers, Joseph Tuckerman and Jacob Riis that schools would serve as a protective and safe environment. Tyack gives a vivid account of Tuckerman and Riis stating that compulsory attendance would rescue children from “school of the street” where all kinds of abuses were rampant. In addition, Tyack details that these two (Riis and Jacob) reformers made a case for compulsory attendance by rationalizing that parents were negligent enough to contribute to their children’s various criminal activities and subsequent imprisonment. Furthermore, the population consisted mostly of new immigrants that had no means of paying the tuition charged by private schools. Katz (1976) also indicates that in the early 1960s, John Goodman laments that at the elementary school level, enforcing compulsory education functions more as baby-sitting rather than a place for structured learning. This illustrates that although years have gone by, the debate on the value of a school day still rages on. For instance, in 2009, Arne Duncan, Education Secretary for the Obama administration, is quoted in the Education Next (2010) publication in which he stated that the American system school day is too short. The call for more additional school days stems from the belief that it would improve student performance. This is the opposite of what Goodman viewed or expressed more than two decades ago.
It is important to note that public schools are not necessarily free but are funded through taxation. Therefore, adopting or implementing extended learning time within the traditional school structure translates into the need for additional financing. Marcotte and Hansen (2010) discussed the issue of extended learning time by stating and citing William T. Harris, who, more than one hundred fifty years ago in 1894 in his *Report of the Commissioner* stated,

The boy of today must attend school 11.1 years to receive as much instruction, quantitatively, as the boy of fifty years ago received in 8 years…It is scarcely necessary to look further than this for the explanation for the greater amount of work accomplished… in the German and French than in American schools” (EducationNext.Org, 2010, p. 53).

Note that Harris’s comment means that the American student even at that time was behind by at least 3 years. In fact, Harris’ *Report of the Commissioner* did compare the American education system to international standards. However, it is clear that no tangible studies accompany the assertion that German or French students performed better despite how long their academic year or length of school day.

Walberg (1997) asserted that the way schools are organized or structured promote inefficiency and hinder learning gains in the 21st-century competitive world. As a production input, Walberg stated that effective use of instructional time would increase efficiency and would also result in reducing spending. Wahlberg (1997) discussed the automotive industry principles used earlier in the century in the organization of workflow to increase production performance. These principles, he argued, would increase achievement in schools by merely substituting students as workers.

Instructional time is a structure in both private and public schools that accounts for the day-to-day activities of teaching and learning. Berliner (1990) pointed out that research and
discussion of instructional time is not new. He explained that instructional time is an important 
variable in which a student is expected to learn. He applied the influence of the Model of 
Learning Theory as espoused by J. B. Carroll (1963). Berliner (1990) discussed the influence of 
J. B. Carroll about the nature of instructional time and its relationship to student achievement. 
The most significant concept Berliner discussed about the Carroll model is that of aptitude. 
Berliner quoted Carroll’s definition of aptitude as consisting of intrinsic high level of motivation, 
opportunity to learn, and high quality instruction (Berliner, 1998). In addition, Berliner defines 
time in different categories. He identifies these categories as allocated time, engaged time, and 
academic learning time. Allocated time is the time assigned to a specific subject or course in 
which instructional delivery occurs. The engaged time is when the learner is participating in 
learning activities as given by the teacher. According to Berliner (1987), Academic Learning 
Time (ALT) deals with student readiness at which time learning occurs. Berliner described ALT 
as a more complex concept of learning because it is often misrepresented as engaged time. Table 
1 illustrates a brief history of expanded learning time.

My study primarily explored and explained the influence of the length of school day, if 
any, on third-grade 2011 NJASK test scores. The average school day in New Jersey is 
approximately 6.5 hours (NJDOE, 2010). The minimum 180 school days is required per year for 
a New Jersey public school district. Any policy change to the length of school day would 
ultimately impact funding.
Table 1

*Time line in the history of expanded learning time*

<table>
<thead>
<tr>
<th>Year</th>
<th>Notable significant event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1894</td>
<td>The commission headed by William Torrey Harris publishes the State of American Education noting loss of time in urban schools from 193.1 to 191 school days (Cited in “Prisoners of Time”, 1994).</td>
</tr>
<tr>
<td>1983</td>
<td>A Nation at Risk: Imperative for Education Reform (1983) report is published. A 7-hour day and 200- to 220-day school year is recommended.</td>
</tr>
<tr>
<td>1994</td>
<td>The National Education commission on Time and Learning publishes “Prisoners of Time”(1994). Emphasizing how the constraints on learning time present a hurdle to achieve the targets laid out in Goals 2000 Act (1989). “Design Flaw” correction is recommended. (This refers to the 40 minute or 51 minute instructional period in traditional scheduling).</td>
</tr>
<tr>
<td>1997</td>
<td>Incentives for increasing instruction days from 180 to 200 are offered in Arizona. Arizona becomes the first in the nation to implement an expanded instructional school year and receives additional funding. Data shows increase in student achievement.</td>
</tr>
<tr>
<td>1998</td>
<td>The National Conference of State Legislatures include Expanding Learning Time as an issue. However, public schools are slow to change. The now approved Charter Schools adopt longer school days—at least 60% of Charter Schools have longer school days.</td>
</tr>
<tr>
<td>2005</td>
<td>Massachusetts offers competitive grants to school districts electing to add 300 hours to their school year.</td>
</tr>
<tr>
<td>2009</td>
<td>The Obama Administration passes the American Recovery and Reinvestment Act. $3.5 billion is earmarked for School Improvement Fund whose goal is to “turn around” chronically low-performing schools (USDOE, 2009). The focus for the fund is on increasing learning time.</td>
</tr>
<tr>
<td>2012</td>
<td>The Chicago Public School system increases its school day from 5.75 hours to 7 hours, adding $130 million to give principals and communities to structure the new school day.</td>
</tr>
<tr>
<td>2015</td>
<td>The Boston Public School system agrees to add 40 minutes to the instructional day.</td>
</tr>
</tbody>
</table>

*Note. Source: National Center for Time and Learning (NCTL) [http://www.timeandlearning.org/]*
Statement of the Problem

The research conducted and subsequent results on the influence of the length of a school day on student achievement have been mixed. In their review of the literature on extending the school day and its effect on student achievement, Aronson, Zimmerman, and Carlos (1999) concluded that results of the studies remain assumptions only. The authors noted that because these studies rely heavily on correlational study methods rather than experimental design methods, results tend to make measuring the impact of the influence on student achievement difficult. Furthermore, the authors stated that the few studies have not been longitudinal, leading researchers to speculate about gains or losses in achievement in their conclusions (Aronson et al., 1999). In one of the most intensive meta-analysis review of the influence of length of a school day or school year on school achievement studies—spanning from 1985 to 2009—Patall, Cooper, and Allen (2010) found weaknesses in the causal relationship and that achievement outcomes were rarely studied. Their study consisted of different location of subjects and design methodologies; the authors examined the data and found the effect size was not adequately reported. Without any effect size report, Patall et al. (2010) were unable to provide the magnitude of the impact of extending the school day or school year on student achievement.

Few, if any, studies have been conducted in the State of New Jersey, particularly at the elementary school level. The present study helps fill this gap by exploring and explaining whether the length of a school day has any influence on student achievement on LAL and MA NJ ASK Grade 3 proficient scores. The results of the NJ ASK high-stakes testing scores are often used for making various placement decisions about students (Tienken, 2008). Due to the nature of high-stakes testing, the NCLB mandate relied heavily on the results to determine whether a school was reaching the target known as adequate yearly progress (AYP) or whether
to label the school as “failing.” The targets were supposed to reach 100% achievement for all students by the year 2014.

There have been only a few studies conducted on the length of the school day variable and its influence on student academic achievement as measured by NJ ASK third-grade language arts and mathematics scores. Turnamian (2012) conducted a study that examined the influence of the value of demographics on the NJ ASK 3 LAL and MA scores. He did not include the influence of the length of the school day or school year as a variable. Furthermore, the few that have been done have focused on NJASK fourth grade through eighth grade. In addition, the studies are mostly concentrated in schools located in urban or low-income areas.

For example, Smith (2000), in her study of Annual Instructional time in Chicago Elementary Schools, pointed out that these schools tend to have high percentages of poor and minority students. This study will include schools designated A-J by the District Factor Group (DFG) in New Jersey. At the high school level, a few studies have been conducted on the length of the school day and its influence on academic achievement as measured by Grade 11 HSPA scores (deAngelis, 2014). Therefore, the results will aid policy makers, stakeholders, and administrators to make informed decisions on whether or not to restructure the school day.

**Purpose of Study**

The few studies conducted on the influence of the length of the school day on student achievement have been at the middle school and high school level. Those conducted at the elementary school level have not involved schools in New Jersey. Therefore, the purpose of this study is to examine the relationship between the length of school day and third-grade student achievement in New Jersey Public Schools. This cross sectional, nonexperimental, explanatory
study will investigate which variables significantly influence the strength and direction of LAL and MA performance on the 2011 NJ ASK 3.

I explain the variance that can be accounted for in student performance by answering the following overarching research question, what is the influence of the length of the school day on third-grade NJ ASK LAL and MA student performance when controlling for school, student, and faculty/staff variables? The research is guided by following subsidiary research questions.

**Research Questions**

RQ 1. What is the influence of length of school day on third-grade NJ ASK 2010–2011 student proficiency performance in Mathematics when controlling for school, student, and faculty/staff variables?

RQ 2. What is the influence of length of school day on third-grade NJASK 2010–2011 student proficiency performance in LAL when controlling for school, student, and faculty/staff variables?

**Null Hypothesis**

H1. There is no statistically significant relationship between length of school day and student performance on the Mathematics section of the 2010–2011 third-grade NJ ASK.

H2. There is no statistically significant relationship between length of school day and student performance on the LAL section of the 2010–2011 third-grade NJ ASK.

**Independent Variables**

Each year, the New Jersey Department of Education (NJDOE) publishes the annual report card. This is posted on the State’s website and also disseminated through the *New Jersey Star Ledger*, the state’s newspaper. The independent variables, also referred to as predictors in
this study are factors that might potentially influence student achievement on the NJ ASK as identified through the extant literature. The NJDOE (2011e), in the Interpretive Guide for NJ School Performance Reports, collected data on student attendance rate, student mobility, and social economic status (SES). Regarding faculty, the department collected faculty educational levels beyond the bachelor’s degree, the faculty attendance rate, and faculty mobility. On the school level, data on school size, daily instruction time in minutes, and length of school day were collected. Table 2 illustrates the independent variables (inputs) and the dependent variable (output).

Table 2

*Independent Variables: School, Student, and Teacher/Staff Predictors*

<table>
<thead>
<tr>
<th>School variables</th>
<th>Student variables</th>
<th>Faculty variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>School size</td>
<td>SES percentage</td>
<td>Percentage of teachers/staff with advanced degrees</td>
</tr>
<tr>
<td>Daily instructional time in minutes</td>
<td>Students with disabilities percentage</td>
<td>Teacher/staff mobility</td>
</tr>
<tr>
<td>Length of school day</td>
<td>Student mobility rate</td>
<td>Teacher/staff mobility</td>
</tr>
<tr>
<td></td>
<td>LEP students percentage</td>
<td>Teacher/staff attendance rate</td>
</tr>
<tr>
<td></td>
<td>Student attendance rate</td>
<td></td>
</tr>
</tbody>
</table>

↓ ↓ ↓

Dependent variables: 2010–2011 NJ Ask 3 student performance in mathematics & LAL

**Dependent Variable**

On the New Jersey Report Card, the dependent variable is the reported NJASK aggregate proficiency scores as measured in the three categories reported above: partially proficient (<200), proficient (200–250), and advanced proficient (251–300), (NJDOE, 2011a). For the purpose of this study, the dependent variable will be the aggregate percent proficient in Grade 3 for the
identified school, which is comprised of all those students who attained both proficient and advance proficient in both LAL and MA. For the 2011 NJASK test administration, 1,997 elementary schools participated with a total of approximately 100,000 (NJDOE, 2012) students who took the NJASK. Using Excel spreadsheets and Access databases, the NJDOE publishes the scores for all school districts on the World Wide Web and archives the results on their website. In analyzing these data for this study, SPSS (Statistical Package for the Social Sciences) software was employed. Because this is a cross-sectional, explanatory study method, the appropriate analysis to use is the linear simultaneous and hierarchical regression method. This method is able to show which of the variables have the strongest impact and how much of the variance can be accounted for in the dependent variable. The data is obtained from the archives and are assumed to be accurate. The unit of analysis in this study is school.

**Significance of the Study**

The current body of research on the influence of length of the school day on achievement as measured by the NJASK third-grade scores at the elementary school level is lacking. Patall et al. (2010) stated in the summary that the results range from “consensus” to “confusion” in the meta-study on the influence of the length of the school day and student achievement. The focus of this study, the influence of the length of school day on Grade 3 student achievement as measured by the results from the 2011 NJASK third-grade mathematics and language arts proficiency assessment, will provide school administrators and community members informed decisions for restructuring their schools. It will lay the groundwork for conducting further research using experimental design methodology. The researchers and policy makers need facts based on sound empirical evidence that aids the decisions they make concerning achievement and dispel perceptions about the current competitiveness with other nations that are compared to
New Jersey and the rest of America. If the results would show a strong correlation between achievement and length of the school day, policy makers, administrators, and other stakeholders would consider adding instructional minutes to the school day to improve student performance, especially at the third-grade level.

**Limitation/Delimitations of the Study**

This study is a nonexperimental explanatory design study that focused only on the 2011 NJASK third-grade scores in mathematics and language arts from 2011. Therefore, the following are limitations and delimitations:

- A causal effect cannot be determined.
- The data collected comes from only one point in time.
- At the elementary school level, this study does not observe exactly how much time in minutes is spent on mathematics or LAL instruction on a given day within the length of a school day.
- The quality of classroom instruction cannot be determined or controlled for in this design.
- When the NJ ASK test is conducted, many irregularities are not reported due to the self-reporting process. This calls into question the validity of some of the scores. Tienken and Orlich (2012) illuminate the issue of Conditional Standard Error of Measurement during high-stakes testing. This study did not take this into account.

**Assumptions**

The data collected from the New Jersey Department of Education website is assumed to be accurate and valid. It publishes the scores for each school building in the Annual New Jersey Performance Reports better known as the “Report Card” (NJDOE, 2011). It is also assumed that
the students included in the collected data had only been in school for 2 years and that they were being tested for the first time.

**Definition of Terms**

The definitions used in this study are primarily obtained from the New Jersey Department of Education website issued in May 2012. The definitions have been modified to include terms in my study but mirror the same titles: school environment, student information, staff/faculty information, and student performance indicators (NJDOE, 2011a).

*Adequate (or Annual) yearly progress (AYP)*—Specifically spelled out in the NCLB mandate, this is a report in which states have to measure progress based on the targets and benchmarks that schools and/or districts must show to reach the goal of 100% in language arts and mathematics. This is done by a formula provided by the state department of education. This goal was to be reached by 2014 (NJDOE, 2011b).

*Average class size*—According the NJDOE the average class size is determined by enrollment by grade which is then divided by the total number of classrooms available for that grade. For elementary grades, the state average is calculated by the statewide total enrollment for each grade, divided by the statewide total number of classrooms in that grade (NJDOE, 2011b).

*District factor group (DFG)*—Using the data from the United States Census, the State of New Jersey ranks schools by their socioeconomic status identified as A-J with A being the lowest or poorest and J being highest or wealthiest school districts (NJDOE, 2011b).

*Every Student Succeeds Act (ESSA)*—The reauthorization of the ESEA (USDOE, 2015).

*Faculty attendance rate*—The NJDOE calculates the average daily attendance for the faculty of the school by dividing the total number of days present by the total number of days contracted for all faculty members (NJDOE, 2011b).
Faculty mobility rate—The faculty mobility is defined as the rate at which faculty members move into and move out of the school during the school year. The rate is determined by the number of faculty who entered or left employment in the school after the October 15, divided by the total number of faculty reported as of that same date (NJDOE 2011b).

Faculty and administrator credentials—The credential percentages of faculty and administrative members in the school who hold bachelor’s, master’s, or doctoral degree (NJDOE 2011b).

Length of school day—This is the amount of time a school is in session for a typical student on a normal school day (NJDOE, 2011b).

Length of school year—In a New Jersey public school, this is the number of days in the regular school year. The average number of days in most states is between 175 to 180 days (NJDOE, 2011b).

Instructional time—Instructional time is the amount of time per day in which a typical student is engaged in instructional activities under the supervision of a licensed or certified teacher (NJDOE, 2011b).

Students with disabilities—This is the percentage of students with an individualized education program or plan (IEP). This includes speech and hard of hearing, regardless of placement and programs. It is determined by dividing the total number of students with an IEP by the total enrollment in that school (NJDOE, 2011b).

Limited English proficient (LEP) students—This is synonymous with English Language Learners (ELL). This is the percentage of LEP students in the school. It is determined by dividing the total number of students who are in limited English proficient programs by the total enrollment in the school (NJDOE 2011b).
School accountability—This is the evaluation of school performance measured by students’ performance on learning standards. Due to mandates, the federal government requires that all states establish minimum standards for accountability for school level and school district in their states. Mandates outlined in NCLB, RTTP, and currently, ESSA are typical examples (NJDOE, 2011b).

Student mobility rate—The student mobility rate is the percentage of students who both entered and left the school during the school year. The student mobility rate is derived from the sum of students entering and leaving the school after the October enrollment count. It is determined by dividing the total enrollment in the school (NJDOE, 2011b).

Student attendance rate—This is reported at each grade level. It refers to percentages of students on average who are present at school each day. The student attendance rate is determined by dividing the sum of days present in each grade level by the sum of possible days present for all students in each grade. The school and state totals are calculated by the sum of days present in all applicable grade levels divided by the total possible days present for all students (NJDOE 2011b).

Student suspensions—This is the rate of suspensions in the school. It is the percentages of students who were suspended at least once during the school year. If students suspended more than one time, they are counted once. The percentages are determined by dividing the total number of students that are suspended statewide (NJDOE, 2011b).

Student expulsions—This is the percentage of students who were expelled from the school and district during the school year. The total represents the total number of students expelled statewide (NJDOE, 2011b).
Student administrator ratio—According to NJDOE, the number of students per administrator in the school is referred to as the Student Administrator Ratio. It is determined by dividing the total school enrollment in October by the number of administrators reported in fulltime equivalents (FTEs). Where a single administrator has responsibility for more than one school, the FTE may represent the administrator as less than one (NJDOE, 2011b).

Student/faculty ratio—According to the NJDOE, the Student/Faculty Ratio is the number of students per faculty member in the school. It is determined by dividing the reported October school enrollment by the combined full-time equivalents (FTEs) of classroom teachers and educational support services personnel assigned to the school as of October of the school year (NJDOE, 2011b).

Organization of the Study

Chapter 1 discusses the NJASK results and the problem of the influence of the length of school day on student achievement. The chapter gives historical background and the purpose of studying the nonexperimental study. In addition, it reviews the influence of the length of the school day and the variables that are controlled to determine the impact of each to ensure that the variance in student achievement can be explained.

Chapter II will discuss the literature review of the length of a school day and its influence on student achievement that has been conducted. It will include other factors that influence student achievement that have been studied as reported previously by the New Jersey Department of Education Report Cards.

Chapter III will discuss the design methods and the procedure for data collection. This will consist of what was discussed in Chapter I above. The data will be collected for the NJASK 2011, third-grade mathematics.
Chapter IV consists of the presentation of data analysis from data collected. It will also include the statistical findings from the analysis.

Chapter V will consist of the discussion in terms of a concise summary, the implications based on the results for the school level and district administrators, stakeholders, and policy makers. In this chapter, the researcher will arrive at the conclusion by revisiting the research question of whether the school day has influence on student achievement, whether there is relationship between the length of a school day and student achievement on NJASK third-grade MA. If so, this chapter will present the strength and impact, if any, of the influence of a school day.
CHAPTER II
LITERATURE REVIEW

Introduction

The purpose of this nonexperimental, explanatory study is to determine the strength, direction, and impact of the relationship between the length of a school day as listed on the 2011 New Jersey Report Card third-grade student performance on the NJ ASK in LAL and MA. The NJDOE determines these high stakes standardized test cut off scores as follows: partially proficient (less than 200), proficient (200–250) and advanced proficient (250–300) (NJDOE, 2011a, p. 64). The highest possible score a student can attain is 300. Any student identified as partially proficient has a score below the minimum acceptable achievement level and the school is expected to offer academic support to meet the AYP as mandated by the No Child Left Behind Act. The objective of this literature review is to identify empirical studies that have been conducted on length of a school day. The literature review will seek to examine if there was any statistical significance based on the student, faculty (teacher/staff), and school variables. This literature review will be guided by the overarching question: What is the influence of the length of school day on third-grade NJ ASK student performance in LAL and MA?

The Literature Review Research Procedures

In analyzing the literature review for this study, I followed Boote and Beile’s framework (2005). Boote and Beile (2005) recommend a 12-item scoring rubric for scholarly literature reviews. The major database sources were Proquest, ERIC (Education Resources Information Center), EBSCO host, and JSTOR. In addition, Google Scholar and Academic Search Premier were used in reviewing and obtaining the literature. I accessed online academic databases and used the following key words: teacher education attainment, instructional time, student
achievement, NJ ASK, student attendance rates, student mobility, school size, length of a school day, teacher effectiveness, teacher quality, accountability, high-stakes testing, and socioeconomic status. Teacher education attainment did not yield the desired search results. Therefore, I employed the term “teacher credentials.” I also reviewed the work cited within the body of the reviewed literature in dissertations, peer-reviewed scholarly journals and scholarly articles. The purpose of locating the various citations was to provide concrete evidence of reliability and credibility of the findings and discussion of the significance of the studies.

**Methodological Issues in Studies of Predictors**

Although numerous empirical studies were conducted on the elementary school level, only a few tackled the issue of the influence of length of school day on student achievement as measured by standards-based testing. Furthermore, of the experimental studies that were conducted, the sample sizes were not large enough to facilitate the ability to generalize to larger populations. The data analysis depended mostly on correlation coefficient results.

**Inclusion Criteria**

For the purpose of this review, the research study had to meet the following criteria to be included:

- Seminal work
- Peer reviewed journal articles, dissertations, and government reports
- Experimental, quasi-experimental, and nonexperimental with control group studies (including those conducted in other countries but published in English)
- Studies done in elementary grade levels 2 – 8
- Studies focusing on student achievement
• Published within the past 7 years

• Miscellaneous research cited in government reports

Most of the studies conducted using the nonexperimental research method did find a relationship between the variables and length of school day. However, correlational studies do not lend themselves to cause and effect results or conclusions. Therefore, experimental and quasi-experimental studies and meta-analysis were included in this review. Based on the main overarching question, the literature review will be organized as follows:

• Theoretical Framework

• The New Jersey Report Card

• High stakes standardized testing

• Teacher variables

• Student variables

• School variables

Theoretical Framework

In the quest to find the most effective way of educating students by evaluating the evidence that shows that the students have achieved at a higher level as measured by test scores, my current study is grounded in the education production theory paradigm, as researched by Coates (1998). In the era where high-stakes testing scores are weighted heavily in accountability instruments, Coates (1998) advanced the production theory, “in order to motivate a new empirical approach to the estimation of an education production function” (p. 3). For this paper, inputs (variables) that influence the output (NJ ASK 3) test scores were investigated. The inputs were explored at 3 levels as follows: School variables—school size, daily instructional time in minutes, and length of a school day; student variables—SES percentage, students with
disabilities percentage, student mobility rate, LEP students’ percentage, and student attendance rate; faculty variables—percentage of teachers/staff with advanced degrees, teacher/staff mobility, and teacher/staff attendance rate. Fredrick and Wallberg (1980) also discussed these inputs using the production input/output theory and their relationship to student achievement (output). Furthermore, Coates (1998) explained the concept of education production theory in response to the endless education reform debates where the cost of educating a child (per pupil expenditure or PPE) rises faster that the measured scores on standardized tests (p. 3).

The importance of using the production function education theory stems from the belief that education and the number of years spent in schooling is the backbone of human capital and a large indicator of economic growth. However, relevant inputs need to be measured to accurately measure the outputs. Furthermore, the production functions enable the researcher to gauge how efficiently the resources are allocated (Pritchett & Filmer, 1997). The focus of my study is the elementary school level. Hanushek & Woessmann (2012) noted that it is appropriate to use test scores as a measure of output due to the nature of the emphasis on cognitive skills in elementary schools. All inputs and their interaction with each other will be investigated and calculated to determine effects on achievement.

**The New Jersey Report Card**

**Some Background**

The NJ ASK3 is aligned to the NJCCCS (New Jersey Core Content Curriculum Standards). The main purpose of this high-stakes test is to ascertain “an early indication of the progress students were making in mastering the knowledge and skills” (NJDOE 2011c, p. 1) in LAL and MA. For this study, the NJ ASK 3 was administered between May 9 and May 12, 2011, to 101,839 enrolled students of whom 100,389 received valid scaled scores in LAL and 100,722
received valid scaled scores in Mathematics (NJDOE, 2011c). The New Jersey Department of Educations reported the students’ performance valid-scale scores, which area illustrated in Table 3.

Table 3

2011 New Jersey Assessment of Skills and Knowledge for Grade 3

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Proficient</th>
<th>Advanced proficient</th>
<th>Mean scale score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language arts literacy</td>
<td>55.8%</td>
<td>7.2%</td>
<td>205.7</td>
</tr>
<tr>
<td>Mathematics</td>
<td>40.5%</td>
<td>38.4%</td>
<td>231.6</td>
</tr>
</tbody>
</table>

(Source: (NJDOE, 2011c)

In presenting the historical context of the New Jersey Report Card, the New Jersey Department of Education (NJDOE) explained that the reliance on standard-based assessment to gauge how schools and students are performing stems from the passage of the Public School Education Act (PSEA) by the New Jersey Legislature in 1975. The Act’s objective was to ensure that every child regardless of the background from which they come, would have the same opportunity to be prepared to function in a “democratic society” (NJDOE, 2015, pp. 1–3). Elementary Grades 3 to 8 testing in reading and MA started in 1978 with the Minimum Basic Skills. After numerous amendments to, and adoptions of the revised assessments spanning more than10 years, the Elementary School Proficiency Assessment and Grade Eight Proficiency Assessment, were administered from 1997 to 2002. In 2001, High School Proficiency Assessment (HSPA) was required for graduation for all New Jersey students.

In response to the NCLB, the State of New Jersey was required by the federal government to administer standard based assessments to students in Grade 3 to Grade 8 every single year. The NJ ASK3 was developed and administered for the first time in 2003 and was
administered through the eighth grade until 2014 when the Common Core State Standards (CCSS) were adopted. To align the newly aligned standards, the Partnership of Assessment for College and Career Readiness (PARCC) standardized test was adopted and administered in the spring of 2015.

Previously, the NJ ASK was originally known as Elementary School Performance Assessment administered from third grade to seventh grade; the Grade Eight Proficiency Assessment was administered at the eighth-grade level. All the assessments, then and now, are required to be aligned with the NJCCCS and the CCSS. In issuing the data annually, the NJDOE stated that the main goal of the report is to increase both school- and district-level accountability to parents and other stakeholders. The focus of my research is to examine three main categories of predictor variables of school, student, and faculty/staff with a focus on length of school day and determine what influence they might have on third-grade student performance.

**High-Stakes Testing**

In the follow up study to their 2006 study on the relationship of high-stakes testing and student achievement, Nichols, Glass, and Berliner (2012) pointed out that the major reason for both the federal and state high-stakes testing policies was to improve school performance. The authors expanded their original study by developing a measure for high-stakes testing policy implementation, which they labeled as Accountability Pressure Rating (APR). The authors explained that most of the research on the relationship between high-stakes testing and student achievement has mixed results in terms of its effect on the school reform debate. In their Accountability Pressure Rating study, Nichols et al. (2012) sought to reexamine the relationship whether a pattern of correlation exists between APR and fourth- and eighth-grade 2005 to 2009 National Assessment for Education Progress (NAEP) reading and math scores (p. 3). By using a
method they referred to as “comparative judgments,” Nichols et al. (2012) collected qualitative data, which consisted of legislative policy enactments and implementation and then converted it to quantitative indicators for analyses. Portfolios consisting of accountability reports and policy change articles were then created. The authors utilized the aide of graduate students to select two portfolios based on their judgment to gauge the pressure the selection exerted (p. 5). The authors examined the data to find out the correlation over time; when disaggregated by student’s ethnicity, and when disaggregated by student’s socioeconomic status. To determine the correlations, the APR formula and regression analyses were run.

The results showed that, though all subgroups were found to be performing below the NAEP standard, Hispanic students, over time, outperformed African-American students (p. 16). The results also show that African-American students tend to feel more pressure as it relates to achievement. Furthermore, Nichols et al. (2012) as cited by Sammarone (2014), found that there was no correlation between APR and fourth- and eighth-grade math when the results were disaggregated by socioeconomic status (p. 16). In presenting their correlation analysis, Nichols et al. (2012) said that their results reveal that those states with a high poverty rate index tend to rely more on test-related practices that in turn exert more pressure on both the teachers and the students they teach. The results indicated that, compared to their privileged white peers, poor children tend to feel more pressure as it relates to high-stakes tests (Nichols et al., 2012 pp. 20–22).

According to Heubert and Hauser’s (1999) study of the use of high-stakes testing in policy making, “The High-Stakes term embodies both hopes and fears these tests inspire” (p. 14). The authors explained that advocates for the high-stakes testing rationalize that if teachers and students believe that something will be gained or lost through testing, they are bound to
work hard to do their best to achieve at a highest level (Heubert & Hauser, 1999). The authors also stated that opponents of the high-stakes tests argued that due to the fact that policies are based on the outcomes of the tests, students might end up being harmed by the decisions. This line of debate about relying on high-stakes testing as a form of measurement and accountability is not new. Heubert and Hauser (1999) traced this to the ESEA of 1965 in which Title 1 funding was disbursed to public schools targeting low achieving schools. The Act was reauthorized as NCLB Act of 2001 (USDOE, 2002). In 2015, this Act reauthorized and was amended yet again. The amended act is now being called the Every Student Succeeds Act (ESSA; Klein, 2015). The ESSA will still utilize high-stakes standardized tests to measure achievement. Heubert and Hauser (1999) pointed out that the high-stakes tests are subject to human error. Furthermore, Heubert and Hauser cited Tyack describing the use of standardized tests primarily due to “mass education between 1870 and 1900” (Heubert & Hauser, 1999, p. 31).

The recent debate on the performance of American students is based on the results from OECD, PISA, and Trends in International Mathematics and Science Study beginning in 2001. Darling-Hammond (2012) noted that policy makers have used OECD/PISA data to vocalize their dissatisfaction of the America’s performance and after so many policies, there seems to be no change in ranking in comparison to the scores achieved by other countries such as South Korea, Finland, and Norway. Darling-Hammond went on to argue that, in America, although there has been an increase in test scores as mandated by NCLB, results show that under the National Assessment of Educational Progress (NAEP), reading and writing scores have flat-lined. Only elementary mathematics scores show improvement (2012). Darling-Hammond (2012) has raised the question about the content PISA assesses compared to what American schools assess bearing in mind that the social composition of other countries that might influence the outcome is
markedly different (2012). Students in United States’ schools are more diverse than their peers in other countries.

Zhao (2009), citing Nichols and Berliner (2007), also argued that the American public seems to think that test scores do measure the quality of schools. Zhao (2009) argued that the test scores are based only on two subject areas of mathematics and language arts. The success of students, of the school, and indeed, of the teachers is evaluated on these subject areas. Zhao (2009) advised that multiple measures that consist of other indicators such as student’s motivation and creativity should be included in defining the success of a school. He went on to explain that measuring school performance based on test scores is too simplistic (Zhao, 2009). It is obvious that the public hardly ever take into account other factors that influence the outcomes. Research has shown that socioeconomic status, combined with other factors, is a greater achievement predictor and yet policy makers tend to overlook this fact. For example, Tienken (2013), upon reviewing test scores of Grades 4, 8, and 11, reported that there was a difference in performance among the poor and the affluent students in the State of New Jersey. The difference was primarily in scoring errors that were up to 13 scaled points among the poor (Tienken, 2013). If there are scoring errors, one must assume that the data is not reliable. This echoes Zhao’s assertion that test scores, as a measure of school performance, is too simplistic.

**Student Variables**

**Social Economic Status**

James Coleman conducted one of the most influential studies on socioeconomic status (SES) in 1966. He presented data in the Equality of Educational Report. The data sample involved 4,000 public schools and 645,000 students from American schools. The focus of the report was to examine access to quality education among minority and low-income students.
Using surveys and scores from standardized assessments, Coleman (1966) uncovered gaps in achievement especially among African American students beginning in lower grades but “progressively increased at higher grade levels” (Coleman, p. 21). At the time of the study, the schools were experiencing de facto segregation just as it is today. Although the Coleman study found disparities in the way the resources were distributed between the poor or disadvantaged schools, Coleman finds these disparities to be insignificant. However, in analyzing the findings, Coleman (1966) concluded that achievement for minority students did depend on the school they attended. He notes that the aspiration for high achievement was just as strong as other students who came from a high socioeconomic background. In this case, he stated that socioeconomic status (SES) had the greatest impact on student achievement (Coleman, 1966).

Numerous studies on the influence of socioeconomic status (SES) continue to be conducted. Aikens and Barbarin (2008) states, “SES is measured as a combination of education, income, and occupation” (p. 2). The authors describe the vicious cycle faced by children from low SES environment. The cycle begins with lack of adequate support from parents, neighborhood, and school districts. This is exacerbated by low academic performance caused by low education quality due to underfunding. Using the Early Childhood Longitudinal Study (ECLS) of kindergarten children from school year 1998 to 1999, Aikens and Barbarin (2008) found that the higher the SES, the higher the initial reading scores. This suggests that children from low SES are already behind as they enter school and accounts for persistence in reading below grade level unless necessary interventions are employed.

In conducting a meta-analysis of Review of Research on SES and academic achievement, Sirin (2005) employed analysis of variance (ANOVA) to analyze various measures that were published in literature from 1990–2000. First, Sirin (2005) stated, “one indicator for potential
social economic available to a student is parental income” (p. 419). This is because parents will
tend to move into and live in a school district with higher SES. Secondly, Sirin (2005) cites
Brooks-Gunny, Denner, and Klebanov (1995), who explained that school SES is measured by
the percentage of students who are eligible for free and/or reduced lunch. Therefore, Sirin (2005)
using Brooks-Gunny et al. research, examined three students’ characteristics to accomplish SES
measurement. The characteristics consisted of grade level, noting that the influence of SES on
student achievement varies by grade level (p. 420). In addition, Sirin (2005) examined the
students’ minority status based on research that had indicated that minorities tend to reside in
low-income households and are more likely to attend underfunded schools. Finally, Sirin (2005)
discussed school location, noting that the location is closely relation to the social and economic
conditions of that particular neighborhood (p. 420). These characteristics determined the
relationship between SES and academic achievement, and the effect size. The author concluded
that the students’ family SES had the strongest correlation to academic achievement while school
was found to have even a stronger correlation to academic achievement.

Student Attendance

In defining how attendance rate is calculated, the New Jersey Report Card stated that it is
the grade level percentage of those students, on average, that are present each school day
(NJDOE, 2011a). In a study conducted by Gottfried (2010), he examines the relationship
between student attendance and achievement by using Instrumental Variables Strategy approach.
The setting of the study was in an urban elementary and middle school in Philadelphia School
Gottried’s longitudinal study had a sample size of 86,000, K–8, in 223 elementary and middle
school students. The author’s study consisted of 332,000 student-year observations. The findings
of the study collaborated Easton and Englehard (1982), who Gottfried cites. The results found that student absences or low attendance rate did correlate negatively on reading achievement. Gottfried also states and cites (Kane 2006, Broadhurst, Patron, and May-Chanal, 2005; Rothman 2001; Alexander, Entwisle, and Horsey 1997; Gamaron, 1996) that, as students progress into higher grades with a habit of chronic absenteeism, they tend to drop out and exhibit antisocial behavior. Gottfried (2010) discussed the negative and cyclical effects that can result from chronic absenteeism such as the decline in the school quality due to lack of adequate funding. Within a community experiencing this decline, it may lead to high unemployment as the neighborhood becomes despondent. Gottfried (2010) recommends that enacting preventative attendance policies in the early years would increase attendance. In his study, Gottfried (2010) takes into account the students’ GPA and attendance. A strong relationship between these two variables was found.

Another study focusing primarily on school wide student attendance and student achievement at a building level was conducted by Roby (2003) who examined the strength and direction of the two variables on the Ohio Proficiency Tests at grades 4, 6, 9, and 12. A total of more than 3,000 students were included in the sample. In calculating the variances, the $r^2$, or coefficient of determination was used. At ninth-grade level, attendance accounted for 60% of variance in achievement. At the fourth-grade level, the variance in achievement was 32%, and at the sixth- and 12th-grade level, the variance in achievement was only 29% (Roby, 2003, p. 8). Based on these results, Roby (2003) found a strong correlation between student attendance and student achievement as students move up in grade levels.

Connolly and Olson (2012) conducted a longitudinal study that examined the attendance patterns of students enrolled in prekindergarten and kindergarten in the Baltimore City Schools.
The aim was to determine chronic absenteeism patterns in the children. The authors organized the sample they were study in 3 cohorts. In cohort 1, students had entered prekindergarten in the school year 2006–2007; cohort 2 entered kindergarten in school year 2007–2008, and cohort 3 entered prekindergarten in school year 2008–2009. To predict chronic absenteeism, suspensions, retention in grades and scoring proficient or higher on the Maryland School Assessment (MSA), logistics regressions models were performed (Connolly & Olson, 2012). To predict average daily attendance (ADA), and Stanford Achievement Test 10 (SAT IO) scale scores on the MSA, the Ordinal Least Square was performed. Finally, Heckman Model was used to check what the authors termed as “missingness” in MSA scores.

Connolly and Olson (2012) hypothesizes that students with low attendance rate are more likely to miss school at higher rates. The authors explained further that subsequently, the higher absentee rates usually lead to disruption in instruction and that causes an unfavorable learning environment (Connolly & Olson, 2012). Additionally, the chronic absenteeism rates at school level have impact on student in that they are likely to have lower scores once they get into 1st grade.

**Student Mobility**

According to Audette and Algozzine, “United States has one the highest mobility rates of all developed countries in the world” (1998, p. 31). The authors cite Kerbow (1998) and the government report (U. S. General Accounting Office, 1994), that at least one in every six students in elementary school’s third grade, have experienced transferred to at least three school changes since they entered first grade. Although these transfers are within the same school district due to a “moving up” transition, the majority of the transfers are due to family situations that warrant changing schools during the academic year (Audette & Algozzine, 1998). Studies
have shown that the transfers have a negative effect on the success of the students and the schools. Furthermore, the students who come from poor families and the already disadvantaged are greatly negatively impacted. For instance, the 1994 General Accounting Office report indicated that of the third graders who transferred school frequently, 41% were performing below the expected grade reading level in comparison to their peers nationwide with only 26% of those who had never changed schools (Audette & Algozzine, 1998, p. 31). The authors conducted a study with a sample size of 78,000 students and 4,000 teachers located in 25 largest school districts, with a focus of determining the relationship between within-district transfer and achievement in social studies and science. Data compiled over 3 years from all elementary schools were assessed. Regression analyses, which included variables of class size, socioeconomic status, income, and teacher credentials were utilized. The Pearson $r$ correlation was used to measure the strength and direction between mobility and achievement. The results indicate that the correlation was moderate with 20–30% variance accounted for in achievement and was statistically significant when compared to other variables (Audette & Algozzine, 1998).

Whether it is the phased-out NCLB Act or the newly adopted Common Core (Partnership for Common Core—PARCC) testing, the continued reliance on the use of standardized testing to measure quality and as a tool for accountability prompted Parke and Kanyongo (2012) to conduct a study which examined the influence of student mobility on achievement across ethnic backgrounds, SES, and gender. In the 2004 to 2005 academic school year, the authors studied a total of 32,000 students in Grade 1 through Grade 12 in the same school district. The sample consisted of 57% African Americans, 38% Caucasians. A combined total of 6% consisted of Asian, Hispanic, and Native American Indian. Of the total student population, 64% were eligible for free or reduced lunch (Parke and Kanyongo, 2012, p. 164). This study was targeted to the
stakeholders; especially educators in the district so they could make informed decisions to reduce student mobility, increase attendance, and to increase achievement (p. 164).

Parke and Kanyongo (2012) classified students in the study in the following four groups:

- Stable attenders—those students who remain in the school the entire academic year
- Stable nonattenders—those students who transfer at least once during the academic school year
- Mobile attenders—those students with less than 5% absence rate during the academic school year
- Mobile nonattenders—those students who are absent frequently (Parke & Kanyongo, 2012, p. 164)

In answering their research questions to find the effects of mobility on achievement, the authors employed chi-square analysis to identify whether there was significant relationship between grade level and attendance. They used factorial analysis of variance (ANOVA) to determine the interaction of variables in each of the ethnic groups categorized above. A combination of both the chi-square and ANOVA was used to examine mobility at high school building level. A two-factor analysis of covariance (ANCOVA) was run to determine the effect of student mobility on achievement while controlling for gender and socioeconomic status (Parke & Kanyongo, 2012, p. 164).

When the data at elementary school level (grades 1 through 5) were analyzed, Parke & Kanyongo (2012) found 80% of Grade 1 students were stable but the percentage had decreased to 47% by Grade 5. The results indicated that mobility was lowest in Grade 1 with only 9%. However, there was a dramatic increase to 47% by Grade 5. The results also indicated that there
was a significant relationship between grade level and attendance mobility, $\chi^2 (12, N = 11,796) = 1096.49, p < .001$, the effect size of .305 (p. 164), was moderate.

Parke and Kanyongo continued to explain that, when the middle school data were analyzed, mobility and attendance was found to be significant, $\chi^2 (6, N = 7,597) = 404.27, p < .001$, and a correlation of .231. However, as in the elementary grades, the attendance decreased from 77% to 56%, and the mobility increased from 7% to 20%. The high school mobility and attendance was also significant, $\chi^2 (9, N = 9,839) = 215.79, p < .001$. However, the correlation was weak with $r = .148$ (p. 164).

When the relationship between ethnic group and attendance-mobility was examined, Parke and Kanyonge stated further that the results indicated the relationship was significant in elementary grades $\chi^2 (6, N = 11,796) = 468.41, p < .001$, but with a correlation of $r = 199$, it was found to be low (p. 166); at the middle school level the relationship between ethnicity and attendance-mobility was significant $\chi^2 (6, N = 7,597) = 180.59, p < .001$, and a low correlation of $r = .154$ (p.166). However, Parke and Kanyongo continued, at the high school level, the relationship between ethnicity and attendance-mobility was found to be significant $\chi^2 (6, N = 9,839) = 652.20, p < .001$, and a strong correlation of $r = .257$ (p. 166).

In examining the results for their research question, “What is the impact of mobility and attendance on the mathematics achievement in Grade 8 and Grade 11 as measured by the Pennsylvania System of School Assessment (PSSA)? Are there differential effects for demographics subgroups” (Parke & Kanyongo, 2012, p. 163). On the Grade 8 PSSA mathematics achievement, the student attendance-mobility had a significant impact on the math scores ($p < .001$) and the “Tukey analysis indicated that the mean scaled score for stable attenders (1332) was significantly larger” (Parke & Kanyongo, 2012, p. 167). In addition, the
ethnicity variable had a significant impact on math scores ($p < .001$), with white students having a significantly higher score than black students (p.167). The results of the data suggest that ethnicity and low social economic status are predictors of mobility-attendance. Furthermore, blacks and other minority groups are more vulnerable to low achievement on standardized tests.

Friedmann-Krauss and Raver (2015) conducted a study on the effect of school mobility on elementary school children on math achievement. The authors explained that school mobility is the same as student mobility. Using Chicago School Project data sets, the sample consisted of 381 students who they followed for a total of 6 years until they entered the fourth grade (Friedmann-Krauss & Raver, 2015). According to the authors, their study was the first in examining the role of student mobility in elementary grades. The study aimed to “predict elementary school children’s cognitive self-regulation as a means of ‘unpacking’ the linkage between higher school mobility and lower math achievement” (Friedmann-Krauss & Raver, 2015, p. 1728). The 381 students that were followed represented 63% of the original 602 participants. In gathering the data, Friedmann-Krauss & Raver (2015) employed multiple sources each year. The Illinois Standards Achievement Test mathematics scores were the basis of the study. According to the authors, the study sought to contribute to understanding the potential disruptive role of school mobility in influencing children’s cognitive dysregulation. Friedmann-Kauss and Raver (2015) explained that the cognitive dysregulation may compromise children’s ability to learn mathematics in the school context (p. 1727). When the data was analyzed, the results showed that of the 381 students who were followed, approximately 30% had changed school two times; 45% had changed schools once, almost 10% had changed schools three times and 1% had changed schools four times. (Friedmann-Krauss & Raver, 2015). Data analysis of the mathematics test scores indicated that children who experienced frequent mobility had
greater dysregulation at third-grade level \( (b = 0.10, \ SE = 0.04, \ p = .023) \) these types of students were also predicted to have lower math skills at fourth-grade level \( (b = -43.34, \ SE = 3.56, \ p < .001; \) Friedmann-Krauss & Raver, 2015). The authors concluded that students experiencing frequent mobility were at least 8 months behind perhaps due to curriculum disruption or loss of instructional time (Friedmann-Krauss & Raver, 2015).

Thompson (2015), studied the influence of student mobility on 2011 NJ ASK fifth-grade scores. The sample consisted of 696 elementary public schools in New Jersey. The author finds that there was no statistically significance influence of student mobility on the percentage of those students who scored either proficient or advanced proficient on the NJ ASK fifth-grade language arts scores. The results also showed that there was a weak and negative statistical significant influence of student mobility on the mathematics NJ ASK fifth-grade mathematics scores (Thompson, 2015). On the other hand, Thompson (2015) finds that socioeconomic status was a strong predictor on both the NJ ASK fifth-grade language arts and mathematics scores.

**Students With Learning Disabilities**

The purpose NCLB Act at the time was to improve school performance and increase accountability as measured by high stakes standardized tests. Although high stakes standardized tests had been in use for a long time, the NCLB’s mandates went further by focusing and linking performance to funding, which in effect, can affect the ranking of the school, in terms of quality by the accountability measures that were put in place. Under the NCLB, all students are expected to show learning progress, called Adequate Yearly Progress (AYP), including students with learning disabilities while taking into the account the 2004 Individuals with Disabilities Act (IDEA).
Several studies have examined the issue of including the test scores by students with learning disabilities on the standardized high-stakes tests as long as accommodations are made as outlined in the student’s Individual Education Plan (IEP). According to Ysseldyke, Christenson, Dennison, Triezenberg, and Hawes (2003), the results have been mixed. In the study of the effect of bundled accommodation on high-stakes testing, Fletcher, Francis, O’Malley, Copeland, Caldwell, Kalinowski, Young, and Vaughn (2009) cited Elliot and Thurlow (2006) stating that this issue of allowing modifications or accommodations raises concerns on the fairness of the different assessments.

The rise in the number of requests for accommodation also raises the question that the learning disabled student has an unfair advantage over the regular student (Fletcher et al., 2009). In a study to examine the effect of multiple (bundled) accommodations, Fletcher et al. (2009) conducted an experiment using a sample of 695 students who had reading difficulties in Grade 7 from 17 middle schools located in 4 suburban areas. The participants were randomly assigned to the Texas Assessment of Knowledge and Skills experimental version of 2007 high stakes standardized tests in which 3 types of accommodations were utilized (Fletcher et al., 2009); including 2 read aloud sections and an extension of testing from the usual 1-day to 2-day test administration (Fletcher et al. 2009). In addition, this particular study was also an extension of earlier research that had been designed for Grade 3 (Fletcher et al., 2006). To evaluate the effect of these accommodations, independent of other variables of gender, ethnicity, and socioeconomic status, the authors conducted a series of chi-square tests to analyze the data. The authors state, “None of these tests were statistically significant (p > .10). The randomization procedures worked well” (Fletcher et al., 2009, p. 454). Furthermore, when the authors analyzed the pass rate data, the results showed that 68% passed using the standard administration; 84%
passed using the 1-day administration, and 85% passed using the 2-day administration (p. 460). The authors note in their discussion that the accommodations do work when they are designed for specific types of disabilities and they seem to caution against using accommodation just because it is deemed acceptable (Fletcher et al., 2009).

In another study that reviewed present research on school reform as mandated by NLCB and the 2004 IDEA Act, Katsiyannis, Zhang, and Jones (2007) clarified further that although concerns about including students with disabilities performance in high-stakes testing and the subsequent school accountability are warranted, their study found that there was a positive outcome in that there was an increase in participation in the testing (Katsiyannis et al., 2007). In addition, the authors, citing Ysseldyke et al. (2004), “there is little empirical evidence on the consequences of high-stakes tests on individual students, especially those with disabilities and preliminary or limited data on participation and performance require further validation” (Katsiyannis et al. 2007, p. 165–166).

**Students With Limited English Proficiency (or English Language Learners)**

The 2010 Census Bureau reported that in 2009, approximately 21% of children ages 5 to 17 spoke another language at home other than English (Pereira & Gentry, 2013). This group is referred to as either English Language Learners (ELL) or students with Limited English Proficiency (LEP). These children must attend school due to the compulsory attendance laws. Public schools are required to measure their learning progress using high stakes standardized tests and accountability systems in which their achievement scores are included in their individual performance and that of their school (Menken, 2010). The concern is that all content knowledge of the tests are written and administered in the English language. Therefore, the proficiency in the language has an effect on performance (Menken, 2010). Regardless of how
new the students are to the English language, the researchers question the validity of using the test score results on these tests to make major decisions such as graduation, grade promotion, and program placement (Gandara & Baca 2008; Menken, 2008; Solórzano as cited by Menken, 2010). The author stated that there is an element of language complexity in the use of the English language which causes additional challenges to the ELL student in that the vocabulary word use in the reading passages or mathematics’ word problems tend to be regional across the United States (Menken, 2010). For instance, in the mathematics section, the ELL student must decipher the meaning before she or he embarks on dealing with calculations (Menken, 2010).

Furthermore, Menken (2010) stated that the ELL student falls short of obtaining a cut-off proficient score. “The achievement gap does not mean that the ELL students are failing to acquire English or learn the course content; rather, it simply affirms that the students are indeed ELLs, and that language is posing a barrier reflected in their test performance” (Menken, 2010, p. 125).

Faculty/Staff Variables

Faculty and Administrator Credentials

The New Jersey Department of Education Report Card classifies faculty and administrator credentials as percentages of faculty and administrative members by their educational levels of bachelor’s, master’s, or doctoral degrees. The aim is to illuminate the relationship between teacher quality and student achievement (NJDOE, 2011). Although it is safe to state that administrative (school leadership) studies are extensive, the same cannot be said about the influence of teacher or subject teacher credentials on student achievement. The process of teaching or school leadership credentialing begins with certification in the content area based on a minimum number of credits from a college, and passing the Praxis test in the State of New
Jersey. There are two paths that lead to standard certification—traditional teacher preparation program and alternate route that grants a candidate a Certificate of Eligibility.

Guarino, Rathbun, and Hausken (2006) investigated the relationship between teacher qualifications and student achievement. Their study used Early Childhood Longitudinal Study-K data (ECLS-K) through the National Center for Education Statistics (USDOE, 2006). The sample data was collected during the fall to the spring, from the class of 1998–1999 kindergarten class. The sample size consisted of 22,000 in approximately 1,000 public and private kindergarten programs (p. 7). The data was divided into five categories: achievement assessment (tests of reading, mathematics, and general knowledge), student characteristics (demographic information on race, ethnicity, and socioeconomic status), teacher qualifications (level of certification, education attainment in degree terms, number of methodology courses in mathematics and reading taken), instructional practice (instructional activities and skill emphasis in reading, mathematics, science, social studies), and school characteristics (size of the school, percentage of minorities, school environment, fiscal, and organization) (pp. 7–12). The authors used hierarchical linear modeling to determine the relationship between student gains in reading and mathematics and teacher qualifications. The results of regression in all five categories showed gains beginning with effect sizes ranging from 0.07 to 0.10. There was an effect size of 0.23 regression gain in mathematics for students in the class where the teacher was fully certified (Guarino, Rathbun, and Hausken, 2006, p. 32).

Clotfelter, Ladd, and Vigdor (2007), on extending an earlier cross-sectional study on the influence of teacher credentials discussed findings in their article, “How and Why Do Teacher Credentials Matter for Student Achievement.” The authors asserted that their study did affirm the fact that teachers with strong credentials tend to teach in better and higher performing schools
that likely have advantages (Clotfelter et al., 2007). Furthermore, the study found that teacher experience and the teacher are closely linked to teacher scores. This is accomplished by using a value-added model whereby the student’s achievement in the current year is used as a function in the student’s previous year.

**Faculty Mobility**

In the study of the influence of faculty mobility on NJ HSPA, (Graziano, 2012) noted that there was no school district that was immune to faculty or staff mobility. Faculty or staff mobility may occur either within the school district or out of the district altogether. According to Graziano (2012), faculty mobility does influence student achievement. When teachers leave constantly, there is disruption in the curriculum implementation and due to loss of instructional time. This affects the learning process and subsequently affects student achievement. The author cites Johnson, Berg, and Donaldson (2005) asserting that the mobility rate in high poverty areas is approximately twice that of suburban school districts.

In a study of approximately 70 elementary schools in an urban school district, Guin (2004) examined the characteristics of the elementary schools that were experiencing chronic turnover. This study was different from other studies found on the literature on teacher mobility due to the focus on the school’s characteristics. Guin (2004) examined the impact of teacher mobility on the organization and efficient running of the school. The author argued that if a school has a teacher turnover problem, then in effect it will have a negative impact on the organization of the school, “it is likely that these schools will struggle to improve learning” (p. 2). In addition, Guin (2004) stated that the chronic high rate of turnover does affect morale and leads to disintegration of cohesiveness. In analyzing the results of the study, teacher turnover had a negative influence on student achievement. Guin (2004) concluded that there was negative
In one of the most current research studies on teacher mobility, Allensworth (2009) researched why teachers leave in the Chicago Public Schools (CPS). Allensworth stated that mobility is normal because where conflict exists, it is reduced. However, constant and persistent high rates of turnover tend to be disruptive to the teaching and learning process (p.1). In referring to the CPS, the authors assert that chronic turnover or mobility is a source of concern because this issue occurs in schools where the composition of the student body is much more disproportionately made up of low-income students and predominantly African Americans (Allensworth, 2009). In addition, their results showed that the revolving door of teachers tends to be in the first three years of the teachers’ entrance into the profession (Allensworth, 2009).

In reaffirming earlier studies on the effect of teacher mobility on student achievement, Ronfeldt, Loeb, and Wykoff (2013) used regression models to examine correlation between student Mathematics and English Language Arts (ELA) Literacy test scores. Included in the study were variables of student, class, and teacher characteristics. For this study, the authors utilized a sample data of 670,000 observations fourth- and fifth-grade students in all New York City elementary schools. This longitudinal study, which spanned 8 academic years starting from 2001–2002, then from 2005 to 2015, focused on “measuring school-by-grade level turnover” (p.9). The authors developed regression models to run the effects of teacher turnover on student achievement in that school and in what specific academic year (p.13). In analyzing the data, Ronfeldt et al. state, “We were able to link in math, ELA, to student, class, school, and teacher characteristics” (p. 9). Based on the results of the regression models, the authors concluded that turnover does have harmful effects on student achievement.
Teacher/Staff Attendance

Researchers studying the teacher attendance rates have stated that the percentage of teachers being absent in an academic year seems to be low as compared to other schools in other countries. In fact, Clotfelter, Ladd, and Vigdor (2007) stated that absenteeism in American schools is not as endemic as some developing countries such as Kenya and India experience (Clotfelter et al., 2007). However, compared to other professions in American business organizations, teacher absences are excessive. The authors noted that studies have reported that in public and private sector, absenteeism stood a 2.5% and 1.7% respectively. Using datasets from North Carolina schools, the authors assert that the aim of their study was to explore consequences of the absenteeism and its effect on student achievement; the frequency, incidence, and effect (Clotfelter et al., 2007). The results showed that those students whose teacher was absent an additional 10 days had seen a drop of 2.3% standard deviation in math and 1.0% standard deviation in reading.

A quantitative research study using descriptive statistics by Brown and Arnell (2012) was conducted in one of Alabama’s Title 1 schools. The study spanned from 2006–2009, with a sample of 560 students in grades 3, 4, and 6. The school’s student body has over 83% receiving free or reduced lunch. By the end of the study the author’s state, “This increased to 89.3%, which is an indicator of poverty in this particular area” (Brown & Arnell, 2012, p. 178). The study illustrated that additional absences in a school year has an impact on proficiency levels. Brown & Arnell (2012) examined spreadsheet tables comparing student performance for third grade on the Stanford Achievement Test (SAT 10) and revealed that in the 2006–2007 academic year, 15.3 teacher absent days resulted in 75.8% of student as being proficient in reading and 77.8% in math. The result indicated that 70% achieved a proficient level. In the school year 2007–2008,
the teacher absent days increase to 19.5 resulting in a drop to 39.4% proficient in reading and 42.76% in math (Brown & Arnell, 2012). In comparing grades 3 through 6, the data showed that the higher the teacher absences, the lower the proficient scores the students achieved. The researchers recommend that teachers should limit their absences to 10 days or less to improve student achievement (Brown & Arnell, 2012). The findings of this study also affirm similar studies that teacher absences occur disproportionately in low-income or minority-dominated schools.

School Variables

School Size

Following the publication of A Nation at Risk report in 1983, one of the most common strategies for improving school in the early 1990s was to restructure the larger schools into smaller units (Tanner and Tanner, 2007). The goal of this structural change was to reduce anonymity of a large school that was perceived at that time as being prevalent. The policy makers assert that, “smaller schools would service the student better by giving them personal attention” (Tanner and Tanner, 2007, p. 456). Various studies indicate that smaller school is better and leads to high achievement (Grauer, 2012). Grauer cites Nathan and Thao’s (2007) study in which they reported that one high school in Ohio saw graduation rates improve from 51% to 79% when larger schools were broken up into smaller schools. The classification of the size of the school is based on total enrollment in the building. To be classified as a small school the population is between 300 and 400, a medium sized school has a population of about 400 to 600, and a large school has a population of over 600. Researchers seem to be flexible about what constitutes a small or large size school. Slate and Jones (2005) in the review of literature of school size studies, recommend that the terms “small school” and “large school” should not be
used at all because these terms are ambiguous and that they add to the confusion of the understanding of the effect of school size on achievement. The authors also cite Johnston and Pennypacker (1993) who asserts that earlier school size studies showed some form of bias due to the nature of the methodology designs. According to Johnston and Pennypacker (1993), most early studies used advocacy research design. This was problematic because it was evident that the researchers were not objective and their findings were either rendering their support for small schools or large schools. The data analysis interpretation was slanted towards the side that they were supporting. Friedkin and Necochea (1988) studied the effect of school size on performance using a theory they termed “contingency” perspective. The authors discuss mechanisms through which size can influence performance or have either negative or positive effects. In their study they examined the California Assessment Performance scores that were administered during the 1983 to 1984 school cycle in Grade 3 ($n = 4,337$), Grade 6 ($n = 3,865$), Grade 8 ($n = 1,577$), and Grade 12 ($n = 832$) levels. The authors explained the positive mechanisms, as the opportunities the school size had in utilizing the economies of scale in acquiring and disbursing its resources efficiently. They also explained further that negative mechanisms refer to the constraints of school size (Friedkin & Necochea, 1988). An example given is conflict among teachers, staff members, or students and frequent incidents of negative student behaviors. In analyzing the summary of their findings, Friedkin and Necochea (1988) data showed strong correlation in school level scores for Language Arts and Mathematics. However, when using multiple linear regression in examining the effect size, Friedkin and Necochea (1988), report that a weak correlation exists between size and performance at third-, sixth-, and eight-grade levels ranging from -.198 to -.33. At the 12th-grade level, a positive correlation of .149 was found, meaning that the larger the high school, the better the school’s performance.
Numerous studies have found that school size and performance is influenced by other variables. Different studies focus on different variables they include in determining which one makes an impact on performance. Howley & Howley (2004) contributed to the school size literature with the Matthew project in which they examined the effect size when they studied school size and the effect of social economic status (SES). Their study was conducted in 4 states of Montana, Georgia, Ohio, and Texas. Because every school in each state was included, the sample size was substantial enough to generalize. The discussion focused on measuring equity and excellence as it relates to school size. The findings in the Howley & Howley (2004) study suggest that, other than Montana whose schools are small, each state varies in excellence and equity depending on the grade level tested. In schools located in impoverished areas, Howley & Howley (2004) argued that there is a positive relationship between achievement and social economic status if they are larger. The authors concluded that because only wealthier communities fare better in achievement when schools are larger, the focus should be on having small schools in areas where there predominantly low-income or minority students to improve achievement.

**Instructional time**

One of the recommendations made in the *A Nation at Risk* report was to increase learning time. In addition, policymakers have rationalized that America is lagging behind their counterparts in other developed countries in performance because the learning time is shorter. In reviewing studies conducted on this topic, Aronson, Zimmerman, and Carlos (1999) stated that this was only a perception by policy makers. The authors asserted that the instructional time studies, although numerous, have had their own limitations in that they rely heavily on correlation method design. They argue that there is a lack of a control group that the
experimental method design would present a stronger impact. In the course of synthesizing the body of research literature that existed at the time, Aronson, Zimmerman, and Carlos (1999) discussed three categories of time in school and learning. The first is the allocated time, which is a school year, second is engaged time, which is when a student is engaged in learning; the third is the academic learning time, when a student and teacher report to a classroom for a specific subject. The allocated time category is classified into instructional time and noninstructional time (Aronson et al. 1999, p. 2). The instructional time is devoted to core academic subjects and electives during the school day. On the other hand, noninstructional time consists of nonlearning activities such as lunch and recess (Aronson et al. 1999). The authors caution that in academic learning time, a student who already knows the material but is reviewing it should not be included in the academic learning time category because he is not learning anything. Furthermore, the authors argue that the issue is not adding more time but rather, more efficient use of time is crucial to improving achievement (Aronson et al. 1999).

Stemming from chronic low student performance in the Chicago Public Schools system, Smith (2000) studied how instructional time was being utilized. Smith (2000) explained that time was only one factor that influences achievement, among others such as high-stakes testing and special events that interrupt normal learning time (Smith, 2000, p. 659). The author asserts that in a school organization, instructional time is a very important and powerful function. In his seminal work on the model of school learning theory, Carroll (1963) emphasized the actual time spent on that particular task and the learning rate of each individual. Smith (2000), cites other researchers such as Gamoran (1987), and Lee & Smith (1997) who argue that learning time theory, especially at the elementary school level, suggest that the results correlate with student achievement. Furthermore, Smith (2000) cites Elicker & Mathur (1997) whose results in
elementary school’s disadvantaged students showed improvement in child development.

According to Smith (2000), the need to study instructional time can reveal how much time is spent on learning and that evidence shows that the “largest and most powerful relationships between instructional time and learning are found in schools and classrooms serving disadvantaged and low-performing students” (Smith, 2000, p. 655). In her recommendation for expanded time for students, Smith (2000) suggests that students do not need to be in contact with the same teacher and neither would they be required to stay longer each day.

Because most policy makers in the America use OECD/PISA data to measure how the students are performing in comparison to their peers, a study on the effect of instructional time on math, science, and reading achievement was conducted by Lavy (2009). Lavy’s (2009) sample was from the 2006 PISA data of more than 400,000 students from 57 countries. PISA measures skills and knowledge of 15-year olds. The comparison data source consisted of longitudinal study of fifth to eighth graders in Israel. The results showed that “instructional time has a positive and significant effect on academic achievement of pupils and that the effect size was modest to large” (Lavy, 2009, p. 4). He explained further that, “On average an increase of one hour of instruction per week in math, science, or reading raises the test score in these subjects by 0.15 of standard deviation of within student distribution of test scores” (Lavy, 2009, p. 4).

**Length of School Day**

Kate Walsh (2007), publishing findings on the study of length of a school day in her article *Time in School: Opportunity to Learn*, the author urges schools that were seeking to adjust the use of time in school to examine the student school day rather than the length of the instructional day. The author used data consisting grades K–5 in 50 largest school districts.
Walsh (2007) compared those schools with shortest school days and those with longest school days. The author stated that the schools with shortest days had 41 days less in school in a single year, and of one less year of school for every 4½ school years (p. 79). Walsh (2007) finds that the variance was explained by the length of the school day.

When Chicago Public Schools and New York City Public Schools were compared, the results indicated that Chicago schools had the shortest day and with 1001 hours of instruction in a year (Walsh, 2007). On the other hand, New York schools had the longest day with 1271 hours of instruction in a year (Walsh, 2007). The focus of Walsh’s study was on explaining length of school day as opportunity to learn rather than the measure of learning.

Caldwell, Huitt, and Graeber (1982) stated that, although the average school day was approximately 5 hours per day, variations were found even within the same school district. The authors cited Harris et al. (1968), whose study of the length of school day on Grades 1 and 2 reading assessment scores showed a positively correlation with student achievement. Caldwell et al. (1982) noted that the length of a school day presented a constraint on students’ opportunity to learn.

The recommendations that were made on the two crucial seminal reports on the state of American education, A Nation at Risk (1983) and Prisoners of Time (1994), were to restructure the school calendar so that the students spend more time in school. The policy makers believe that this is the most effective turnaround and reform strategy that would increase performance that persistently occur in low performing schools. For this reason, Kolbe, Patridge, and O’Reilly (2012) analyzed data on extended learning time from the 2007–2008 Federal Schools and Staffing Survey (SASS) to examine length of school day. In the study, the authors define a school with 7 or more hours per day as a longer or extended school day. To discuss trends
overtime, the authors incorporated 1999–2000 and 2004 data in the study. Kolbe et al. (2012) found the average school day in a traditional public school was 6 hours 45 minutes. However, they also found that the average school day in elementary schools was shorter, clocking 6 hours and 36 minutes. The authors caution that the use of average is misleading and opted to use median, which was found to be above the national average (Kolbe et al., 2012). In analyzing the data, the authors compared traditional public, charter, and private schools to determine any variation of time across these school sectors (Kolbe et al., 2012). In studying the data on how schools use time on activities related to learning and achievement, they focused on three main points:

- Average amounts of time children spend in school, and the differences among students enrolled in traditional public, private, and charter schools;
- The extent to which schools have added more time to their school year and day, and which schools are more or less likely to do so; and
- Differences among schools in the use of time during the school day. (Kolbe et al., 2012, p. 2).

In discussing the structure of a typical school year and a school day, Kolbe et al. (2012) finds that there has not been much change in the number of the days in the school calendar. Typically, schools in America begin in the fall and end in the early summer, which is a span of 9 to 10 months. The authors assert that the majority of the traditional public schools, at least 86%, have longer than the average school day (Kolbe et al., 2012). When compared to charter schools, the charter schools’ school day was 15 minutes longer. The authors argue that over a period of 10 years, the charter schools had a longer school day compared to the traditional public schools. Although state policies have established minimum requirements for time they expect students to
spend in school, the authors assert that districts and schools have the flexibility in adding either minutes to the school day or days to a week or school year of 180 days or more (Kolbe et al., 2012). Further examination of the data revealed that only 8.5% traditional public schools had adopted 181–183 school days, 5% had 184–185 school days, and only 3% had 186 days in their school calendar. In comparing the charter schools’ calendar, the authors found that 24% had longer than 180 days, 10% had more than 187 days (Kolbe et al., 2012).

In one of the most recent studies on this issue, Sammarone (2014) conducted a cross-sectional, correlation, explanatory study on the influence of school day length on the total percentage of students who scored Proficient and Advance Proficient on the NJ ASK 2011 LAL and MA in Grades 6, 7 and 8. The sample included more than 650 public schools in the State of New Jersey. Sammarone’s (2014) sample consisted of the following:

- Grade 6 LA (n = 786) MA (n = 786)
- Grade 7 LA (n = 644) MA (n = 653)
- Grade 8 LA (n = 645) MA (n = 640) (Sammarone, 2014)

The author categorized the school day as follows: Short School Day, 6 hours 24 minutes, Mean School Day, 6 hours 37 minutes; Long School Day, 6 hours 52 minutes (Sammarone, 2014, p. 92). The author’s study controlled for school, faculty, and student variables. To determine the strength and direction of relationship of the predictor variables, Sammarone (2014) used hierarchical regression models and ran two- and one-way ANOVA at each grade level and subject test area. The author used the ANOVA to obtain which variable had the strongest statistical significance. In analyzing the Grade 6 NJ ASK scores, Sammarone (2014) found that there was statistical significance difference in passing percentages between short and mean school day lengths. The author explained further that there was statistical difference between
short and long school days. Sammarone (2014) stated that no statistical significant difference was found between mean and long school days. In addition, the author found that the passing percentage for short school day was 7.5 percentage points lower than mean day and 4 percentage points lower than long school day (Sammarone, 2014, p. 140).

According to Sammarone (2014), the gain in percentage of Proficient and Advanced Proficient was an increase from short school day to mean school day rather than an increase to long school day. In analyzing the results at Grade 7 math level, Sammarone (2014) stated that the passing percentage for schools with short school day category, was 6.3 percentage points lower than the mean school day category; and that the mean school day passing percentage was 4.9 points lower than that of long school day category.

Sammarone (2014) employed a Post Hoc testing to compare the passing percentages in NJ ASK 8 grade language arts and found a statistical significant difference of a gain of 5.5 points for short school day and mean school day; and a gain of 8.6 points from short school day to long school day. In addition, a gain of 3.1 resulted from mean school day to long school day.

Sammarone (2014) concluded that based on the regression models used in the study, (Sammarone, 2014) the language arts model predictors were higher than the MA models. When the variables in each model were analyzed, the author found that the socioeconomic status (SES) was the strongest influence on the dependent variable (Sammarone, 2014). The author stated that although the school day length was statistically significant, the r squared was “consistently small, ranging from 0.2% to 1.2%. This illustrated the length of school day has minimal influence on the NJ ASK passing percentage rates in grade 6, 7, and 8” (Sammarone, 2014, p. 258).

deAngelis (2014) studied the influence of length of a school day at the high school level. The author examined the influence of a school day on Grade 11 NJ HSPA. The HSPA is a high
school exit examination administered annually in Grade 11, a year before the students graduate in Grade 12. If they do not pass, students are unable to obtain their high school diploma. The study consisted of 326 public schools in the State of New Jersey (deAngelis, 2014). The researcher used hierarchical regression models to determine the relationship of extended school day and student achievement while controlling for student variables, school variables, and faculty variables (deAngelis, 2014). The author employed a HSD Tukey post hoc test to determine whether significant differences exist between the variables. The results showed that socioeconomic status has the greatest influence on the length of school day on both mathematics and language arts Grade 11 HSPA scores (deAngelis, 2014). Furthermore, the author found that the length of a school day had a minimal effect on the HSPA achievement scores (deAngelis, 2014).

Using a longitudinal, quasi-experimental design method with comparative interrupted time series approach, Checkoway, Gamse, Velez, and Linkow (2013) conducted a study that evaluated the implementation and outcomes of the Extended Learning Time (ELT) in the State of Massachusetts. The Extended Learning Time initiative allowed participating schools to focus on improving student outcomes and improving instruction by lengthening the school day or school year. The sample consisted of 24 elementary, middle, and K–8 ELT-funded schools. Due to the type of design method, the authors included 25 matched comparison schools (Checkoway et al., 2013). The authors collected data annually during spring. The data was collected by site visits and attitude and perception surveys (Checkoway et al., 2013). The authors explain, “The use of interrupted time series, use of matched comparison schools and statistical controls, and rigorous model specification taken together are capable of yielding credible and robust estimates of program impacts” (Checkoway et al., 2013, p. A-3). The authors’ goal of the study was to
understand school level ELT implementation and to explore the direction and relationship between implementation and outcomes (p. A-3). Regarding the issue of implementation, the result showed that even though ELT schools implemented the core elements, variations in key components existed across all schools. In addition, the authors stated that measuring different aspects of how time was used was challenging because it was not consistent across the ELT schools.

When Checkoway et al. (2013) analyzed the outcomes’ data and found that teachers and students in ELT schools reported that they experienced fatigue. The results also showed that there was no statistically significant difference of the effects of ELT in the first 3 years of implementation. However, in year 4 of implementation, the fifth graders in the ELT schools outperformed their peers in comparative schools on the science test (Checkoway et al., 2013). The authors concluded that using the descriptive analysis revealed no clear relationship between the ELT and student achievement (Checkowa et al, 2013).

Marcotte and Hansen (2010) compared the effect of having a long academic school year and a shortened school year due to unscheduled school closings. The authors noted and discussed the role and effect of the length of a school day in the accountability system in the wake of NCLB. The authors pointed out that in American schools, little variation in the length of a school year, which has an average of 180 instructional days (Marcotte & Hansen, 2010). Their earlier study examined the effect of weather-related school closing primarily due to snow, on third-, fifth-, and eighth-grade mathematics assessments (Hansen, 2008; Marcotte, 2007). The results indicate that student proficiency test scores dropped by at least 1 to 2 percentage points (Marcotte & Hansen, 2010, p. 55). Researchers concluded that increasing instructional time does increase student achievement. The challenge for policy makers and school administrators is
whether to extend the school day or extend the school year. Rather than lengthening an academic school year, the authors suggest lengthening school days similar to the one adopted by the State of Massachusetts 2020 initiative (p. 55). The Massachusetts 2020 was launched in 2006 consisting of 10 schools in 5 districts that focused on redesigning the schedule. The extended learning time was increased by 300 hours. By the fall of 2015, Massachusetts’s schools signed a contract to extend learning time. The policy makers pointed out that this initiative will only be successful with effective quality teaching and focus on student achievement (www.Mass2020.org, 2010, p. 3).

A follow up study using data obtained from Schools and Staffing Survey through the National Center on Education Statistics (NCES), Farbman, Kolbe, and Steele (2015) examined data from 1999–2000, 2003–2004, 2007–2008, 2011–2012, Schools and Staffing Survey in which they identified and examined input functions for their report. The authors examined the data that focused on schools with extended days and academic years, year round schools, and time spent on instruction (Farbman et al., 2015). Quoting a 1994 National Center on Time and Learning (NCTL) report that states, “Unacknowledged design flaw in American education will frustrate our aspirations” (Farbman et al., 2015). In their data analysis of the Schools and Staffing Survey responses, Farbman et al. (2015) find that there has been only minimal change in scheduling of the start and end of the day, and end of the school year since the 2012 analysis of the Schools and Staffing Survey data conducted by Kolbe et al. The authors pointed out that the actual instructional days in an academic year have remained the same (Farbman et al., 2015). The authors explained that their findings indicate that longer school days were more prevalent in areas that are predominantly minority and low income and that the longer school days allow students more learning opportunities in the classroom and nonacademic programs. Farbman et al.
(2015) concluded that questions still arise on the effect of a longer school day on student achievement.

**Chapter Summary**

For this present study, the focus was to explore how student, faculty and school fixed factors influences percentage of proficient and advanced proficient ratings on the third-grade MA and LAL sections of the 2011 NJ ASK. The examination of each one separately might lead to misinterpretation. Therefore, investigating how the factors interact with each other can enable educators to understand how student achievement can be realized.

Results of research of student attendance indicate that there is a negative effect on achievement. Morrissey, Hutchison and Winsler (2014) concluded that chronic absenteeism at an early age grew negatively in magnitude, as the children grew older. In addition, absenteeism affects the learning environment unfavorably.

Research also shows that those students who are not mobile and attend school regularly tend to perform better in school. Therefore, a positive correlation between student achievement and good attendance and nonmobility exists, as noted by Thompson (Thompson, 2015).

At the elementary school level, there is little variation in instructional time especially in New Jersey. Little research exists on the quality of instructional time and how it might influence student achievement due to the inclusion of interruptions for various reasons. The student mobility study conducted by Thompson (2015) reiterated that NJ ASK 5 scores may or may not be directly influenced by instructional time (p. 43). Therefore, the results on extended school day research by adding instructional time, have been mixed.

Teacher credentials, teacher mobility, and teacher attendance rates influence student achievement. The results of most of the research reveal that when credentials and teacher quality
are combined, students tend to increase academic performance. However, teacher mobility tends to harm students’ achievement due to disruption in curriculum delivery and lack of continuity. This affects students in predominantly low-income areas or predominantly minority students.

The accountability system in measuring student achievement and the subsequent punishment that goes with it in pre- and post-NCLB has been the reliance on high-stakes testing. Most of the research indicates a high correlation between SES and how well students are able to perform on standardized tests. The APR (Accountability Pressure Rating), developed by Nichols et al. (2012) indicates that minorities, especially African American, feel as much pressure as the teachers who teach them.

Although there has been more research conducted on the length of a school day than at the secondary school level, results have been mixed. Turnamian (2012) notes that the SES of a student is a much stronger predictor on student achievement. The reviewed extant literature, however does not provide empirical evidence at elementary school level that is generalized to the NJ ASK3 standardized test results. This study will aim to explore all relevant predictors and their effect on achievement.
CHAPTER III
METHODOLOGY

Introduction and Research Design

The purpose of my study was to explain and determine the relationship between the length of the school day and student achievement on the high-stakes standardized NJ ASK 2011 third-grade LAL and MA scores. The results of this study will assist administrators and any other stakeholders in K–12 schools in making research-based informed decisions to increase student achievement in an era of high stakes standardized tests. Although the NCLB legislation as of 2015 has been reauthorized and renamed Every Student Succeeds Act (ESSA) and the PARCC assessments replaced NJ ASK starting in the 2013–2014 school year, length of the school day and its influence on student achievement needs to be explored at the elementary school level to fill the gaps in the body of literature that currently exists.

My study utilized a nonexperimental, explanatory, cross-sectional design using quantitative methods. I downloaded the NJ DOE Report Card 2010–2011 dataset and examined variables listed on the spreadsheet (NJDOE, 2011c). According to Belli (2008) a researcher using a nonexperimental, explanatory research design cannot manipulate variables but rather, studies them because they are attributes. She states “the goal of the nonexperimental, explanatory research design is to explore potentially causal relationships” (Belli, 2008, p. 71). She further stated that the variables are measured in some way.

When I conducted this study, the emphasis was on utilizing nonexperimental, explanatory research design and employing hierarchical regression models to examine the influence and impact of predictor variables listed on the NJ DOE 2010–2011 Report Card on the dependent variable, NJ ASK Grade 3 2011 LAL and MA overall proficiency ratings by school. The
multiple regression models (MRM) were used to determine which specific variables have statistically significant influence on student achievement. The following variables were included in the models: School (instructional time, school size, and length of school day); student (mobility rate, attendance rate, social economic status, percentage of special needs students, and percentage of English Learners students); faculty/staff (mobility rate, attendance rate, and advanced degrees; NJDOE, 2011). According to Creswell (2009), the correlational design method is used when a researcher seeks to explore to which extent a variable can co-vary. This type of method compares two or more variables that are collected at one point in time (Creswell, 2009, p.146). Cresswell (2009) further explained that the collected data involves participants from one single group using correctional statistical tests and draws conclusions based on the result. As the definition of correlational study suggests, the data was from one point in time, NJ ASK Grade 3 2011 LAL and MA results. The unit of study is at the school level.

**Research Questions**

RQ 1. What is the influence of length of school day on the percentage of Proficient and Advanced Proficient students on third-grade standardized assessment in MA measured by the NJ ASK in the 2010–2011 academic year when controlling for school, student, and faculty/staff variables?

RQ 2. What is the influence of length of school day on the percentage of Proficient and Advanced Proficient students on third-grade standardized assessment in LAL measured by the NJ ASK in the 2010–2011 academic year when controlling for school, student, and faculty/staff variables?
Null Hypothesis

H1. There is no statistically significant relationship between the 2011 NJ ASK 3 percentage of students scoring Proficient and Advance Proficient in LAL and length of school day when controlling for school, student, and faculty/staff variables.

H2. There is no statistically significant relationship between the 2011 NJ ASK 3 percentage of students scoring Proficient and Advance Proficient in MA and length of school day when controlling for school, student, and faculty/staff variables.

Sample Population and Data Source

For this explanatory correlational study, school was the unit of analysis. Using the data retrieved from the New Jersey School Report Card results of the NJ ASK 3 that was administered to 776 elementary public schools in the spring of 2011 (NJDOE, 2011). The present study excluded the following from the sample:

- Parochial schools
- Special Education Commission Schools
- Charter Schools
- Magnet Schools
- K–8 schools
The sample included the schools that met the following criteria:

- The school building included 3rd grade
- Classified as a public elementary school
- A Pre-K–3, K–5 elementary school

Data Collection

For the present study, data was retrieved from the New Jersey Department of Education (NJ DOE) website. The data was downloaded from the 2011 School Report card and saved in Microsoft Excel spreadsheet data file. The NJ DOE arranges the data by county, district, and school codes (NJDOE, 2011). The downloaded data file was guided by county, district, and school codes were consolidated to create a unique identification code. The data was custom sorted to exclude data that did not meet the sample criteria—magnet, charter, alternative, or high schools. Any schools that did not report data or reported partial data were excluded. The cleaned and formatted data was imported into IBM SPSS statistical software package. Using the NJDOE’s District Factor Group classification, the schools were examined and categorized by the same criteria (NJDOE, 2011c).

The data retrieved from the NJ DOE Excel spreadsheet consisted of the variables shown in Table 4.
Table 4

*Description of Downloaded Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Variable measurement type</th>
</tr>
</thead>
<tbody>
<tr>
<td>County Name</td>
<td>The NJ DOE lists all 21 counties on its website. Each county has its own Office of Education</td>
<td>Categorical/Script</td>
</tr>
<tr>
<td>School District Name</td>
<td>Within each county, there are school districts identified by a district code</td>
<td>Categorical/Script</td>
</tr>
<tr>
<td>School Name</td>
<td>Name of each building in the district</td>
<td>Categorical/Script</td>
</tr>
<tr>
<td>School Type</td>
<td>The configuration of a school. From Pre-K to 12, by building</td>
<td>Categorical/Script</td>
</tr>
<tr>
<td>Demographic Factor Group (DFG)</td>
<td>An indicator of socioeconomic status of the citizens residing in that district</td>
<td>Categorical/Nominal (A = 1; J = 8)</td>
</tr>
<tr>
<td>Length of School Day (by minutes)</td>
<td>The length of school day as reported by the school district. The average is approximately 330 minutes per day</td>
<td>Scale/Total minutes per day</td>
</tr>
<tr>
<td>Student Mobility</td>
<td>When students change schools within the school district or out of the school district. This must be reported to the NJDOE’s NJ Smart data base with a cut-off date of October 15 each year</td>
<td>Scale/Percentage of total school population</td>
</tr>
<tr>
<td>Student Attendance</td>
<td>Total students present in school on a normal school day within the academic calendar</td>
<td>Scale/Percentage of total absent</td>
</tr>
<tr>
<td>Faculty Attendance</td>
<td>Total teachers present in school on a normal school day</td>
<td>Scale/Percentage of total absent</td>
</tr>
<tr>
<td>Variable</td>
<td>Definition</td>
<td>Variable measurement type</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>Faculty Mobility</td>
<td>The number of teachers who leave the school building within the school building or leave the district all together</td>
<td>Scale/Percentage of total school population</td>
</tr>
<tr>
<td>Faculty with Master’s Degree or Higher</td>
<td>The number of teachers with degrees beyond bachelors’ degree</td>
<td>Scale/Percentage of total school population</td>
</tr>
<tr>
<td>School Enrollment</td>
<td>Total enrollment within the building.</td>
<td>Scale/Total number of students enrolled</td>
</tr>
<tr>
<td>Percentage of Students on Free or Reduced Lunch</td>
<td>This is a percentage of disadvantaged students (low income)</td>
<td>Scale/Percentage of total school economically disadvantaged</td>
</tr>
<tr>
<td>Percentage of Students with Limited English Proficiency</td>
<td>Percentage of Student whose first language (in the household) is not English</td>
<td>Scale/Percentage of total school LEP</td>
</tr>
<tr>
<td>Percentage of Students with Disabilities</td>
<td>Percentage of Students with learning disabilities or physical limitations that are subject to special accommodations (IEP)</td>
<td>Scale/Percentage of total school receiving special education services</td>
</tr>
</tbody>
</table>
To ensure accurate scores for each reporting school, percentages of students who scored proficient (TPAP) and advanced proficient test scores were entered manually in worksheets and corresponding workbooks.

Using the information gathered by the 2010 Census, New Jersey classifies and categorizes public schools by District Factor Group (DFG). The DFG is based, in part, on socioeconomic status of the population within that school district. In addition to the scores, length of school day and other relevant data noted in Table 5, the New Jersey Report Card publishes the DFG to which a particular school belongs. According to the classification, school districts identified as “A,” have a substantial population of economically disadvantaged residents while school districts identified as “J” consist mainly affluent or wealthy residents (NJDOE, 2011c).

Table 5

<table>
<thead>
<tr>
<th>DFG</th>
<th>Number of elementary schools in the group</th>
<th>DFG</th>
<th>Number of elementary schools in the group</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>104</td>
<td>DE</td>
<td>97</td>
</tr>
<tr>
<td>B</td>
<td>76</td>
<td>FG</td>
<td>117</td>
</tr>
<tr>
<td>CD</td>
<td>68</td>
<td>GH</td>
<td>130</td>
</tr>
<tr>
<td>I</td>
<td>152</td>
<td>J</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>776</td>
</tr>
</tbody>
</table>

Data Analysis

Michel (2004) notes that the use of multiple regression technique allows a researcher to determine the best predictor of an outcome variable which in this case would be student performance on the 2011 NJ ASK 3. As indicated above, the purpose of the present study is to determine the influence of length of school day on the NJ ASK 3 language arts and math test
scores and overall school student attendance. I sought to establish a relationship rather than to
determine any causation. Therefore, simultaneous multiple-regression and hierarchical multiple
regression were used to perform analysis of the NJ ASK 3 2011 Report Card data (NJDOE,
2011d). The results from the simultaneous multiple regression were analyzed further using
hierarchical multiple regression analysis. The utilization of hierarchical multiple regression
allows more than one predictor variable (independent variables) to determine the relationship
with dependent variable (NJ ASK 3 scores). Hoyt, Leierer, and Millington (2006) explained that
simultaneous regression has the ability of producing needed information from the included
variables. The authors pointed out,

> Correlations among predictor variables are the rule in nonexperimental research, the
interpretation of regression coefficient (B) is relative to other predictors included in the
regression equation; variables that are significant predictors of the dependent variable in
one analysis may become nonsignificant in subsequent analyses if additional, overlapping
predictor variables are added. (Hoyt et al., 2006 p. 225)

Onwuegbuzie and Daniel (2003) caution that multiple regression relies on the use of stepwise
method, which is susceptible to Type I errors. This is because stepwise regression method uses
entry and removal of variables of backwards and forwards. The authors strongly recommend the
use of hierarchical regression models. I followed the standard multiple regression models by
entering simultaneously all variables in the regression equation to evaluate the impact on the
dependent variable. The variables entered had to have a statistical significance of $p < 0.05$. Any
variables that yielded statistical insignificant results were removed from the model. The sample
size in this study consisted of 776 schools (see Table 5). I used Field’s formula to calculate the
predictive power of the variables to determine how statistically significant the contribution was to
the dependent variable. The result I sought was the effect size as close to zero as possible and
represented by $R$. The formula is as follows: $K/(n – 1)$, where $k$ is the number of independent
variables in the study, \( n \) is the sample size included in the study (Field, 2009, p. 222). The calculation is as follows: \( 10/(776 – 1) = 0.012 \). The result means the expected \( R = 0.01 \).

Pallant (2010) recommends that when using SPSS, a procedure be in place for evaluating output resulting from the simultaneous multiple-regression analyses of variables. I followed the procedure of configuring the SPSS to yield output to enable analyzing descriptive statistics tables, correlation tables, model summary, and ANOVA tables. The importance of starting with descriptive statistics provides the mean and standard deviations for variables. The correlational tables provide results that show the relationship between independent variables and the dependent variables. To test the null hypothesis for each question, the ANOVA table shows whether there is any statistical significance. To analyze what impact and which direction each of the independent variables contribute to the dependent variable, the coefficient table provides the needed result. Below, in Figure 1, is a summary of variables that were analyzed using the simultaneous regression and hierarchical models.

The purpose of the present study is to determine whether there is a relationship between length of school day and student achievement on the 2011 NJ ASK 3 language arts and mathematics and a school’s overall student attendance rate. The instrumentation of the study consisted of total percentage of proficient and advanced proficient student performance scores on the 2011 NJ ASK 3. The scaled school level percentages are reported by the NJ DOE and are published on the website in the 2011 Technical Report (NJDOE, 2011d).


Figure 1. Simultaneous regression framework.

Instrumentation

Reliability and Validity

Trochim (2006) explained that reliability refers to the quality of measurement. Reliability of a measure is the ability to be consistent when repeated. Trochim (2006) went on to note that reliability must be integrated with validity. This means that when a test is administered, the same results should be obtained. Koretz (2008) was of the same view in affirming this assertion that validity is the most important criteria for evaluating testing.

The NJDOE published a Score Interpretation Manual for grades 3 - 8 (SIM) in 2011, a guide to understanding the Assessment Test (NJDOE, 2011d). The purpose was to ensure reliability and validity (NJDOE, 2011d). The technical manual targeted all concerned stakeholders for them to understand test administration, test scoring and test results
dissemination. The report highlighted the fact that the assessment measured how well students were expected to perform based on the now defunct New Jersey Core Content Curriculum Standards (NJCCCS). The SIM pointed out that the NJCCCS were revised every 5 years by the State Regulations as noted in the New Jersey Administrative Code, Chapter 6A8 - 2.1(a)5i: “NJ ASK reflects continuous refinements and evolving understanding of the CCCS while using assessment instruments that are highly standardized for the purpose of ensuring validity, reliability, and comparability” (NJDOE, 2011d, p.11). The NJ DOE acknowledges the high stakes nature of the assessment in relation to school accountability. It assures stakeholders that the NJ ASK 3 is not only reliable and valid but is also inclusive for the testing population and all subgroups (NJ DOE, 2011d, p. 25). The department provides evidence of the test reliabilities measured by Cronbach alpha as follows:

For general population:
- LAL student responses ranged from 0.82 to 0.91
- Math student responses ranged from 0.84 to 0.92

For Spanish students:
- LAL student responses ranged from 0.73 to 0.85
- Math student responses ranged from 0.81 to 0.89

The report concluded that the above evidence indicates that the assessment is highly reliable and valid (NJDOE, 2011d, pp. 25–26).

The adoption of the Common Core State Standards (CCSS), one can assume that reliability and validity of the PARCC testing presents new challenges for the NJ DOE. The PARCC utilizes the option of on line test administration process, which brings into question a host of other reliability and validity issues.
Chapter Summary

The purpose of my study was to determine the influence of length of school day on NJ ASK 3 LAL and MA test scores and a school’s overall rate of student attendance. The study used nonexperimental, cross sectional, explanatory research design with quantitative methods. Simultaneous and hierarchical multiple regression models were used to determine which predictor variables had the strongest statistically significant influence on the dependent variables of the 2011 NJ ASK 3 percentage of the students scoring proficient and advanced proficient levels in math and LAL. School level was the focus of the present study. The population sample consisted of 776 elementary schools located in all 21 NJ counties (NJDOE, 2011c). Only public schools were included. The data was downloaded from the NJDOE website into a Microsoft Excel spreadsheet and data analysis was performed using the SPSS software.
CHAPTER IV
ANALYSIS OF THE DATA

Introduction

This research was conducted using a nonexperimental, cross-sectional, explanatory quantitative research design to determine the impact of the influence of school, faculty, and student variables on student performance on the third-grade Language Arts and Mathematics on the high stakes NJ ASK. This study sought to explain the strength and direction of the relationship between the length of a school day and student performance based on the 2011 New Jersey Report Card where “school” served as the primary unit of analysis. The overarching research question, subsidiary questions, and the null hypotheses for this study is listed below.

Overarching Research Question

What is the influence of the length of the school day on the 2011 Grade 3 LAL and MA percentages of total proficient and advanced proficient on the NJ ASK3 scores when controlling for school, faculty, and student variables?

Subsidiary Research Questions

RQ 1. What is the influence of length of school day on percentages of total proficient and advanced proficient on the NJ ASK3 LAL when controlling for school, faculty/staff, and student variables?

RQ 2. What is the influence of length of school day on percentages of total proficient and advanced proficient on the NJ ASK3 Mathematics when controlling for school, faculty/staff, and student variables?
Null Hypotheses

H1. There is no statistically significant relationship between length of school day and the LAL 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

H2. There is no statistically significant relationship between length of school day and the Mathematics 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

The Purpose of the Study

The purpose of this study was to determine the strength and direction of the relationship between the length of school day and student performance in Grade 3 on the 2011 NJ ASK in LAL and MA. This study will add to the existing research literature on the influence of length of school day specific to Grade 3, which is the first testing grade on the high-stakes NJ ASK. Additionally, it is hoped that this study might also lay the foundation for possible longitudinal studies.

Organization of the Chapter

This chapter, describes how the data was collected and analyzed, and report those results. The first part of the chapter provides the descriptive statistics of the sample. The second part of the study provides the procedure of data analysis using the SPSS (Statistical Package for the Social Sciences) software, including the subsequent output analysis. The final part will provide the research findings that answer the research questions and the null hypotheses.

Description of the Sample, Power and the Variables

The data used in this study was obtained from the New Jersey Department of Education School Report Card website. The data for the 2011 NJ ASK, published in the spring of 2012, was
retrieved from the archived reports spanning from the school years of 1996 to the school year of 2014. The pertinent data on schools, faculty, and students are submitted to the New Jersey Department of Education using the NJ Smart, a statewide data collection repository of student and teacher data. The data gathered includes, but is not limited to, the Demographic Factor Group (DFG) information and additional variables that research has suggested influences student achievement. Note that the DFG classification refers to socioeconomic status where A represents the poorest school districts and whereas I and J are considered to be wealthiest or more affluent school districts (NJDOE, 2011a). The data was downloaded into a Microsoft Excel spreadsheet file. Only elementary public schools were included. Parochial and charter schools were excluded. A total of 776 elementary schools from all DFGs who participated in the 2011 NJ ASK 3 LAL and MA were in the original file. When the data was examined, the schools that had missing data were deleted from the overall data file. Once the dataset was custom-filtered and formatted, it was imported into IBM SPSS. Originally, there were 776 elementary schools from all DFG groups in the data set. The schools that were missing vital information such as the percentage of special needs students, percentage of student on free or reduced lunch (SES), percentage of language proficiency, and faculty attendance rate were removed from the dataset. Therefore, 533 schools made up the final sample.

**Power**

As discussed in the previous chapter, Field (2013) advised that a sample should provide adequate power to run all required analyses. Field (2013) explained that an expected R for random data should be as close to zero (0) as possible and is calculated using the following formula; \( k/(N – 1) \) where \( k \) is the number of independent variables in the study and \( N \) is the sample size (See Table 6).
Independent variables and dependent variables. In reviewing the literature, extensive and existing research suggests that certain predictor variables influence student achievement. The outcome or dependent variable, in this case, the 2011 NJ ASK 3 LAL and MA scores were retrieved from the NJ DOE website. For this study, the variable of interest was length of school day.

The school variables consisted of school enrollment (school size) and the length of school day in minutes. The faculty/staff variables consisted of faculty attendance rates, faculty mobility and percentage of faculty with master’s degree or higher. The student variables consisted of attendance rate in the school, student mobility rate, percentage of student on free or reduced lunch, percentage of students with learning disabilities, and percentage of students with limited language proficiency. When the “scrubbing” and formatting of data was completed it was imported into the SPSS software. The predictor and outcome variables used in the subsequent analysis are listed in Table 7 below.
Table 7

*Independent and Dependent Variables Used in this Study Entered in IBM SPSS Software*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Label/measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Economic Status</td>
<td>Predictor/Independent</td>
<td>%SES/Scale</td>
<td>Percentage of students with free or reduced lunch</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>Predictor/Independent</td>
<td>DISAB/Scale</td>
<td>Percentage of students with learning disabilities</td>
</tr>
<tr>
<td>Limited Language Proficiency</td>
<td>Predictor/Independent</td>
<td>LPCT/Scale</td>
<td>Percentage of students with limited language proficiency</td>
</tr>
<tr>
<td>Attendance</td>
<td>Predictor/Independent</td>
<td>Attendance/Scale</td>
<td>Rate of student attendance in the school</td>
</tr>
<tr>
<td>School Size</td>
<td>Predictor/Independent</td>
<td>School Enroll/Scale</td>
<td>Total school enrollment</td>
</tr>
<tr>
<td>Student Mobility</td>
<td>Predictor/Independent</td>
<td>STMOB/Scale</td>
<td>Rate of student mobility</td>
</tr>
<tr>
<td>Faculty Attendance</td>
<td>Predictor/Independent</td>
<td>FATTEND/Scale</td>
<td>Rate of Faculty Attendance</td>
</tr>
<tr>
<td>Faculty Mobility</td>
<td>Predictor/Independent</td>
<td>FMOBILITY/Scale</td>
<td>Rate of Faculty Mobility</td>
</tr>
<tr>
<td>Faculty with Master’s or Higher</td>
<td>Predictor/Independent</td>
<td>MA+/Scale</td>
<td>Percentage of Faculty with MA or higher</td>
</tr>
<tr>
<td>Length of School Day</td>
<td>Predictor/Independent</td>
<td>SchDayLength/Scale</td>
<td>Length of school day in minutes</td>
</tr>
<tr>
<td>Total Proficient or Advanced Proficient in LAL</td>
<td>Outcome/Dependent</td>
<td>TPAP/Scale</td>
<td>Percentage of combined proficient and advanced scores</td>
</tr>
<tr>
<td>Total Proficient or Advanced Proficient in Mathematics</td>
<td>Outcome/Dependent</td>
<td>TPAP/Scale</td>
<td>Percentage of combined proficient and advanced scores</td>
</tr>
</tbody>
</table>
Procedure

Earlier, it was determined that the sample size of the schools had adequate power to run simultaneous multiple regression analysis. The expected R in each subject area was .019 as calculated and indicated in Table 6. The first step was to determine which of the independent variables had statistical significance and predictive strength on the outcome by running a simultaneous multiple regression analysis using the enter method. All 10 variables were entered at the same time in the initial models. Based on the results of the simultaneous regression, hierarchical regression models were developed and used to better determine which variable or variables had the strongest statistical significance and explained the most amount of variability in the outcome variables.

Research Question 1: Statistical Analysis and Results

RQ 1. What is the influence of length of school day on total percentage of students achieving Proficient and Advanced Proficient in Grade 3 LAL as measured by 2011 NJ ASK 3 when controlling for school, faculty/staff, and school variables?

H1. There is no statistically significant relationship between length of school day and the LAL 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

The initial simultaneous multiple regression was run by entering all 10 independent variables listed on the New Jersey Report Card as follows (see Table 8).
Table 8

*Initial Simultaneous Regression for Language Arts Literacy: Dependent and Independent Variables*

<table>
<thead>
<tr>
<th>Regression</th>
<th>Outcome/Dependent Variable</th>
<th>Predictor/Independent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression I</td>
<td>Total Proficient and Advanced Proficient on NJ ASK 3 LAL (TPAP) Scores</td>
<td>• Percent of Students with Free or Reduced Lunch (FRL)(SES)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Percent of Students with Limited Language Proficiency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Student Mobility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rate of Student Attendance in the School</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• School Enrollment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• School Day Length</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Percent of students with disabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rate of Faculty Attendance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faculty Mobility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Percentage of Faculty with MA or higher</td>
</tr>
</tbody>
</table>

**Descriptive Statistics for Research Question 1**

The school variables that were examined consisted of length of school day in minutes and the total school enrollment (school size). The descriptive statistics indicate that the average length of school day was approximately 388 minutes and the average school enrollment was approximately 462 students (See Table 9).

In examining the student variables, the mean attendance rate was approximately 95% which was comparable to that of faculty attendance which had a mean rate of 96%. The mean for students with learning disabilities was approximately 15% while the mean for students with
limited language proficiency was 6%. The mean for student mobility rate was approximately 11%. For those students receiving free or reduced lunch, the mean was approximately 37%.

When faculty/staff variables were examined, the mean rate of attendance was 96% while the mean for faculty mobility was only 3%. The variable of percentage of faculty with master’s degree or higher was approximately 45% (See Table 9).

Table 9

Descriptive Statistics of the Language Arts Literacy Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPAP</td>
<td>62.027</td>
<td>22.996</td>
</tr>
<tr>
<td>SES (%)</td>
<td>37.5</td>
<td>30.849</td>
</tr>
<tr>
<td>DISAB</td>
<td>14.794</td>
<td>5.673</td>
</tr>
<tr>
<td>LPCT</td>
<td>6.460</td>
<td>8.010</td>
</tr>
<tr>
<td>Attendance</td>
<td>95.444</td>
<td>1.177</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>462.73</td>
<td>191.885</td>
</tr>
<tr>
<td>SchoolDayLength</td>
<td>388.36</td>
<td>12.892</td>
</tr>
<tr>
<td>STMOB</td>
<td>10.767</td>
<td>8.051</td>
</tr>
<tr>
<td>FATTEND</td>
<td>96.286</td>
<td>2.075</td>
</tr>
<tr>
<td>FMOBILITY</td>
<td>3.316</td>
<td>5.203</td>
</tr>
<tr>
<td>MA+</td>
<td>45.278</td>
<td>15.980</td>
</tr>
</tbody>
</table>

Note. N = 533.

A simultaneous multiple regression was run to examine the statistical significance of each of the 10 entered variables in relation to the first outcome variable, Total Proficient & Advanced Proficient in LAL (see Table 10).
Table 10

**Simultaneous Multiple Regression with all the Independent Variables Entered**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables entered</th>
<th>Variables removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MA+, FMOBILITY, DISAB, SchDayLength, SchoolEnroll, FATTEND, LPCT, Attendance, STMOB, %SES&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Enter</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Dependent variable: TPAP.

<sup>a</sup> All requested variables entered.

In the Model Summary (Table 11), the R square was .411 which indicates that 41.1% of variance in the dependent variable can be explained or predicted when all 10 predictor variables were included in the model. The Durbin-Watson was 1.922, indicating that the residuals are not correlated, an assumption of regression analysis (Field, 2013).

Table 11

**Simultaneous Multiple Regression Model Summary for Language Arts Literacy**

<table>
<thead>
<tr>
<th>Model Summary&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.641&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.411</td>
<td>.400</td>
<td>17.8109</td>
<td>2.048</td>
</tr>
</tbody>
</table>

<sup>a</sup> Predictors: (Constant), MA+, FMOBILITY, DISAB, SchDayLength, SchoolEnroll, FATTEND, LPCT, Attendance, STMOB, %SES

<sup>b</sup> Dependent Variable: TPAP

The ANOVA (Analysis of Variance) table showed that the regression model was statistically significant \((F(10,522) = 36.481; p < .001)\) when all variables were entered in the model (Table 12).
Table 12

Simultaneous Multiple Regression ANOVA Table for Language Arts Literacy

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>115727.969</td>
<td>10</td>
<td>11572.797</td>
<td>36.481</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>165592.766</td>
<td>522</td>
<td>317.228</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>281320.736</td>
<td>532</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP
b. Predictors: (Constant), MA+, FMOBILITY, DISAB, SchDayLength, SchoolEnroll, FATTEND, LPCT, Attendance, STMOB, %SES

The coefficients table for this model (Table 13) was used to identify which of the independent variables or predictors were statistically significant in the Simultaneous Multiple Regression and also to determine whether there was multicollinearity between the predictors. By squaring each of the significant predictor variables’ standardized beta, the effect size provided the explained variance. The model indicated that the percentage of students on free or reduced lunch was statistically significant and was the strongest predictor of student achievement ($\beta = -0.529$, $p < .001$), which accounted for 28% of the explained variance in the outcome variable. The negative beta indicates as the percentage of students in the school on free or reduced lunch increases, school performance on the LAL test decreases. The next closest predictor is the percentage of students with learning disabilities in the school ($\beta = -0.123$, $p < .001$), which accounted for 1.5% of the explained variance in the outcome. The negative beta indicates as the percentage of students with learning disabilities increases in the school, the school performance on the LAL test decreases. The predictor variable school enrollment ($\beta = -0.132$, $p < .001$), which accounted for 1.7% of the explained variance in the outcome variable. The negative beta indicates as the school size increased due to increased enrollment, school performance on the test
decreases. The predictor variable student mobility was weak (β = -.095, p < .05), which accounted for less than 1% of the explained variance in the outcome variable. The predictor variable faculty with a master’s degree or higher was found to be statistically significant (β = .138, p < .001), which accounted for approximately 2% of explained variance in the outcome. This positive beta indicates that as the percentage of faculty who attain a master’s degree or higher increases, the percentage of students in the school achieving proficiency and advanced proficiency on the LAL test increases. The percentage of students with limited language proficiency was also weak (β = .087, p < .05), which accounted for less than 1% of explained variance in the outcome. The coefficients table determined that length of school day, the variable of interest in this study, was not found to be statistically significant (p>.05).

When the Variance Inflation Factors (VIF) were examined, multicollinearity was not found to be a problem since all VIFs were under 10 (Lewis-Beck & Lewis-Beck, 2016).

In an effort to better examine the variables that had the strongest impact on the outcome variable, a hierarchical multiple regression was performed using the significant variables identified in the simultaneous multiple regression analysis. According to Leech, Barrett and Morgan (2011), this method enables the researcher to enter the variables in a block or stepwise sequence to determine the specific influence that an individual significant predictor variable has on the outcome variable as other significant predictor variables are entered into the model. In the first model, the percentage of students on free or reduced lunch (SES) was entered. In the second model, the percentage of students with learning disabilities and percentage of students with limited language proficiency was entered. In the third model school enrollment, faculty with a master’s degree or higher, and student mobility were entered. Finally, the fourth model included the school day length variable, the focus of this study (see Table 14).
Table 13

*Simultaneous Multiple Regression Coefficients Table for Language Arts Literacy*

Coefficients$^a$

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Zero-order</td>
<td>Partial</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>26.908</td>
<td>88.063</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%SES</td>
<td>-.394</td>
<td>.042</td>
<td>-.529</td>
<td>-9.335</td>
<td>.000</td>
<td>-.586</td>
</tr>
<tr>
<td>DISAB</td>
<td>-.500</td>
<td>.144</td>
<td>-.123</td>
<td>-3.482</td>
<td>.001</td>
<td>.011</td>
</tr>
<tr>
<td>LPCT</td>
<td>.250</td>
<td>.123</td>
<td>.087</td>
<td>2.021</td>
<td>.044</td>
<td>-.229</td>
</tr>
<tr>
<td>Attendance</td>
<td>.424</td>
<td>.828</td>
<td>.022</td>
<td>.513</td>
<td>.608</td>
<td>.385</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>-.016</td>
<td>.004</td>
<td>-.132</td>
<td>-3.801</td>
<td>.000</td>
<td>-.162</td>
</tr>
<tr>
<td>SchDayLength</td>
<td>-.002</td>
<td>.061</td>
<td>-.001</td>
<td>-.025</td>
<td>.980</td>
<td>.051</td>
</tr>
<tr>
<td>STMOB</td>
<td>-.271</td>
<td>.121</td>
<td>-.095</td>
<td>-2.240</td>
<td>.026</td>
<td>-.414</td>
</tr>
<tr>
<td>FATTEND</td>
<td>.179</td>
<td>.404</td>
<td>.016</td>
<td>.442</td>
<td>.659</td>
<td>.239</td>
</tr>
<tr>
<td>FMOBILITY</td>
<td>-.054</td>
<td>.150</td>
<td>-.012</td>
<td>-.361</td>
<td>.718</td>
<td>.011</td>
</tr>
<tr>
<td>MA+</td>
<td>.198</td>
<td>.053</td>
<td>.138</td>
<td>3.719</td>
<td>.000</td>
<td>.366</td>
</tr>
</tbody>
</table>

$^a$ Dependent Variable: TPAP
Table 14

Hierarchical Regression Variables Entered for Language Arts Literacy

<table>
<thead>
<tr>
<th>Variables Entered/Removed&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Model 1</th>
<th>Variables Entered</th>
<th>%SES&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 2</td>
<td>DISAB, LPCT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Enter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 3</td>
<td>SchoolEnrollment, MA+, STMOOb&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Enter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 4</td>
<td>SchoolLength&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Enter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Dependent Variable: TPAP  
<sup>b</sup> All requested variables entered.

The Model Summary (Table 15) indicates that in Model 1, the F Change Statistic was 277.355; the F Change Statistic in Model 2 was 10.038, while the F Change Statistic in Model 3 was 12.960. For the Significant F Change, Model 1 was $p < .001$, Model 2 was $p < .001$, and Model 3 was $p < .001$. Model 4 was not statistically significant, $p > .05$. The Durbin-Watson was 1.919, which indicates that the residuals in the regression analysis across all models were not correlated (Table 15).

For Model 1 the R Square Change was .343 which means that 34% of variance can be explained by the percentage of students on free or reduced lunch (SES). In examining Model 2, the R Square change was .024 which means approximately 2% of variance can be explained when the percentage of students with disabilities and the percentage of students with limited language proficiency were included. In Model 3, the R Square change was .044 which means approximately 4% of variance can be explained when school enrollment, faculty with master’s degree or higher, and student mobility were included. The final step entered in the hierarchical regression analysis was Model 4 in which the R Square Change was .000 which means that a 0%
of variance can be explained when the school day length, the focus of this study, was entered into the last hierarchical model. The school day length had no significant influence on student achievement on the NJ ASK 3 LAL scores.

Based on the Model Summary, the best predictive model was found to be Model 3. The R Square for Model 3 was .411 which means 41% of variance can be explained by Model 3 when the variables included percentage of students on free or reduced lunch (SES), percentage of students with learning disabilities, percentage of students with limited language proficiency, school enrollment, faculty with master’s degree or higher, and student mobility. This model did not include the variable of interest, school day length.

Table 15

*Hierarchical Regression Model Summary for Language Arts Literacy*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R Square Change</td>
<td>F Change</td>
</tr>
<tr>
<td>1</td>
<td>.585</td>
<td>.343</td>
<td>.342</td>
<td>18.6552</td>
<td>.343</td>
<td>277.355</td>
</tr>
<tr>
<td>2</td>
<td>.600</td>
<td>.367</td>
<td>.364</td>
<td>18.3455</td>
<td>.024</td>
<td>10.038</td>
</tr>
<tr>
<td>3</td>
<td>.641</td>
<td>.411</td>
<td>.404</td>
<td>17.7534</td>
<td>.044</td>
<td>12.960</td>
</tr>
<tr>
<td>4</td>
<td>.641</td>
<td>.411</td>
<td>.403</td>
<td>17.7702</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), %SES
b. Predictors: (Constant), %SES, DISAB, LPCT
c. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+; STMOB
d. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+, STMOB, SchDayLength
e. Dependent Variable: TPAP

The ANOVA table (Table 16) in the hierarchical regression analysis showed that all four Models in the hierarchical regression in and of themselves were statistically significant.
Table 16

Hierarchical Regression ANOVA Table for Language Arts Literacy

ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>96524.056</td>
<td>1</td>
<td>96524.056</td>
<td>277.35</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>184796.680</td>
<td>531</td>
<td>348.016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281320.736</td>
<td>532</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Regression</td>
<td>103281.098</td>
<td>3</td>
<td>34427.033</td>
<td>102.29</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>178039.637</td>
<td>529</td>
<td>336.559</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281320.736</td>
<td>532</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Regression</td>
<td>115535.246</td>
<td>6</td>
<td>19255.874</td>
<td>61.095</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>165785.490</td>
<td>526</td>
<td>315.182</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281320.736</td>
<td>532</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Regression</td>
<td>115535.329</td>
<td>7</td>
<td>16505.047</td>
<td>52.267</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>165785.406</td>
<td>525</td>
<td>315.782</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281320.736</td>
<td>532</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP
b. Predictors: (Constant), %SES
c. Predictors: (Constant), %SES, DISAB, LPCT
d. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+,
   STMOB
e. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+,
   STMOB, SchDayLength

The Hierarchical Regression Analysis Coefficients Table (Table 17) was used to determine which of the significant variables in Model 3, the best predictive model, accounted for the most amount of variance in the outcome variable, Grade 3 NJ ASK LAL performance. In Model 3, the significant predictors were the percentage of students on free or reduced lunch (SES) \( (p < .001) \). The next were the percentage of students with learning disabilities \( (p < .001) \), school enrollment \( (p < .001) \), faculty with master’s degree or higher \( (p < .001) \). Student mobility was also significant \( (p < .05) \) and percentage of students with limited language proficiency was also significant \( (p < .05) \)
By squaring the Standardized Beta for each of the statistically significant predictors, effect size is determined by identifying the amount of variance which can be explained by each of the predictors. Model 3 indicates that the strongest predictor for student achievement on the outcome was the percentage of students on free or reduced lunch (SES; $\beta = -.544, p < .001$) which means approximately 29% of variance in this model can be explained by the percentage of students on free or reduced lunch (SES). The negative beta indicates that as the percentage of students on free or reduced lunch increases, the performance of the school on the Languages Arts Literacy test decreases. The next significant predictor in the model is faculty with master’s degree or higher ($\beta = .140, p < .001$) which means approximately 1.9% of variance in this model can be explained by the percentage of faculty with master’s degree or higher. The positive beta indicates that when percentage of faculty with master’s degree or higher increases, the performance of the school on the LAL test increases. The next significant predictor in the model is school enrollment ($\beta = -.135, p < .001$), which means approximately 1.8% of variance in this model can be explained by school enrollment. The negative beta indicates that as the school enrollment increases (school size), the school performance on the LAL test decreases. Students with disabilities was also significant ($\beta = -.125, p < .001$) which means approximately 1.5% of variance in this model can be explained by the percentage of students with learning disabilities. The negative beta indicates that as the percentage of students with learning disabilities increases, the performance of the school on the LAL test decreases. Student mobility, though weak, was also significant ($\beta = -.100, p < .05$) explaining approximately 1% of variance in the Model. The negative beta indicates that as the percentage of student mobility for the school increases, the school performance on the LAL test decreases. The weakest significant predictor is the percentage of students with limited language proficiency ($\beta = .092, p < .005$), which means that
less than 1% of variance in this model can be explained by the percentage of students with limited language proficiency. The positive beta indicates that as the percentage of students with limited language proficiency increases in a school performance in LAL increases for that school.

Table 17

Hierarchical Regression Coefficients Table for Language Arts Literacy

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95.0% Confidence Interval for B</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t</td>
<td>Sig.</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>78.390</td>
<td>1.272</td>
<td>61.622</td>
<td>.000</td>
<td>75.891</td>
</tr>
<tr>
<td>%SES</td>
<td>-.437</td>
<td>.026</td>
<td>-.586</td>
<td>-16.65</td>
<td>.000</td>
</tr>
<tr>
<td>DISAB</td>
<td>1.432</td>
<td>.145</td>
<td>-.107</td>
<td>-2.974</td>
<td>.003</td>
</tr>
<tr>
<td>LPCT</td>
<td>.344</td>
<td>.121</td>
<td>.120</td>
<td>2.844</td>
<td>.005</td>
</tr>
<tr>
<td>2 (Constant)</td>
<td>85.077</td>
<td>2.702</td>
<td>31.492</td>
<td>.000</td>
<td>79.770</td>
</tr>
<tr>
<td>%SES</td>
<td>-.594</td>
<td>.031</td>
<td>-.676</td>
<td>-16.17</td>
<td>.000</td>
</tr>
<tr>
<td>DISAB</td>
<td>.433</td>
<td>.145</td>
<td>-.107</td>
<td>-2.974</td>
<td>.003</td>
</tr>
<tr>
<td>LPCT</td>
<td>.344</td>
<td>.121</td>
<td>.120</td>
<td>2.844</td>
<td>.005</td>
</tr>
<tr>
<td>3 (Constant)</td>
<td>84.489</td>
<td>4.578</td>
<td>18.456</td>
<td>.000</td>
<td>75.495</td>
</tr>
<tr>
<td>%SES</td>
<td>-.405</td>
<td>.038</td>
<td>-.544</td>
<td>-10.74</td>
<td>.000</td>
</tr>
<tr>
<td>DISAB</td>
<td>-.508</td>
<td>.142</td>
<td>-.125</td>
<td>-3.573</td>
<td>.000</td>
</tr>
<tr>
<td>LPCT</td>
<td>.264</td>
<td>.120</td>
<td>.092</td>
<td>2.202</td>
<td>.028</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>.016</td>
<td>.004</td>
<td>-.135</td>
<td>-3.955</td>
<td>.000</td>
</tr>
<tr>
<td>MA+</td>
<td>.202</td>
<td>.053</td>
<td>.140</td>
<td>3.816</td>
<td>.000</td>
</tr>
<tr>
<td>STM audiences</td>
<td>-.286</td>
<td>.119</td>
<td>-.100</td>
<td>-2.412</td>
<td>.016</td>
</tr>
<tr>
<td>4 (Constant)</td>
<td>84.868</td>
<td>23.799</td>
<td>3.566</td>
<td>.000</td>
<td>38.115</td>
</tr>
<tr>
<td>%SES</td>
<td>-.405</td>
<td>.038</td>
<td>-.544</td>
<td>-10.71</td>
<td>.000</td>
</tr>
<tr>
<td>DISAB</td>
<td>-.598</td>
<td>.143</td>
<td>-.125</td>
<td>-3.561</td>
<td>.000</td>
</tr>
<tr>
<td>LPCT</td>
<td>.264</td>
<td>.121</td>
<td>.092</td>
<td>2.185</td>
<td>.029</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>.016</td>
<td>.004</td>
<td>-.135</td>
<td>-3.950</td>
<td>.000</td>
</tr>
<tr>
<td>MA+</td>
<td>.202</td>
<td>.053</td>
<td>.140</td>
<td>3.810</td>
<td>.000</td>
</tr>
<tr>
<td>STM audiences</td>
<td>-.286</td>
<td>.119</td>
<td>-.100</td>
<td>-2.410</td>
<td>.016</td>
</tr>
<tr>
<td>SchoolDayLength</td>
<td>-.001</td>
<td>.061</td>
<td>-.001</td>
<td>-0.16</td>
<td>.987</td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP

Null Hypothesis 1

Based on simultaneous and hierarchical regressions’ interpretation and analysis of the data, the null hypothesis has been retained. It was determined by the results that the school day length was not statistically significant as a predictor of student achievement on the 2011 NJ ASK 3 LAL scores when controlling for school, faculty/staff, and student variables.
Research Question 2: Statistical Analysis and Results

RQ 2. What is the influence of length of school day on total percentage of students achieving Proficient and Advanced Proficient in Grade 3 MA as measured by 2011 NJ ASK 3 when controlling for school, faculty/staff, and school variables?

H². There is no statistically significant relationship between length of school day and the MA 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

An initial simultaneous multiple regression was run by entering all 10 independent variables listed on the New Jersey Report Card as follows (See Table 18):

Table 18

Initial Simultaneous Regression for Mathematics: Dependent and Independent Variables

<table>
<thead>
<tr>
<th>Regression</th>
<th>Outcome/Dependent Variable</th>
<th>Predictor/Independent Variable</th>
</tr>
</thead>
</table>
| Regression I | Total Proficient and Advanced Proficient on NJ ASK 3 Mathematics (TPAP) Scores | • Percent of Students with Free or Reduced Lunch (FRL)(SES)  
• Percent of Students with Limited Language Proficiency  
• Student Mobility  
• Rate of Student Attendance in the School  
• School Enrollment  
• School Day Length  
• Percent of students with disabilities  
• Rate of Faculty Attendance  
• Faculty Mobility  
• Percentage of Faculty with MA or higher |
Descriptive Statistics for Research Question 2

The descriptive statistics for the school variables that were examined for the MA subject area were not significantly different from that of the LAL. However, the number in the sample for MA was 532 (See Table 19).

Table 19

Descriptive Statistics of Mathematics

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPAP</td>
<td>75.362</td>
<td>23.8311</td>
<td>532</td>
</tr>
<tr>
<td>%SES</td>
<td>37.1%</td>
<td>30.8667%</td>
<td>532</td>
</tr>
<tr>
<td>DJSAB</td>
<td>14.814</td>
<td>5.6736</td>
<td>532</td>
</tr>
<tr>
<td>LPCT</td>
<td>6.456</td>
<td>8.0184</td>
<td>532</td>
</tr>
<tr>
<td>Attendance</td>
<td>95.431</td>
<td>1.1839</td>
<td>532</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>461.66</td>
<td>193.2923</td>
<td>532</td>
</tr>
<tr>
<td>SchDayLength</td>
<td>388.32</td>
<td>12.998</td>
<td>532</td>
</tr>
<tr>
<td>STEMOB</td>
<td>10.784</td>
<td>8.0953</td>
<td>532</td>
</tr>
<tr>
<td>FATTEND</td>
<td>96.302</td>
<td>1.9805</td>
<td>532</td>
</tr>
<tr>
<td>FMOBILITY</td>
<td>3.356</td>
<td>5.2768</td>
<td>532</td>
</tr>
<tr>
<td>MA+</td>
<td>45.372</td>
<td>16.0060</td>
<td>532</td>
</tr>
</tbody>
</table>

A simultaneous multiple regression was run to examine the statistical significance of each of the 10 entered variables in relation to the second outcome variable, total proficient and advanced proficient in mathematics (see Table 20).

Table 20

Simultaneous Multiple Regression for Mathematics With All the Independent Variables Entered
In the Model Summary (Table 21), the R square was .226 which indicates that 22.6% of variance in the dependent variable can be explained or predicted when all 10 predictor variables were included in the model. The Durbin-Watson was 2.109, indicating that the residuals are not correlated, an assumption of regression analysis (Field, 2013).

Table 21

**Simultaneous Multiple Regression Model Summary for Mathematics**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th>Sig. F Change</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.476*</td>
<td>.226</td>
<td>.212</td>
<td>21.1596</td>
<td>.226</td>
<td>15.255</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), MA+, FMOBILITY, DISAB, SchDayLength, SchoolEnroll, FATTEND, LPCT, Attendance, STMOB, % SES
b. Dependent Variable: TPAP

The ANOVA (Analysis of Variance) table showed that the simultaneous regression model was statistically significant ($F(10,521)=15.255; p < .001$) when all variables were entered in the model (Table 22).
Table 22

**Simultaneous Multiple Regression ANOVA Table for Mathematics**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>68300.381</td>
<td>10</td>
<td>6830.038</td>
<td>15.255</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>233265.550</td>
<td>521</td>
<td>447.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>301565.931</td>
<td>531</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP

b. Predictors: (Constant), MA+, FMObility, DISAB, SchDayLength, SchoolEnroll, FATTEND, LPCT, Attendance, STMOB, %SES

The coefficients table for this model (Table 23) was used to identify which of the independent variables or predictors were statistically significant in the Simultaneous Multiple Regression and also to determine whether there was multicollinearity between the predictors. By squaring each of the significant predictor variables’ standardized beta, the effect size provided the explained variance. The model indicated that the percentage of student on free or reduced lunch was statistically significant and was a strongest predictor of student achievement ($\beta = -0.305, p < .001$), which accounted for 9% of the explained variance in the outcome variable. The negative beta indicates as the percentage of students in the school on free or reduced lunch increases, school performance on the MA test decreases. The next closest predictor variable is school enrollment ($\beta = -0.116, p < .05$), which accounted for 1.3% of the explained variance in the outcome variable. The negative beta indicates as the school size increases due to increased enrollment, school performance on the MA test decreases. The predictor variable faculty with a master’s degree or higher was found to be statistically significant ($\beta = .113, p < .05$), which accounted for 1.2% of the explained variance in the outcome variable. The positive beta indicates that as the percentage of faculty who attain a master’s degree or higher increases, the percentage
of students in the school achieving proficiency and advanced proficiency on the MA test increases. The percentage of students with learning disabilities, though weak, was statistically significant ($\beta = -.093, p < .05$), which accounted for less than 1% of the explained variance in the outcome variable. The negative beta indicates that as the percentage of students with learning disabilities increases, school performance on MA decreases. The coefficients table determined that length of school day, the variable interest in this study, was not found to be statistically significant ($p>.05$).

Table 23

*Simultaneous Multiple Regression Coefficients Table for Mathematics*

<table>
<thead>
<tr>
<th>Coefficients $^a$</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>-87.615</td>
<td>101.994</td>
<td>-.859</td>
<td>.391</td>
</tr>
<tr>
<td>%SES</td>
<td>-.235</td>
<td>.046</td>
<td>-.305</td>
<td>5.130</td>
</tr>
<tr>
<td>DISAB</td>
<td>-.391</td>
<td>.171</td>
<td>-.093</td>
<td>-2.284</td>
</tr>
<tr>
<td>LPCT</td>
<td>.240</td>
<td>.136</td>
<td>.081</td>
<td>1.756</td>
</tr>
<tr>
<td>Attendance</td>
<td>1.369</td>
<td>.960</td>
<td>.088</td>
<td>1.426</td>
</tr>
<tr>
<td>SchoolEnroll</td>
<td>-.014</td>
<td>.005</td>
<td>-.116</td>
<td>-2.901</td>
</tr>
<tr>
<td>SchDayLength</td>
<td>-.051</td>
<td>.072</td>
<td>-.028</td>
<td>-0.706</td>
</tr>
<tr>
<td>STMOB</td>
<td>-.276</td>
<td>.142</td>
<td>-.094</td>
<td>-1.938</td>
</tr>
<tr>
<td>FATTEND</td>
<td>.694</td>
<td>.516</td>
<td>.058</td>
<td>1.345</td>
</tr>
<tr>
<td>FMOBILITY</td>
<td>.027</td>
<td>.175</td>
<td>.006</td>
<td>.155</td>
</tr>
<tr>
<td>MA $^+$</td>
<td>.168</td>
<td>.062</td>
<td>.113</td>
<td>2.894</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Zero-order</th>
<th>Partial</th>
<th>Part</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the Variance Inflation Factors (VIF) were examined, multicollinearity was not found to be a problem since all VIFs were under 10 (Lewis-Beck & Lewis-Beck, 2016).

In an effort to better examine the variables that had the strongest impact on the outcome variable, a hierarchical multiple regression was performed using the significant variables identified in the simultaneous multiple regression analysis. According to Leech, Barrett and Morgan (2011), this method enables the researcher to enter the variables in a block or stepwise sequence to determine the specific influence that an individual significant predictor variable has
on the outcome variable as other significant predictor variables are entered into the model. In the first model, the percentage of students on free or reduced lunch (SES) was entered. The second model included percentage of student with learning disabilities. The third model included school enrollment and faculty with master’s degree and higher and the fourth model included the school day length variable, the focus of this study (See Table 24).

Table 24

**Hierarchical Regression Variables Entered for Mathematics**

<table>
<thead>
<tr>
<th>Variables Entered/Removed*</th>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>$\text{%SES}^{b}$</td>
<td>.</td>
<td>Enter</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>$\text{DISAB}, \text{LPCT}^{b}$</td>
<td>.</td>
<td>Enter</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>$\text{SchoolEnrollment}, \text{MA+}, \text{STMOB}^{b}$</td>
<td>.</td>
<td>Enter</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>$\text{SchDayLength}^{b}$</td>
<td>.</td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP
b. All requested variables entered.

The Model Summary (Table 25) indicates that in Model 1, the F Change Statistic was 129.578; the F Change Statistic in Model 2 was 2.625; while the F Change Statistic in Model 3 was 10.001. For the Significant F Change, Model 1 was $p < .001$, Model 2 was not significant, $p > .05$; Model 3 was $p < .001$. The Significant F Change statistic for Model 4 was not statistically significant, $p > .05$. The Durbin-Watson was 1.978, which indicates that the residuals in the regression analysis across all models were not correlated (Table 25).

For Model 1 the $R^2$ was .150 which means that 15% of variance can be explained by the percentage of students on free and reduced lunch (SES). In examining Model 2 the $R^2$
square was .153 which means that 15.3% of variance can be explained when students with learning disabilities were included. In Model 3 the R square was .176 which means that 17.6% of variance can be explained when school enrollment and faculty with master’s degree and higher were included. The final step entered in the hierarchical regression analysis was Model 4 in which the R Square Change was .000 which means that a 0% of variance can be explained when the school day length, the focus of this study, was entered in the last hierarchical model. Consequently, it can be concluded that school day length had no significant influence on student achievement on the NJ ASK 3 MA scores.

Based on the Model Summary, the best predictive model was found to be Model 3. The R Square for Model 3 was .176 which means 17.6% of variance can be explained by Model 3, which included the variables percentage of students on free or reduced lunch (SES), percentage of students with learning disabilities, school enrollment, and faculty with master’s degree or higher.

Table 25

Hierarchical Regression Model Summary for Mathematics

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig F Change</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.405a</td>
<td>.164</td>
<td>.163</td>
<td>21.8051</td>
<td>.164</td>
<td>104.261</td>
<td>1</td>
<td>530</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.428b</td>
<td>.181</td>
<td>.177</td>
<td>21.6246</td>
<td>.017</td>
<td>5.442</td>
<td>2</td>
<td>528</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.468c</td>
<td>.219</td>
<td>.210</td>
<td>21.1805</td>
<td>.038</td>
<td>8.458</td>
<td>3</td>
<td>525</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.469d</td>
<td>.220</td>
<td>.209</td>
<td>21.1910</td>
<td>.001</td>
<td>.480</td>
<td>1</td>
<td>524</td>
<td>.489</td>
<td>2.119</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), %SES
b. Predictors: (Constant), %SES, DISAB, LPCT
c. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+, STMOB
d. Predictors: (Constant), %SES, DISAB, LPCT, SchoolEnroll, MA+, STMOB, SchDayLength
e. Dependent Variable: TPAP

The ANOVA Table (Table 26) in the hierarchical regression analysis showed that all four Models in the hierarchical regression in and of themselves were statistically significant.
The Hierarchical Regression Analysis Coefficients Table (Table 27) was used to determine which of the significant variables in Model 3, the best predictive model, accounted for the most amount of variance in the outcome variable, Grade 3 NJ ASK MA performance. In Model 3, the significant predictors were the percentage of students on free or reduced lunch (SES) \( (p < .001) \). The next were school enrollment \( (p < .05) \) and faculty with master’s degree or higher \( (p < .05) \).

By squaring the Standardized Beta for each of the statistical significant predictors, effect size is determined by identifying the amount of variance which can be explained by each of the predictors. Model 3 indicates that the strongest predictor for student achievement on the outcome was the percentage of students on free and reduced lunch (SES; \( \beta = -.352, p < .001 \) which
means approximately 12% of variance in this model can be explained by the percentage of students on free or reduced lunch (SES). The negative beta indicates that as the percentage of students on free or reduced lunch increases in the school, the performance of the school on MA test decreases. The next significant predictor in the model is faculty with master’s degree or higher ($\beta = .113, p < .05$) which means approximately 1.3% of variance in this model can be explained by the percentage of faculty with master’s degree or higher. The positive beta indicates that when percentage of faculty with master’s degree or higher increases, the performance of the school on the MA test increases. Finally, the significant predictor in the model is school enrollment ($\beta = -.107, p < .05$) which means approximately 1% of variance in this model can be explained by school enrollment. The negative beta indicates that as the school enrollment (school size) increases, the school performance on the MA test decreases.
Table 27

Hierarchical Regression Coefficients Table for Mathematics

*Coefficientsa*

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Zero-order</td>
<td>Partial</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>86.981</td>
<td>1.479</td>
<td>58.796</td>
<td>.000</td>
<td>-.405</td>
<td>-.405</td>
</tr>
<tr>
<td></td>
<td>%SES</td>
<td>-.313</td>
<td>.031</td>
<td>-.405</td>
<td>-10.21</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>92.389</td>
<td>3.224</td>
<td>28.653</td>
<td>.000</td>
<td>-.405</td>
<td>-.412</td>
</tr>
<tr>
<td></td>
<td>%SES</td>
<td>-.367</td>
<td>.035</td>
<td>-.475</td>
<td>-10.40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>DISAB</td>
<td>-.361</td>
<td>.172</td>
<td>-.086</td>
<td>-2.093</td>
<td>.037</td>
</tr>
<tr>
<td></td>
<td>LPCT</td>
<td>.298</td>
<td>.136</td>
<td>.100</td>
<td>2.185</td>
<td>.029</td>
</tr>
<tr>
<td>3</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>92.886</td>
<td>5.386</td>
<td>17.246</td>
<td>.000</td>
<td>-.405</td>
<td>-.274</td>
</tr>
<tr>
<td></td>
<td>%SES</td>
<td>-.273</td>
<td>.042</td>
<td>-.354</td>
<td>-6.519</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>DISAB</td>
<td>.424</td>
<td>.170</td>
<td>.101</td>
<td>-2.496</td>
<td>.013</td>
</tr>
<tr>
<td></td>
<td>LPCT</td>
<td>.259</td>
<td>.135</td>
<td>.087</td>
<td>1.923</td>
<td>.055</td>
</tr>
<tr>
<td></td>
<td>SchoolEnroll</td>
<td>-.016</td>
<td>.005</td>
<td>-.126</td>
<td>-3.178</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>MA+</td>
<td>.175</td>
<td>.062</td>
<td>.117</td>
<td>2.812</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>STMOB</td>
<td>-.329</td>
<td>.139</td>
<td>-.112</td>
<td>-2.363</td>
<td>.019</td>
</tr>
<tr>
<td>4</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>111.988</td>
<td>28.089</td>
<td>3.987</td>
<td>.000</td>
<td>-.405</td>
<td>-.275</td>
</tr>
<tr>
<td></td>
<td>%SES</td>
<td>-.274</td>
<td>.042</td>
<td>-.355</td>
<td>-6.353</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>DISAB</td>
<td>.417</td>
<td>.171</td>
<td>-.099</td>
<td>-2.446</td>
<td>.015</td>
</tr>
<tr>
<td></td>
<td>LPCT</td>
<td>.269</td>
<td>.136</td>
<td>.091</td>
<td>1.987</td>
<td>.047</td>
</tr>
<tr>
<td></td>
<td>SchoolEnroll</td>
<td>-.016</td>
<td>.005</td>
<td>-.127</td>
<td>-3.195</td>
<td>.001</td>
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<td>MA+</td>
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<td>.119</td>
<td>2.843</td>
<td>.005</td>
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<td>STMOB</td>
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<td>-2.385</td>
<td>.017</td>
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<td>SchDayLength</td>
<td>-.050</td>
<td>.072</td>
<td>-.027</td>
<td>-.693</td>
<td>.489</td>
</tr>
</tbody>
</table>

a. Dependent Variable: TPAP
Null Hypothesis 2

Based on the simultaneous and hierarchical regressions’ interpretation and analysis of the data, the null hypothesis has been retained. It was determined by the results that the school day length was not statistically significant as a predictor of student achievement on the 2011 NJ ASK 3 MA scores when controlling for school, faculty/staff, and student variables.

Conclusion

The null hypotheses for both Grade 3 2011 NJ ASK LAL and MA were retained. School day length, the variable of interest and focus of this study was found not to be statistically significant as a predictor of achievement in LAL or MA at the school level.

For the 2011 NJ ASK 3 LAL, the strongest predictor variable with statistical significance was the percentage of students on free or reduced lunch or SES \((p < .001)\). The next predictor variables with statistical significant were the percentage of faculty or staff with master’s degree or higher \((p < .001)\) and school enrollment \((p < .001)\). The percentage of students with learning disabilities was also statistically significant \((p < .001)\) and the percentage of students with limited language proficiency, though weak, was statistically significant \((p < .05)\). The predictor variable student mobility was also a weak though statistically significant \((p < .05)\).

For the 2011 NJ ASK 3 MA, the strongest predictor variable with statistical significance was the percentage of students on free or reduced lunch or SES \((p < .001)\). The next predictor variables with statistical significance were the percentage of faculty or staff with master’s degree or higher \((p < .05)\) and school enrollment \((p < .05)\).

Further discussion regarding the variables of significance as well as the variable of interest will be addressed in Chapter 5. Implications concerning practice and policy will also be
discussed in Chapter 5. Additionally, potential areas for future research will be recommended based on the findings of this study.
CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter aims to explain and discuss the findings based on the data analysis reported in the previous chapter. The conclusions will be drawn from the discussions. Recommendations to policy makers and stakeholders for policy, practice, and further research will be made. The conceptual framework of production/function theory was introduced and discussed in Chapter 1. The production/function theory stated that for every expenditure, a good return on investment is expected and measured by outcomes. Over the years, stakeholders have examined the cost of education and the subsequent results as measured by the results of some form of high-stakes testing. The stakeholders have argued that there is a gap between educational inputs and outputs. Typical input examples in a public school setting are length of school day, instructional minutes, the quality of the curriculum, the quality of teachers, and other demographic factors. Examples of output variables are measurable outcomes such as performance on industry standard skills assessment, school graduation rates, and mean scores on high school proficiency exit assessments. The input variables are examined to determine their effectiveness on the output variables. Some policy makers and stakeholders have argued that when they look at the results, student achievement in public schools does not meet the expectations of the expenditures. Politicians at the federal, state, and the local level have focused on the need to require students to spend more time in the school by extending the school day and/or the school year to meet the required minimum standards they have set for identifying student proficiency.

In 2012, in the state of New Jersey, a Senate Bill (S-2087) was passed, and enacted as law to supplement the New Jersey Statute, chapter 6 of Title 18A. Under this law, up to 25
public schools were selected to participate in a pilot program as an experiment to extend the school day to improve student performance on state-mandated assessments. The funding of the extended school day was from private partnerships who had later received a tax credit. In 2016, the New Jersey State Legislature passed a similar bill (A-4779) and enacted as a supplement to Chapter 7F of Title 18A. The sponsors passed this bill and its subsequent enactment “to declare a State of Emergency” because the data showed that students at the elementary school level were performing below proficient in LAL especially in urban areas. The supplements to Title 18A, chapters 6 and 7 identified these schools as “underperforming” and sought to provide funding for K–3 to extend their school day by up to 150 minutes (2 1/2 hours). One would assume that for the politicians sounding this alarm, more time in school translates to more learning. Data is still being gathered because the 3-year pilot program was put in place in 2016.

The focus of my study was the influence of length of school day on third grade student academic performance as defined by their performance on the Grade 3 2011 NJASK high-stakes test in LAL and MA. Based on the literature, additional variables were included in the analysis to control for their influence on student achievement. Along with the variable of interest, length of school day, the following variables were included in the analysis as controls - student economic status, student attendance, student mobility, students with disability and students with limited language proficiency. For faculty, the control variables were staff mobility, faculty with master’s degree or higher, and faculty attendance. The individual school served as the primary unit of analysis.

The Purpose of the Research

The purpose of this study was to determine the strength and direction of the relationship between the length of school day and student performance in Grade 3 on the 2011 NJ ASK in
LAL and MA. This study will add to the existing research literature on the influence of length of school day specific to Grade 3, which is the first grade to be tested on the high-stakes NJ ASK. Additionally, it is hoped that this study might also lay the foundation for possible longitudinal studies.

**Organization of the Chapter**

In this chapter, a summary of findings is provided and expounds on the results, which are then compared to previous research on the length of school day. The intention of this study is to provide policy makers and stakeholders evidence-based recommendations for policy and practice. The new ESSA 2015, a reauthorization of ESEA, states, “The law calls for evidence-based school improvement strategies, and allows states to use multiple measures, not just test scores to gauge student success” (ESSA, 2016, p. v). It is in this realm that the presented data and the subsequent summary of findings will serve as the empirical evidence the policy makers will need to make informed decisions to improve student achievement.

**Research Questions and Answers**

This is a nonexperimental, cross-sectional, explanatory study using quantitative research design methods to determine the impact of the influence of school, faculty, and student variables on student performance on the third-grade NJ ASK LAL or MA. The overarching research question for this study was:

What is the influence of the length of school day on the 2011 Grade 3 LAL and MA percentages of total proficient and advanced proficient on the NJ ASK 3 scores when controlling for school, faculty, and student variables?

Two separate simultaneous multiple regressions were run, one for each content subject area. The results indicated that school day length was not a statistically significant variable on
Grade 3 NJ ASK LAL and MA scores. It was also determined that no statistically significant relationship was found between school day length and Grade 3 NJ ASK scores when controlling for school, faculty, and student variables.

**Subsidiary Research Question 1**

What is the influence of length of school day on percentages of total proficient and advance proficient on the NJ ASK 3 LAL when controlling for school, faculty/staff, and student variables?

**Null Hypothesis 1**

There is no statistically significant relationship between length of school day and the LAL 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

**Answer**

Based on the simultaneous and hierarchical regression analyses of data, the null hypothesis was retained. It was determined that no statistically significant relationship exists between length of school day and Grade 3 NJASK LAL scores when controlling for school, faculty/staff, and student variables.

Simultaneous regression was performed by entering all ten predictor variables into the model. Using and examining this model, the R square value was .411, indicating that 41% of the variability in school performance on the 2011 NJ ASK LAL section can be explained by the overall model. Further analysis of the model indicated that of the ten variables, six predictor variables were found to be statistically significant. By examining and squaring the beta, it was determined that students on free and reduced lunch (SES) was the strongest statistically significant predictor of student achievement with -.529 which accounted for 28% of the explained variance in school performance on the 2011 NJ ASK. The next closest was students
with learning disabilities where the R square value was -.123, which accounted for 1.5% of the
explained variance in school performance on the 2011 NJ ASK, school enrollment (school size)
where the R square value was -.132, which accounted for 1.7% of explained variance on school
performance on the 2011 NJ ASK, student mobility where the R square value was -.095, which
accounted for less than 1% of explained variance, faculty/staff with master’s degree or higher
where the R square value was .138, which accounted for approximately 2% of explained
variance on school performance on the 2011 NJ ASK, and students with limited language
proficiency where the R square value was .087, which accounted for less than 1% of explained
variance on school performance on the 2011 NJ ASK. Length of school day, the variable of
interest in this study, was not a statistically significant predictor of student achievement on the
LAL section of Grade 3 NJ ASK (p > .980).

Using the six significant predictor variables identified in the simultaneous regression, in
addition to the variable of interest, length of school day, a four-step hierarchical regression
model was used in an attempt to partition out specific contributions of the explained variance for
each significant predictor. The hierarchical regression analysis results did not deviate
substantially in the explained variance so therefore, for this research question, the null hypothesis
was retained.

**Subsidiary Research Question 2**

What is the influence of length of school day on percentages of total proficient and
advanced proficient on the NJ ASK 3 MA when controlling for school, faculty/staff, and student
variables?
Null Hypothesis 2

There is no statistically significant relationship between length of school day and the MA 2011 NJ ASK 3 scores when controlling for school, faculty/staff, and student variables.

Answer

Based on the simultaneous and hierarchical regression analyses of data, the null hypothesis was retained. It was determined that no statistically significant relationship exists between length of school day and Grade 3 NJASK MA scores when controlling for school, faculty/staff, and student variables.

Simultaneous regression was performed by entering all ten predictor variables that were identified based on the existing body of research on the length of school day. Using and examining this model, the R square value was .226, indicating that approximately 23% of the variability in school performance on the 2011 NJ ASK MA section can be explained by the overall model. Further analysis of the model indicated that of the ten variables, five predictor variables were found to be statistically significant. By examining the beta, the strongest predictor was students on free or reduced lunch (SES) where the R square value was -.305, which accounted for 9% of explained variance on school performance on 2011 NJ ASK, the next closest was school enrollment (school size) where the R square value was -.116, which accounted for 1.3% of explained variance on school performance on 2011 NJ ASK, faculty/staff with master’s degree or higher where the R square was .113, which accounted for 1.2% of explained variance on school performance on the 2011 NJ ASK, and students with learning disabilities where the R square was -.093, which accounted for less that 1% of explained variance on school performance on the 2011 NJ ASK. Length of school day, the variable of
interest in this study, was not a statistically significant predictor of student achievement on the MA section of Grade 3 NJ ASK (p>.480).

Using the five significant predictor variables identified in the simultaneous regression, in addition to the variable of interest length of school day, a four step hierarchical regression model was used in an attempt to partition out specific contributions of the explained variance for each significant predictor variable. The hierarchical regression analysis results did not deviate substantially in the explained variance so therefore, for this research question, the null hypothesis was retained.

Conclusions and Discussion

In the course of comparative analysis of the results of simultaneous and hierarchical regression models for both LAL and MA performance in the amount of explained variance, there was a significant disparity. In LAL, the regression models explained approximately 41% of variance in performance. For MA, the regression models explained approximately 21% of variance in performance. This disparity can be attributed to the emphasis of a more literacy-based curricula in most elementary schools. On the other hand, school districts, being locally controlled, have adopted different math curriculums. For example, one school district might be using the University of Chicago’s Every Day Mathematics curriculum whereas another might be using the Singapore Mathematics curriculum. However, the curriculum implementation and instructional delivery depends on how effective the teacher is in the knowledge of MA and how to teach it at elementary school level. In their article “Who Should Lead Mathematics at the Elementary School Level,” Reys And Fennell (2003), found that elementary school teachers viewed themselves as elementary classroom teachers who teach various subjects rather than “mathematics teachers”. This confirms the findings in this study that the higher the teachers’
credentials, the higher the student achievement. The variance disparity between LAL and MA can be narrowed if the teachers are more knowledgeable in MA. Furthermore, it should be noted that when the supplement to Chapter 7F of Title 18A was enacted, the “emergency” was based on performance of LAL at the third-grade level.

School Day Length

The findings of most of the empirical studies conducted on the length of the school day have been mixed. Even after conducting a review of various studies on the topic of length of the school day from 1985–2009, Patall, Cooper, and Allan (2010) concluded that due to variations in research designs and weak correlation in the results of the studies that determined evidence that would support the effectiveness of lengthening a school day, they suggested that additional research was necessary. In his article entitled, *Education Production Functions*, Hanushek (2007) commented on studies on inputs as measured by various outcomes of student achievement, Hanushek stated, “This measure simply counts the time spent in schools without judging what happens in schools” (p. 1). This statement indicates that the study of length of school day is complex because you cannot accurately measure everything that takes place inside the classroom. What happens inside the classroom is determined by the effectiveness of the teacher in implementing the curriculum. There have been only a few studies that have been conducted on this topic. For instance, variations across the classes in implementation of the curriculum was found by Odom, Fleming, Diamond, Lieber, Hanson, Butera, Horn, Palmer, & Marquis (2010). The authors’ study examined different forms of curriculum implementation and how instruction is delivered. In addition, measuring what happens in the classroom presents some limitations to a research design in that it requires to have a control group.
In one of the complex studies that included various combination of short, median, and long school days, Sammarone (2014) concluded length of school day had no influence on Grade 6, 7, and 8 NJ ASK LAL and MA scores’ results. According to Sammarone (2014), when all predictor variables were examined, the strongest predictor was socioeconomic status. The author explained in part, “socioeconomic status by far had the largest predictive contribution to the dependent variable compared to the other predictor variables” (Sammarone, 2014, p. 258). The author posited that her findings would not justify increasing expenditures related to expanding the school day.

The Coleman Report (Coleman et al, 1966) set out to research disparities of allocation of educational resources and opportunities in American segregated public schools at the dawn of the Civil Rights Era. The Coleman Report (1966) urged policy makers and stakeholders to visualize a child coming hungry to an overcrowded, dilapidated and poorly lit classroom, where he or she is taught by a teacher with no college degree in a school that lacks sufficient textbooks. According to this report, it was more than just statistics. It is a societal issue that seems to still be a concern and more prevalent in urban or high poverty schools even to this day. This landmark document revealed that, in fact, it was socioeconomic status that had the largest impact on student achievement. Hanushek (2016) has conducted research to gauge what improvements have occurred since the Coleman Report was published. Hanushek’s (2016) findings are still of concern due to seemingly lack of tangible progress. The author reports that according to the 2013 National Assessment of Education Progress (NAEP), the achievement gap between white and black has not been narrowed or closed. Hanushek (2016) also found that although the class size has been reduced over the past 50 years, the expenditure per pupil has increased. In addition, Hanushek’s (2016) study found that the student performance in both reading and math has
remained almost at the same level as when the original findings were reported. Hanushek (2016) pointed out that the Coleman Report mentioned poverty only once in the report and it was only in the summary but was never used in the analysis (p. 23). Hanushek (2016) concluded that family demographics and teacher effectiveness influences student achievement.

At the high school level, deAngelis (2014) conducted a study which looked at the influence of school day length on 2011 HSPA. The author’s findings indicated that there was no statistical significance between length of school day and student achievement. deAngelis (2014) also found that socioeconomic status was a statistically significant predictor of achievement on the HSPA. In a similar research, Plevier (2016) conducted a study which looked at the influence of school day length on Grade 4 and Grade 5 NJASK LAL and MA scores. Plevier’s (2016) study also found that there was no statistically significant relationship between school day length and student achievement. The author concluded that school day length was not a predictor of student achievement but rather, socioeconomic status was the strongest predictor of student achievement. The results of Plevier’s (2016) analysis was consistent with both the Sammarone (2014) and the deAngelis (2014) findings along with the findings reported in this study.

Additionally, when the State of Massachusetts evaluated the implementation and outcomes of Extended Learning Time (ELT), Checkoway, Gamse, Velez, and Linkow (2013) reported that the results indicated no clear relationship between ELT and student achievement. Walsh (2007) notes that length of school day is an opportunity to learn rather than the measure of learning. Therefore, ELT serves as an intervention strategy by which, most students in low performing schools are supervised in a safe learning environment.

Most of the recent literature on the effect of socioeconomic status on student achievement was illuminated by Tienken’s research and his follow up studies (Tienken & Orlich, 2013).
Tienken and Orlich argue that students cannot perform at their maximum potential if they are disadvantaged in several factors. One of the factors identified is student mobility and the lack of adequate housing. Families are forced to move frequently.

**Student Mobility**

Parke and Kanyongo (2012) reported that mobility and attendance in elementary grades was statistically significant on student achievement. Due to the negative effects of mobility and poor attendance, minority groups are more vulnerable to low achievement on standardized tests. Friedman and Raver (2015) noted in their findings that, for those students experiencing frequent mobility, they were at least 8 months behind in learning due to the loss of instructional time.

Thompson (2015) looked at various variables that influence student achievement, including student mobility yet Thompson’s study found that socioeconomic status was still the strongest predictor of student achievement. These findings are consistent with a large body of research regarding the impact of socioeconomic status on student achievement previously mentioned. Aikens and Barbarin (2008) found that the higher the socioeconomic status, the higher the initial reading scores.

**Teachers’ Level of Education**

In my study, the predictor variable that was second in influence only to that of socioeconomic status in both LAL and MA was teachers with a master’s degree and higher. These statistically significant variables accounted for 2% and 1.3% of the explained variance in the scores, respectively. The results indicate that there is a positive relationship between teachers with advanced degrees and student achievement. Johnson (2005) explained that students who are assigned teachers with higher credentials tend to outperform students whose teachers have less than a master’s degree especially in subject-specific areas, such as MA.
The positive relationship between strong professional credentials and student achievement suggests that teacher effectiveness is essential to student academic excellence. Guarino, Rathbun, and Hausken (2006) found that there was a strong relationship between teacher credentials and student achievement. Therefore, based on the results of this study and other researchers (Plevier, 2016; Michel, 2004), teacher credentials do have a positive influence on student achievement on the LAL and MA NJ ASK 3 test scores. Unfortunately, studies have shown that teachers who have stronger and more robust credentials tend to teach in better and high performing schools (Clotfelter et al., 2007). These findings adversely affect schools in low-income neighborhood schools as they are unable to hire and retain effective teachers.

**School Size**

This study also found that school size, as defined in this study as total school enrollment, was statistically significant in both LAL and MA achievement scores. The negative relationship suggests that as the school size increases, the school’s performance decreases. Tanner and Tanner (2007) stated that a smaller school services the student better by giving them personal attention. In addition, Howley and Howley (2004) also found that student achievement is higher when the school is smaller. Furthermore, school size tends to increase the class size. This adversely affects individual interactions between teacher and students in the classroom. Research studies such as STAR have shown that as class size increases, student performance in the school decreases (Finn and Achilles, 1999). Schools in poor or urban areas with increased enrollment due to a lack of usable space would likely be at more of a disadvantage when compared to their peers in wealthier districts. At the high school level, when schools were restructured into smaller schools, graduation rates and high achievement increased (Grauer, 2012).
Recommendation for Policy and Practice

In each subject area of LAL and MA on the Grade 2011 NJ ASK 3 test, school day length was not statistically significant as a predictor of student achievement. Based on the New Jersey Senate Bill, S-2087 which was enacted as a supplement to Title 18A, Chapter 6 and New Jersey Legislative Bill, A-4779 and subsequently enacted as a supplement to Title 18A, Chapter 7F, politicians and stakeholders suggest that lengthening a school day will increase student performance at both elementary and secondary school level. The original Senate Bill had set aside at least $75 million dollars for up to 3 years by which selected underperforming schools would be funded in partnership with private stakeholders through tax credits. Additionally, the 2016 Legislative Bill, supplement to Chapter 7F of Title 18A would focus its attention on supporting the K–3 grades in expanding or lengthening the school day. Although research-based evidence shows that socioeconomic status has the strongest impact on student achievement, policy makers and various stakeholders continue to believe that lengthening the school day would improve school performance. Although there are other factors that significantly influence student achievement, many of which are listed on the New Jersey School Report Card, policy makers continue to demonstrate an unwillingness to examine their impact. The focus on school day length and the subsequent funding does not translate into effective teaching and learning. Furthermore, researchers have found that lengthening the school day may be the least effective way to do so.

Aronson, Zimmerman, and Carlos (1999) estimated that the costs of extending the school day could reach $1.1 billion annually depending upon the state. It should be noted that the figures are substantially higher at today’s costs. Researchers (Checkoway et al, 2013) have
pointed out the unintended consequences of teacher burnout and student fatigue could also be an ancillary result of extending the school day.

It is recommended that policy makers and stakeholders adapt social policies to align with issues that students and their families face. The policy makers should have policies to require various and adequate healthcare services within the school building. According to Tienken (2013) the children of poverty lack basic resources such as healthcare and adequate shelter. Lack of healthcare prevents families to participate in wellness for their children. Wellness includes regular doctor visits to monitor child development and other routine medical checkups. The visits result in preventable chronic illnesses. Chronic illnesses lead to a vicious cycle of a habit of chronic absenteeism as students move up through the grades. The policy of extending healthcare would ensure that students, who would otherwise be marginalized due to health concerns and other socioeconomic factors, would benefit from any opportunity to learn programs. Berliner (2009) asserted, “Poverty limits potential” (p. 1). Leaders should pursue partnering with various organization that provide remediation and enrichment resources during the regular school day, after school, and at home. Suitts (2016) gave an example of a pilot project called the Harlem Children’s Zone that has shown that student success with low-income students. The Harlem Children’s Zone adopted the comprehensive Comer approach. The developers of the Comer approach stated that it is a process or model that includes school planning and management, student and support, and parents.

In this study, the descriptive data shows that the mean percentage for students receiving free or reduced lunch in LAL and MA test takers was approximately 37%. In a wealthy country such as the United States, this figure is quite high. Angelillo (2016) noted in his research on the value of community demographics in which he explained that household poverty was a
statistically significant predictor of student performance on Grade 8 NJ ASK test scores. Tunkelo (2012), quotes the American Psychological Association’s definition of SES which states, “Socioeconomic status (SES) is measured as a combination of education, income, and occupation” (p.1). In addition, Tunkelo (2012) cites Aikens and Barbarin (2008) who noted that schools located in a low-income area tend to have inadequate resources to support those children who have low literacy skills. This observation suggests that education is one of the predictors of social mobility. This was echoed in the study by Sammarone (2014) who explained, “Lawmakers must focus on what matters: a family socioeconomic status (SES)” (p. 271). The author went on to state, “Providing assistance for everyday living costs such as housing and quality child care would enable these families to provide a better, more stable home life and in return, students may be able to focus on learning and thereby increasing achievement and narrowing the achievement gap” (Sammarone, 2014, p. 271–272).

Even school districts identified as wealthy have students receiving free or reduced lunch brought on by the 2008 economic recession or an influx of new immigrants lacking the necessary language skills needed to succeed. Sirin (2005) illuminated that parents tend to move and live in a school district with high socioeconomic status. These families still need the tools to adequately prepare their children to assimilate and “catch up” with their peers. In this case, it is recommended that policy makers and school leaders consider within-district public school choice by creating or expanding magnet schools.

In certain New Jersey school districts, the towns and school districts have historical specific zoned-school boundaries. It is recommended that school districts have flexibility in enforcing the boundaries by allowing busing where each school is more than 2 miles from the elementary school of choice. Depending on the location of the school district, the transportation
costs would still be cheaper than extending the school day at the elementary school level. This strategy may be combined with enrichment and remediation programs within the elementary school buildings.

Although my study found that students with limited language proficiency was a weak predictor in school performance, the changing demographics warrants that this variable should get attention in the early primary grades by creating more opportunities for language remediation and instruction to compensate for a student population where the primary language is not English. The data in this study indicates that as the percentage of students with limited language proficiency increases, so does the LAL performance. This means the positive relationship and influence on the NJ ASK scores. The combination of low socioeconomic status and English learning deficiencies, if not remediated, creates an ever wider and continually increasing student achievement gap. Where there are no adult learning programs, funding, through grants should be sought and provided to improve their career-related skills. It is recommended that there be more LAL reading and conversational programs geared to English Language Learners.

In this study, it is evident that teacher effectiveness has a positive influence on student achievement. It is recommended that support for professional development for both elementary and secondary teachers should be expanded. The results indicated that for teachers having a master’s degree or higher, especially in specific subjects, student performance increased. For the schools located in the low-income areas, teachers should be encouraged to pursue advanced degrees beyond the initial bachelor’s degree by offering tuition reimbursement. Research shows that for teachers with master’s degree or higher in specific subject areas their students tend to outperform students whose teachers do not have a master’s degree. For the teacher in specific subjects, tuition reimbursement should not be applied on a first come, first served-basis but
rather by interest and college performance on earned credits. Policy makers should also encourage school districts to create flexible schedules that allow teachers to develop meaningful on-going Professional Learning Communities (PLCs) in addition to common planning time. These strategies should include innovative instructional strategies that improve student engagement and student achievement.

Schools located in the low-economic areas tend to experience a revolving door due to teacher turnover. This study found that teacher mobility had a statistically significant but minimal effect on student achievement. However, Johnson (2005) found that faculty mobility in high poverty areas was a source of concern because it is twice that of suburban school districts. It is recommended that policy makers and stakeholders encourage school districts to budget for various incentives that attract and retain effective teachers in high poverty areas. In addition, continuous support through proven mentorship programs for new and veteran teachers should continue to be developed and implemented. Discussion about merit pay has been met with resistance because it is tied to individual teacher performance based on students’ performance on high-stakes tests. Therefore, it is recommended that leadership in the schools develop a carefully-monitored reward system that would include faculty and staff when the school’s performance shows improvement by using research-based multiple measures assessments.

The reauthorization of Every Student Succeeds Act (ESSA 2016) presents more opportunities as long as research data is reliably collected, accurately analyzed and interpreted. The ESSA document has given individual states the flexibility to develop their own accountability systems (USDOE, 2016). It is incumbent on the states to develop effective programs for the community and the schools that are underperforming. It is recommended that continuous program evaluation using various instruments should be in place to measure the
success and effectiveness of the programs. For instance, gathered data should show student improvement in performance and learning growth.

**Recommendation for Future Research**

This was a study that sought to explore the influence of the length of school day and student achievement as measured by Grade 3 NJ ASK LAL and MA scores. The results indicated that length of school day had no statistically significant influence on the achievement scores. The results of the study were consistent with findings of the most recent studies conducted on this topic. The results have revealed that it is socioeconomic status that should be addressed by providing support to individual students and schools in high poverty areas. It is hoped that more support should be offered to families by improving the neighborhood’s resources. This study compared other studies and concluded that further research is warranted especially on teacher effectiveness and school enrollment at the elementary school level. It is recommended that the following list be considered for further research:

- Design a longitudinal study that includes the sample of students that were in the first assessment of Grade 3 through Grade 5 or 6.
- Design a study using Propensity Score Matching rather than a nonexperimental, cross-sectional, explanatory method to better approximate a randomized design.
- Conduct a study on classroom instructional time and its effect on student achievement.
- Conduct a study on the influence of teacher absenteeism and student absenteeism on student achievement.
- Provide continuous professional development for MA knowledge and instruction strategies for elementary school teachers.
• Research the difference between the quality of the instructional time as compared to the quantity of it.

**Conclusion**

This study sought to explain the influence of school day on student achievement as measured by the Grade 3 2011 NJ ASK in LAL and MA scores. Although the results from various research studies have been mixed, the most significant finding is that of the negative strength of the relationship between socioeconomic status and student achievement. Of all ten variables that were analyzed in this study, the strongest was socioeconomic status, faculty with master’s degree and higher, and school enrollment. Other variables that were found to be statistically significant were students with learning disabilities, students with limited language proficiency and student mobility. It is the conclusion of this research that policy makers and stakeholders focus closely on these variables and collect and disaggregate the data accordingly. Policy makers need to understand the results of the research and how to use the data appropriately and wisely. This way, it will be beneficial to the students in terms of overall achievement and individual efficacy. It would also be beneficial to the policy makers and the stake holders in that a positive return on investment will be realized. Policy makers and stakeholder must examine the findings of studies on the influence of school day length. The results from the research studies indicate that there is no statistical significance based on length of school day on student achievement. Therefore, there is no specific benefit to the students with regards to standardized test achievement and the schools overall in potentially funding this school improvement strategy.
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