Fall 10-24-2016

The Influence of Instructional Time on Student Achievement in Grades 3, 4, and 5 in Language Arts and Mathematics on the 2011 New Jersey Assessment of Skills and Knowledge (NJASK)

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THE INFLUENCE OF INSTRUCTIONAL TIME ON STUDENT ACHIEVEMENT IN GRADES 3, 4, AND 5 IN LANGUAGE ARTS AND MATHEMATICS ON THE 2011 NEW JERSEY ASSESSMENT OF SKILLS AND KNOWLEDGE (NJ ASK)

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Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Education

Seton Hall University

2016

SETON HALL UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN SERVICES
OFFICE OF GRADUATE STUDIES

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Abstract

The purpose of this cross-sectional, non-experimental, explanatory quantitative research study was to determine the strength and direction of the relationship between instructional time and student achievement in Grades 3, 4, and 5 on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts Literacy (LAL) and Mathematics. The unit of analysis was school. The sample included all public elementary schools in the state of New Jersey with students who participated in the NJASK 3-5 LAL and Mathematics assessments for the 2010-2011 school year.

The independent or predictor variable of interest was instructional time, which is defined as the exact amount of time a school dedicates to instruction during a normal school day controlling for educator, student, and school variables. Student variables included student attendance, student mobility, and Limited English Proficiency. Educator variables included educator attendance, educator mobility, and credentials of the educators and administrators at the school. Other school level variables included economically disadvantaged students receiving special education services and total size of the student population for that school.

The variable of interest, total instructional time, was not a statistically significant predictor of student achievement in Grades 3, 4, and 5 on the 2011 NJASK for Language Arts Literacy and Mathematics. The variable that proved to be the most significant predictor of student achievement in Grades 3, 4, and 5 on the 2011 NJASK for Language Arts Literacy and Mathematics was socioeconomic status or economically disadvantaged. Other variables that were found to be statistically significant predictors of student achievement included the percentage of faculty with a higher degree and the percentage of students with disabilities, which were statistically significant predictors of student achievement for students in Grades 3, 4, and 5 on the LAL NJASK, as well as for Grades 4 and 5 on the Mathematics NJASK.

Acknowledgments

First and foremost, I want to thank my Seton Hall Dissertation Committee, Dr. Gerard Babo, Dr. Barbara Strobert, and Dr. Daniel Johnson.

Dr. Babo, I am eternally grateful to you for the everlasting support throughout this process. Regardless of the stage in the process, you were supportive and encouraging. You made me believe that I could achieve my goal.

Dr. Strobert, you have always been a role model for me as a knowledgeable, successful woman in educational leadership. Throughout my coursework and dissertation, you challenged me and encouraged me to persevere.

Dr. Johnson, thank you for helping me to develop a love for learning and writing as my high school teacher. I am so appreciative of all of your encouraging words.

I would be remiss if I did not mention some of the other Seton Hall professors who challenged me and guided me throughout my Ed.S. and Ed.D. programs. Thank you to Dr. Gutmore, Dr. Kuchar, Dr. Tienken, and Dr. Sattan-Bajaj for all of the lessons that you bestowed upon me through your teachings.

A special thank you to my present colleagues and students in Randolph Township as well as my colleagues and students from Sparta and Ogdensburg, who encouraged me to follow my dreams. To my elementary school principal and lifelong mentor, Ms. Patricia Dolan, thank you for inspiring all of your students to persevere and never give up.

Thank you to Meghan Plevier for your words of encouragement and guidance, especially in the last few months when I needed it most. You are a wonderful friend and colleague.

Susie Elias, from our undergraduate programs at Rowan to our Ed.S. and Ed.D. programs at Seton Hall, I am so appreciative of your support and friendship throughout it all. I could not be more proud of you for everything you have accomplished thus far.

To my friends who have been there for me over the years—Kristen Friedrich, Shannon Sullivan, Katie Dennehy, Laura Chegwidden, Michael Nicholas, Stephen Pilot, and Jason Greene—thank you for your everlasting support. And to all of my other friends and family who have always believed in me, thank you!

Dedication

I dedicate this dissertation to my amazing family. You have all been there for me countless times over the years, and I am eternally grateful for your love, support, and guidance throughout each step in this process. I am truly blessed to have all of you in my life.

To my parents, Vito and Rosanne Telischak, thank you for being there for me at all points in this process whether it was a home cooked meal, words of encouragement, or taking care of Paulie. Thank you for believing in me and encouraging me to be a lifelong learner. You are remarkable parents, and I hope to one day bestow the same gift upon my children that you have bestowed upon me; a belief that I can do anything I put my mind to.

Thank you to my brother, Vito, and sister-in-law, Jennifer, for your support. I appreciated the random check-ins to see how things were going. To my niece, Anastasia, and my nephew, Krystof, may you always follow your dreams and reach for the stars. I love you and believe in you!

Thank you to my sister, Jennifer, and my brother-in-law, Luigi, for the dinners and quality time when I needed it most. To my nephews, Luca and Anthony, thank you for making me smile and laugh every step of the way. You are shining stars and I love you so very much!

Thank you to my sister, Kristen, and brother-in-law, Rory, for always encouraging me. Your words of encouragement and praise after each small success in this process made a world of difference and definitely motivated me to continue onward. I know it is only a matter of time before you are both writing your own acknowledgments page.

Thank you to my sister, Vanessa, who has always been there for me and believed in me. Regardless of the time of day, you are always there for me. You are an amazing sister, teacher, and artist. I know you will continue to achieve greatness throughout your life.

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CHAPTER I

INTRODUCTION

Background

Educational programs and decisions have been altered to fit the needs of society as society changes. As politicians become increasingly involved in educational decision-making, it is critical for educational leaders to be active participants in the process to ensure that policy-makers make appropriate data-driven decisions regarding educational topics. Instructional time is at the forefront of many politically-driven discussions about school districts. Understanding the impact and effect of instructional time on student achievement and standardized testing provides educational professionals with necessary information to encourage educationally sound decision making for students in the New Jersey public schools.

State mandates, new evaluation systems, and standardized tests intensify the pressure administrators endure on a daily basis related to student achievement and expectations of educators. With the main focus of improving student outcomes, instructional leaders must evaluate the current research to ensure that school and district decisions are grounded in empirical research findings. According to Patall, Cooper, and Batts Allen (2010), the National Education Commission of Time and Learning was developed in 1991 to research the impact of time on the outcomes of student learning and achievement. Districts allot funds for instructional resources in an attempt to improve instruction for students without necessarily understanding the charge or ramifications of their decisions. Understanding the implications of increasing instructional time is a critical component of successful instructional planning.

The concept of education for all children has been around for decades. By 1960, education had become the nucleus of political discussions and planning under the leadership of

President Johnson (Smith & Gallagher, 2008). In our current educational structure, public education is heavily influenced by politicians and other leaders in society. Political agendas continued to increase pressure on education through summits and documents including *A Nation at Risk*, published in 1983 by the National Commission of Excellence in Education, which evaluated the United States school year and compared it to other countries (Patall, Cooper, & Batts Allen, 2010). The findings identified United States schools as having significantly less time in school each year than in competing countries.

A Nation at Risk sparked conversations about education in our country that led to the development of standards-based education. Standards provide clear parameters for staff related to expectations of content that should be covered throughout the year. Standards led to the belief that standardized testing was needed to measure progress. Standardized testing should have a place in an educational model, but it should not be the sole factor to assess student achievement. Although the test results provide some information, data and research related to the impact of extended instructional time provide other critical information.

The reality is that our society functions as a direct result of funding on the local, state, and federal level. The funding needed to make changes in education and curriculum is generally swayed by influential politicians and business leaders. As districts attempt to improve instruction, politicians and other stakeholders express dissatisfaction with various policies and procedures related to time. Unfortunately, many do not understand the difference between length of school day and instructional time. Without understanding instructional time, many districts increase the length of the school day with expectations that student achievement will improve. The New Jersey State report card for each district delineates the distinction between length of school day and amount of instructional time by explaining each category. As defined by the New Jersey Administrative Code 6A: 32-8.3 (a), (b), (e), the length of the school day must exceed four hours excluding recess and lunch under the guidance of a certified teacher.

The research on instructional time and extending the school day runs the gamut. Districts across the country have attempted to increase instructional minutes through various changes to the school day including, but not limited to, before or after school programs, summer school, extended school day, and year-round schools (Long, 2014). According to the Center for American Progress, over 300 studies have been conducted based on the need for data regarding instructional time and school efficiency (Patall, Cooper, & Batts Allen, 2010). Effective schools evaluate and assess the length of instructional time in the school day to make determinations regarding potential school programs and resource allocation.

According to Morton and Dalton (2007), data from the Schools and Staffing Survey (SASS) show that the average amount of instructional time in the major content areas increased by 36 minutes from 1988 to 2004. The survey data demonstrates the focus in our country on increasing instructional time. Examining average instructional time reveals students receive approximately 80 minutes of instruction a day in language arts and 45 minutes of instruction in mathematics (Phelps, Corey, DeMonte, Harrison, & Ball, 2012). Findings from the Schools and Staffing Survey (SASS) show that instructional time in language arts, math, social studies, and science has increased from 1987 to 2004 (Morton & Dalton, 2007). In order for increased instructional time to be a worthwhile endeavor, it must significantly improve student achievement, especially on standardized state and national assessments. The dilemma lies in the research conducted on the impact of instructional time on student results.

Statement of the Problem

Instructional time has been debated by policymakers as well as by officials at the national, state, and local levels. The reality is that increasing or decreasing instructional time has the potential to impact student achievement, but the research on the impact of increasing instructional time on student achievement varies and the findings are inconclusive. The relationship between amount of instructional time and student achievement requires further investigation. Decisions are often made based on the data collected from standardized assessments such as the New Jersey Assessment of Skills and Knowledge without a clear picture of the impact that extended instructional time has on student achievement. Educational policy and program decisions require policymakers to have additional research and data on the impact of extending instructional time prior to imposing new policies on districts related to instructional time.

Smith (2000) explains that increasing instructional time has the potential to improve student achievement and school success. There are potentially positive and negative effects of extending instructional time with regard to students, educators, parents, and society. Patall et al. (2010) identified positive impacts including increased time for instruction, decrease in cost of daycare, and potential for more learning opportunities. Conversely, increased instructional time could lead to a misuse of the additional instructional minutes and negative impact on student motivation (Patall et al., 2010). Time is a critical resource in education and we must lead schools with data-driven decisions that provide equity and equality for students in all areas, specifically instructional time.

> A student in a classroom one standard deviation below the mean can expect to spend a daily average of 56 min less time in ELA instruction and 30 min less in mathematics

> instruction than a student attending the corresponding classroom one standard deviation above the mean (Phelps et al., 2012, p. 632).

The data ascertained by Phelps et al. demonstrate the problematic nature of instructional time. Students are receiving inequitable instructional time, which has the potential to significantly impact student achievement exponentially. Since the data and research on instructional time are inconclusive, it is critical to develop a more comprehensive understanding of the impact of instructional time on student achievement in Grades 3, 4, and 5.

Furthermore, Smith et al. (2005) observed that using afterschool programs for basic skills increased student achievement in Mathematics and English Language Arts for third grade students in Chicago. The major challenge is establishing whether the added time to the school day is actually improving instruction. Opportunity to learn focuses on the amount of time set aside for learning to occur (Carroll, 1989). Unfortunately, districts increase the number of minutes students are in school with the expectation that it will to increase student achievement, but that is an inaccurate assumption.

Although evaluating the number of minutes students spend on learning is beneficial, districts must examine other factors including quality of instruction. An increase in instructional time is only as powerful as the level of instruction students are receiving during additional instructional time (Jami, Burton, & Chapman, 2012). Instructional quality is often an undervalued element of the instructional time discussion.

For example, if students have an additional 30 minutes of instructional time each day, the charge is that the students would have improved student performance as a direct result of the additional instructional minutes. Allocating additional instructional minutes is essential, but the next step in the process would be to assess the instructional plan for the supplementary instructional block. Certain teachers may use that time to host guided reading groups or work on problem solving techniques, while other teachers may think of that time as free time for students to choose tasks without any guidance. Although each option has merit, the results will vary significantly from classroom to classroom with regard to language arts and mathematics based on the level of expectation and curriculum depth (Long, 2014). These teacher-specific variations in depth and breadth of instruction during additional instructional time are a limitation of this study.

The New Jersey Assessment of Skills and Knowledge Language Arts (NJASK) sections focus on reading and writing performance, which is assessed through writing prompts, reading passages, and open-ended responses. Therefore, the methods employed by classroom teachers during the additional instructional time are a critical component of student success. The quality of instruction, as well as an educator's credentials and experience, impacts student success. With regard to language arts instruction, a student who has a teacher with a comprehensive background as a reading instructor may have more significant results than a student who has a teacher with a background in mathematics.

Purpose of the Study

Administrators need to have a comprehensive understanding of the impacts of increasing or decreasing instructional minutes in order to make equitable and knowledgeable educational decisions for the students and staff in their school/district. Consequently, the purpose of this study is to determine the strength and direction of the relationship between instructional time and student achievement in Grades 3, 4, and 5 on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts Literacy (LAL) and Mathematics.

Additional data will be beneficial for educational policy decisions in an effort to create equity in instructional opportunities for all students in New Jersey public schools. The New Jersey State Report Card for each district delineates the distinction between length of school day and amount of instructional time by explaining each category. Length of school day refers to the total number of minutes a school is in session for a typical full day, while instructional time focuses on the number of minutes of instruction a student receives during that school day. For the purpose of this study, data on instructional minutes were acquired from the New Jersey State Report Card. The New Jersey Department of Education (NJDOE) provides annual district/school information in the areas of instructional time, length of school day, school performance, enrollment, absenteeism, and demographic data, which are presented on the New Jersey State Report Card. It is the hope that the results of this study will provide school officials with information that can potentially enhance decision making related to (a) improving student achievement, (b) time management of school schedules, and (c) effective use of fiscal resources.

Research Questions

The research questions were developed to explore the strength and direction of the relationship between instructional time and student performance on the New Jersey Assessment of Skills and Knowledge for the 2010-2011 school year in LAL and Mathematics. The primary overarching research question for this study is the following: What is the influence of instructional minutes on the 2011 Grade 3, 4, and 5 Language Arts and Mathematics NJASK scores?

Research Question 1: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in LAL measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 2: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in LAL as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 3: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in LAL as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 4: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in grade 3 on the standardized assessment in Mathematics as measured by NJASK3 for 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 5: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in Mathematics as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 6: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in Mathematics as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypotheses

Null Hypothesis 1: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 2: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 3: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 4: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 5: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 6: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 Mathematics scores when controlling for educator, student, and school variables.

Design and Methodology

The methodology used to conduct this study will be a cross-sectional, non-experimental explanatory, quantitative research design. The main data source for the study is the 2011 New Jersey Assessment of Skills and Knowledge scores as well as the duration of instructional time found on the New Jersey State Report Card for each school in New Jersey. Data analysis was completed using the SPSS program. By examining the data from the sources listed previously, it is clear that the data are accurately represented.

Independent/Predictor Variables

The independent or predictor variable of interest is instructional time, which can be defined as the exact amount of time a school dedicates to instruction during a normal school day, controlling for educator, student, and school variables.

Student variables include student attendance, student mobility, percentage of students receiving special education services, and student Limited English Proficiency (LEP). Educator variables include educator attendance, educator mobility, and credentials of the educators and administrators at the school. Other predictor variables that were used as control variables at the school level include socioeconomic status, total size of the student population for that school, and total instructional time.

Dependent/Outcome Variables

The dependent or outcome variable was obtained from the published New Jersey Assessment of Skills and Knowledge (NJASK) scores for students in Grades 3, 4, and 5. The dependent or outcome variable is aggregate student performance by school on NJASK Grades 3-5 in LAL and Mathematics. The NJASK is a criterion-referenced assessment that reports composite scores in both LAL and Mathematics. The composite scores are scaled scores ranging from 100 to 300. The NJASK scores are broken down into three categories: Partially Proficient, in which the score is less than 200; Proficient, in which the score is between 200 and 249; and Advanced Proficient, in which the score is 250 or above.

The unit of analysis is school. The potential sample includes all public elementary schools in the state of New Jersey with students who participated in the NJASK 3-5 LAL and Mathematics assessments for the 2010-2011 school year. The data were obtained from the NJDOE website. The data are valid and reliable since they were collected by the New Jersey Department of Education through evaluation of the completed NJASK 3, NJASK 4, and NJASK 5 assessments in LAL and Mathematics.

Significance of the Study

Policymakers emphasize the value and importance of increasing the amount of time students are in schools, making the assumption that increasing time spent in school will directly impact student achievement and success. The reality is that the research on instructional time is inconclusive due to the vast differences in findings as well as a lack of follow up data collection to further investigate initial findings. This study provides additional data on instructional time and student achievement to extend research on the topic of instructional time and student achievement in Grades 3, 4, and 5 on the New Jersey Assessment of Skills and Knowledge for LAL and Mathematics for the 2010-2011 school year.

These data can assist policymakers and school officials in decision making related to state and local policies concerning instructional time. In addition, it will add to the current research and data collection on the topic by including Grades 3, 4, and 5 in the state of New Jersey. This study can impact site administrators by providing more research and data on the impact of instructional time on student achievement. When districts complete a cost-benefit analysis of increasing instructional time, this study can provide site administrators with critical information to make informed decisions.

Limitations of the Study

The study has certain limitations related to the type of study. Since this is a correlational design, a cause and effect relationship cannot be established. The study is based on the 2010-2011 New Jersey Assessment of Skills and Knowledge data, which is five years old at the time of this study. Since this study only focuses on a specific time period and one point in time, it is considered a cross-sectional study. As stated by Smith (2000), information gathered from the New Jersey State Report Card regarding instructional time does not account for the time loss associated with planned and unplanned school events and circumstances. Therefore, the amount of instructional minutes may not align to actual day-to-day functioning of the school. Furthermore, instructional time as reported on the New Jersey School Report Card is not broken down by specific content area, which limits the implication on how instructional time specifically influences Language Arts Literacy and Mathematics performance. As discussed previously, standardized testing provides districts with information on student achievement, but there are weaknesses. The data assess student understanding one week per year. Student performance in schools varies from day to day and week to week. Some of the student performance scores may not accurately depict the student's true level of performance.

The quality of instruction also impacts the level of student achievement. For example, a student with a teacher who focuses on student completion of low-level thinking tasks may have different results than students who are engaged in higher level thinking tasks that require synthesis and analysis. Regardless of instructional time, student achievement in LAL and Mathematics varies based on the level of expectation and curriculum depth set forth by individual classroom teachers (Long, 2014). Consequently, quality of instruction is not addressed in this study, which presents a significant limitation.

Delimitations of the Study

The data for this study were compiled based on the New Jersey State Report Card for elementary public schools ranging from Grades 3-5. This study focused on a specific year of data, 2010-2011. Although the data were collected during a specific year, standardized test data are an assessment of student performance at a specific point in time. The results of this study can only be generalized to general education and special education students in public elementary schools in New Jersey who participated in the NJASK in Grades 3, 4, and 5 for the 2010-2011 school year.

Organization of the Study

The study is divided into five chapters. Each chapter provides a critical foundation for the subsequent chapter.

Chapter I identified the broad context that the study fits into as well as the problem statement and purpose for the research. The study focuses on the impact of instructional time on student achievement in Grades 3, 4, and 4 on the New Jersey Assessment of Skills and Knowledge in Language Arts and Mathematics.

Chapter II provides an introduction to the literature on the topic of instructional time. The literature review addresses the extant research regarding the relationship with various variables and instructional time.

Chapter III focuses on the methodology of the study including the design, participants, setting, and other information regarding data collection and analysis.

Chapter IV presents the results and findings of the study.

Chapter V summarizes the information that has the potential to impact future studies and research related to instructional time.

CHAPTER II

REVIEW OF LITERATURE

Introduction

School districts across the state of New Jersey are encountering an educational dilemma, as they are charged with the task of improving student performance while being required to cut costs at the district and school level. With regard to improving student performance, school officials attempt to determine whether increasing instructional minutes in the school day positively impacts student performance. In order to accommodate the high expectations set forth by standardized testing and Common Core State Standards, some school districts are attempting to close the gap by increasing instructional minutes during the school day. According to Harn, Linan-Thompson, and Roberts (2008), increasing daily instructional time by 30 minutes had a positive impact on student achievement in basic literacy skills. Increasing instructional time requires districts to restructure the budget to allocate the necessary funding to compensate educators for the additional hours. For instance, if a district were to increase instructional time by 30 minutes each day over the course of the year, educators' contractual days would increase by approximately ten days. In order to make the determination of whether or not it is prudent to reallocate funding, districts in the State of New Jersey must have the necessary data and information to assess the impact of extended instructional time on student achievement.

The purpose of this study was to determine the strength and direction of the relationship between instructional time and student achievement through an evaluation of student performance on the 2011 New Jersey Assessment of Skills and Knowledge in Mathematics and Language Arts scores for students in Grades 3, 4, and 5 who participated in the assessment in New Jersey. The primary overarching research question for this study is the following: What is the influence of instructional minutes on the 2011 Grade 3, 4, and 5 Language Arts and Mathematics New Jersey Assessment of Skills and Knowledge scores? Studies related to extended instructional time, before and after school programs, and student performance were reviewed to provide a foundation of the empirical research that relates to the topic.

Literature Search Procedures

Research studies and other necessary information were retrieved through the use of the Seton Hall online access to educational databases. The online databases used for this study include ERIC, ProQuest, EBSCOhost, and SAGE. Peer reviewed journals including *Journal of Learning Disabilities*, *Education Administration Quarterly*, *Journal of Educational Research*, *Journal of Negro Education*, *Educational Evaluation and Policy Analysis*, and *Sociology of Education* were utilized as well as other journals related to the research. Data related to each variable were obtained through the use of a search involving student achievement and the variable. For instance, a search for information regarding attendance would be searched using "student achievement" and "attendance." Search criteria focused on studies related to students in Grades 1-8.

Inclusion Criteria

In order for research to be included in this literature review, it had to meet the criteria listed:

1. Studies regarding students in Grades 1-8
2. Peer reviewed research
3. Published from 1996-2016
4. Studies that focused on student achievement, including research related to student demographic and school variables

5. Studies that used an experimental or quasi-experimental design
6. Studies that demonstrated a rigorous methodological design (i.e., appropriate sample size, power, and effect)

The literature review included peer reviewed studies that were predominantly quantitative in research design and methodology. Research included in the review addressed studies related to instructional time and length of school day. Additionally, research related to student attendance, mobility, special education, limited English proficiency, and socioeconomic status were incorporated in the literature review. Research studies that focused on staff attendance, mobility, and credentials of faculty and administration were also included in the review of literature. Last, studies related to total school enrollment, instructional time, and length of school day for students in Grades 3, 4, and 5 were also included in the literature review.

Previous research studies identified the variables that potentially impact instructional time including attendance, mobility, socioeconomic status, and staff credentials. Related research has been conducted on the impact of instructional time on middle school and high school student achievement, but there is an insufficient body of research on the impact of instructional time on student achievement on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts and Mathematics for students in Grades 3, 4, and 5.

High-stakes Standardized Testing

Standardized testing is a controversial issue in the world of education. Student achievement and school success is determined based on performance on standardized assessments. “Standards for student performance that are highly restrictive or narrowly defined become problematic when expected achievement outcomes are set to non-developmentally appropriate levels” (Tienken, 2010, p. 105). In order for assessment data to be useful, the standardized assessments must align with developmentally appropriate expectations for student performance. Supovitz (2009) asserts that standardized assessments are being used to simultaneously treat and monitor the academic needs of students. Funding that is currently supporting standardized testing should be reallocated to the instructional needs of students.

Furthermore, research has been conducted to evaluate the potential impact that standardized testing has on the social and emotional well-being of students, especially at the elementary level. Dutro and Selland (2012) found that third grade students explained their competency in school through their success with standardized testing. Standardized tests provide a measure of student achievement but should not be the sole assessment tool used to define a student's performance. The preparation and implementation of standardized assessments has received both criticism and support; regardless of individual perspectives, standardized assessments provide educational professionals with information on student achievement.

New Jersey Core Curriculum Content Standards

As stated on The New Jersey Department of Education's website, the New Jersey Core Curriculum Content Standards (NJCCCS) were developed in 1996 by a group composed of various stakeholders in the school community, including school leaders and community members. The standards were revised every five years and provided educators and school leaders with a framework to guide instructional planning, instructional delivery, and assessment. The standards focused on the necessary skills students should acquire during a K-12 education in the State of New Jersey. Standards were developed for each content area: 21st Century Life and Careers, Comprehensive Health and Physical Education, Language Arts Literacy, Mathematics, Science, Social Studies, Technology, Visual and Performing Arts, and World Languages.

Student Variables

Attendance and Student Achievement

Student achievement and performance on standardized assessments cannot be evaluated effectively without examining student attendance. Legislation from No Child Left Behind placed additional pressure on districts to develop efficient student attendance protocols and procedures. Cota (1997) identified a negative relationship between absenteeism and the students' grade point average ($r = -.24$, $p < .05$). When students are absent for any length of time, there is an impact on their foundation with the topics of instruction in the classroom. Chronic absenteeism potentially impacts students' instructional success during the initial years of formal public education, which is critical for foundational skill development in reading, writing, word study, and mathematics instruction.

Sheldon (2007) compared the National Network of Partner Schools (NNPS) to elementary schools in Ohio. "Analyses also showed the rates of daily attendance were correlated highly with student performance on mathematics and reading achievement tests, ranging from $r = .46$ to $.54$ ($p < .001$)" (p. 270). Therefore, attendance is a critical component of increasing student achievement, and it is imperative that school districts monitor attendance closely. Attendance patterns coupled with Partially Proficient NJASK scores assist districts in determining the supports needed to close the achievement gap for individual students.

Students who fail to attend school on a regular basis are at a severe disadvantage, as they are missing critical classroom instruction to support their needs as learners. Spencer (2009) conducted a study in which eighth grade students were selected for The Truancy Court Prevention Project. Through that project, Spencer was able to evaluate previous years of attendance records. One student was absent for 32 days of kindergarten, and the student was promoted to first grade. Attendance at the primary and elementary levels is essential for the development of foundational reading skills. Students who lack foundational skills in Language Arts Literacy and Mathematics are increasingly problematic with the current standards and expectations in our schools.

Furthermore, the absenteeism of one student can impact the instruction of other students. According to Weller (2000), when a student is absent from school, it has a significant impact on the absent student, other students, and teachers, as is Tuguchi's Loss Function Method. Often-times, educators have to spend whole class instructional time assisting absentees. Remedial instruction is required because absentees were not in attendance for the initial instruction. In the case study explored by Spencer (2009), an educator would have to spend critical instructional time remediating instruction for a student who missed about 20% of instruction from kindergarten. Setting aside time for remediation for struggling learners can be a powerful instructional strategy coupled with consistent student attendance. Instructional time is a critical component of student success in school.

Districts around the country have participated in partnerships with families and community members to increase student attendance. Hinz, Kapp, and Snapp (2003) conducted a study in the Minneapolis Public Schools (MPS) focused on improving student attendance by instituting a Comprehensive Attendance Plan. The Comprehensive Attendance Plan was developed through interviews and focus groups, including over 300 participants (Hinz et al., 2003). A large majority of the students qualified for free and reduced lunch, which provides essential information on the socioeconomic needs of the district. Additionally, there is a high mobility rate in the district, which identifies one of the major needs for the attendance increase. Public education functions on the general principles that students will come to school and teachers will educate students. When students fail to attend school, there is a ripple effect that moves rapidly and can cause students to become increasingly frustrated and more likely to be absent (Hinz et al., 2003). Regrettably, districts grapple with the challenge of meeting the needs of every student to ensure that each student attends school each day.

Educators must define attendance procedures clearly and explicitly to ensure that all stakeholders understand the expectations set forth by the district. One of the concerns noted by Hinz et al. (2003) was the inconsistency in implementation of the attendance procedures from one school to another. Through the use of a standardized reporting system, all students' attendance is inputted in a system that tracks various types of absences. Data were then interpreted and decisions were made regarding consequences for excessive absenteeism. Establishing appropriate consequences for absenteeism requires substantial amounts of data and background information.

There are certain extenuating circumstances that impact student attendance and place undue pressure on students. For example, a student may be absent because he or she does not have transportation to and from school or may have to stay home to assist younger siblings. On the other hand, there are situations in which students choose not to go to school because they have decreased motivation or interest in attending school. "The challenge of changing long-standing patterns around school attendance must be shared by school staff, the district, and the community" (Hinz et al., 2003, p. 148). Since the range of reasons for absenteeism can vary significantly, it is imperative for all stakeholders to be included in the process of establishing high standards and expectations for school attendance.

Discerning between the impact of excused and unexcused absences is a critical component in understanding the influence of absenteeism on student achievement. According to

Gottfried (2009), evaluating a data set consisting of 97,007 elementary student observations from the Philadelphia school district provided specific information on student achievement on standardized reading and math assessments. Information on reasons for absences was divided into excused and unexcused based on the district definition of each type of absence. An excused absence requires a note from a parent or doctor regarding illness of less than three days and a note from a doctor for any absence beyond three days. Unexcused absences include certain family issues and/or events, suspension, or recreational activities.

Gottfried (2009) found that the average number of absences was 13, four excused and nine unexcused. Generally, students who were absent more often had more unexcused absences than excused absences. The students with similar absenteeism characteristics were those with free lunch and disciplinary concerns. "For instance, students who have 100% of their absences excused perform higher on the SAT 9 reading exam than do students with 100% unexcused absences" (Gottfried, 2009, p. 405). This demonstrates the overwhelming impact of differentiating between excused and unexcused absences when evaluating the impact of absenteeism on student achievement. Any increase in the number of days a student is not in school affects achievement, but there is a less negative influence when the absences are excused because some of the students may just be absent due to actual illness. Unexcused absences do have a negative impact on student achievement in reading and mathematics.

Chronic absenteeism undoubtedly impacts academic achievement, as well as content knowledge acquisition. Sheldon and Epstein (2004) identified that chronic absenteeism carries over from year to year ($r = .771$, $p \leq .001$). Data analysis conducted by Sheldon and Epstein (2004) of the 2001 school year identified elevated absenteeism for students in schools with a predominantly low average socioeconomic status ($r = .321$, $p \leq .05$). Subsequently, Sheldon and

Epstein (2004) stated that there were three methods which significantly decreased issues related to chronic absenteeism:

> Delving into the details of the analyses of different types of involvement activities, we found that three specific practices had particularly strong effects on lowering rates of chronic absenteeism in 2001; orienting parents about school expectations and policies for attendance (β= -.256, $p \leq .01$), sending home a list of students with excellent attendance in school newsletters (β= -.209, $p \leq .05$), and connecting chronically absent students with a community mentor (β= -.227, $p \leq .02$)." (p. 51)

This research identifies the importance of the school-home connection when addressing pervasive attendance issues in public education. Attendance is a critical component to consider when examining student achievement.

Mobility and Student Achievement

Districts with significant attendance issues often face another challenge that can further impact student achievement and success on standardized tests: student mobility. Academic achievement is influenced by attendance as well as student mobility. Essential instruction is missed during the transition from one school district to another. According to Kerbow, Azcoitia, and Buell (2003), students who transfer from one school to another during a school year experience a negative impact on their retention of materials by approximately 10%. As students move, specific foundational skills and information that is required for higher level tasks may be unknown, in turn causing other problems in the classroom.

As with the concern of absenteeism addressed previously, educators utilize instructional time to assess the strengths and needs of mobile students and provide necessary transitional support, consequently decreasing instructional time for the remainder of the class (Grigg, 2012).

Educators are provided with a finite amount of instructional time, which is inevitably impacted by school closings, events, and absenteeism. In order to maximize instructional time, it is imperative for educators to have minimal disruptions to the day to optimize the instructional time afforded to each teacher. With high rates of student mobility, instructional time is potentially lost for the majority of the student population to remediate the needs of the transfer students.

Researchers have conducted research related to Annual Yearly Progress (AYP) and student performance on standardized assessments. Thompson, Meyers, and Oshima (2011) researched the relationship between student mobility and student performance, using a criterion-referenced standardized assessment, Academic Competency Test (ACT), focusing on students in Grades 1 to 5. "When school size and poverty status of the school were controlled, the relationship between mobility rate and ACT: reading, language arts and math achievement was significant at the $p<.001$ level across all five grade levels" (Thompson et al., 2011, p. 16). There was a negative correlation between student achievement and mobility, which further supports the impact that mobility inevitably has on individual student achievement.

Student mobility affects district accountability. Student assessment data only impacted state Annual Yearly Progress, which minimized pressure on individual districts to increase student achievement of students who arrive mid-year (Weckstein, 2003). Moreover, districts start the process of providing interventions for students in the first marking period. If a student moves during the second marking period, it may take educators a month or two to obtain necessary data and documentation to provide necessary supports for that student. When students move from one district to another, variation in protocols and procedures for interventions may influence the type or amount of assistance a student receives, if any.

When students change schools in the same district, their assessment data impacts the district data, but does not impact individual school's Annual Yearly Progress under NCLB (Weckstein, 2003). Any movement during the school year can impact a student academically, socially, and/or emotionally. Certain students have been discounted for academic, social, or emotional support when the students move from one district to another in the same state for various reasons.

When there are minimal financial constraints, people predominantly remain in a specific area for many years, if not the entire duration of their children's educational careers. According to Crowley (2003), families who have rooted themselves in a specific town are more likely to ensure attendance and take ownership over their part in ensuring that their children are successful in school. On the other hand, when families find themselves in a situation with limited funds and high cost of living, the focus is on basic survival rather than educational success of their children (Crowley, 2003). When a student's basic needs are not met, it is nearly impossible for the student and family to focus on student achievement and the instruction provided by the teacher.

Additionally, students who are faced with uncertainty of the next school relocation may feel as though they may be uprooted from their school at any point due to family circumstances. Student mobility impacts student performance on standardized tests because there may be gaps in instruction due to variations between schools' timelines for teaching certain content (Grigg, 2012; Kerbow et al., 2003). Due to the rapid movement from one town to another, students on the move may have periods of time without formal schooling, which is detrimental to the critical progression of learning in schools.

Efforts to decrease student mobility focus on supporting the basic needs of the students and their families. Districts have attempted to decrease student mobility by providing other support for families including childcare, food, clothing, and medical care. By increasing support for their basic needs, the family is more connected to the school community and less likely to move as soon as they re-encounter challenging circumstances because the school will be viewed as a support and protection for the family (Crowley, 2003). Addressing student achievement requires a discussion at the school or district level regarding the current level of student mobility and the actions that would need to be taken to decrease student mobility, in turn providing a more significant opportunity for instructional time to impact student achievement.

Student performance improves when students remain in the same school for the entire school year. Engec (2006) used the Iowa Test of Basic Skills (ITBS) to evaluate the relationship between mobility and student performance. "The ITBS was greater for non-mobile students (74.54; effect size, 0.44) than for students who enrolled in schools two or more times within the school year (46.64; effect size, 0.09)" (Engec, 2006, p. 170). These data identify the impact of student mobility on student achievement; more movement equates to lower standardized testing performance. "ANCOVA showed that students who experienced mobility performed poorly compared with their non-mobile peers" (Engec, 2006, p. 171). Engec (2006) found that there is a negative relationship between moving during a school year and student achievement. Therefore, as school districts evaluate student performance based on standardized assessments, it is essential to evaluate student mobility trends as well.

As students move in and out of districts, it is paramount for school districts to evaluate the individual mobility patterns of those students and the impact it will have on student achievement. Movement from school to school affects student performance and achievement (Engec, 2006). According to Wright (1999), when examining mobility in relation to other factors including socioeconomic status (SES) and race, the effect of mobility is less significant than the impact of SES and race on student achievement. The data presented by Wright (1999) regarding the significance of mobility on student achievement was $p < .12$, which is nominally significant.

Another study used longitudinal data from elementary and middle school students in Grades 3-8 in the Nashville Public Schools to analyze the relationship between mobility and student achievement (Grigg, 2012).

> The between-compulsory school change estimates of -0.58 and -1.16 and the during-noncompulsory estimates of -0.60 and -1.25 both represent 6% of the expected gain in both reading and mathematics. The between-noncompulsory estimates (-0.29 and -1.03) correspond to 3% of the expected gain in reading and 6 percent of the expected gain in mathematics. The estimates for during-compulsory moves represent 20% and 50% of the average annual gain in reading and mathematics, respectively." (Grigg, 2012, p. 399)

In conclusion, students who are mobile during the school year generally lose about ten days of instruction, which negatively impacts their overall student performance. Subsequently, the impact of student mobility on performance is a critical factor in assessing student performance and achievement on standardized assessments such as the New Jersey Assessment of Skills and Knowledge for students in Grades 3, 4, and 5.

Special Education and Student Achievement

The pressure of high-stakes testing and school accountability for student achievement presents countless concerns and questions with regard to education for all students. Public schools in the state of New Jersey are comprised of varying needs that include general education as well as special education students. Demeris, Childs, and Jordan (2007) found correlations between the number of special education students and the average Language Arts and

Mathematics scores to be -.032 to .010, which is not statistically significant. The data from this research study are relevant to the research on the impact of instructional time on student achievement in Grades 3, 4, and 5 for a myriad of reasons. As schools and districts address student achievement, concerns about the impact of special education students on general education student performance develop. This study provides data to show that the number of special education students in a classroom does not negatively impact the academic achievement of their general education peers.

Other researchers have focused on the mathematics achievement of students in elementary and middle school to assess the achievement gap for special education students. Research by Schulte and Stevens (2015) supports that the largest achievement gap exists when students are continuously placed in a special education setting ($p < .001$). They examined student success on the North Carolina End of Grade assessments on a longitudinal basis and followed a sampling of students from Grades 3-7. The achievement gap increased from -0.69 in Grade 3 to more than one standard deviation by Grade 6 (Schulte & Stevens, 2015). Achievement of special education students is partially contingent upon the placement of those students in inclusion, resource, or self-contained academic settings.

Furthermore, students with emotional and behavioral disorders with Individualized Education Plans (IEP) are faced with academic achievement challenges. Some researchers have evaluated the academic achievement of students with specific emotional and behavioral special education needs. “The effect size discrepancies for the Total, Broad Reading, Broad Math, and Broad Written Language clusters were approximately .94 in all cases” (Nelson, Benner, Lane, & Smith, 2004, p. 65). The findings explain that 83% of students had lower academic achievement than their general education peers, which identifies the need to identify whether data is specifically related to general or special education students or both populations. Nelson et al. (2004) found that students who have external behaviors associated with their special needs had lower performance than students with internalizing behaviors (see Table 1).

Table 1

Internalizing vs. Externalizing Special Education Factors Regression Analysis

	Initial Entry		*Entry in Last Position*
Construct	*p*		*p*
	Broad Reading		
Externalizing	.000	Externalizing	.000
Internalizing	.790	Internalizing	.303
	Broad Written Language		
Externalizing	.000	Externalizing	.000
Internalizing	.130	Internalizing	.679
	Broad Math		
Externalizing	.000	Externalizing	.000
Internalizing	.750	Internalizing	.733

(Nelson et al., 2004, p. 68)

Consequently, the type of disability with which a special education student is diagnosed has been found to correlate to academic achievement. Although the classification on state reports is special education, special education students' needs vary significantly based on cognitive function and whether the disability presents externally or internally, in turn impacting the academic achievement. The range of special education needs of students and the educational programs available to students vary based on the needs of individual special education students.

Other researchers have examined the impact of inclusion and non-inclusion classroom settings at the high school level on student achievement. Easley Brown (2015) found that general education students who are educated in an inclusive classroom setting have less academic success in Language Arts on the 2013 HSPA as compared to their peers who are in non-inclusive classroom settings (β= -.125, t= -2.260, $p<.05$). These findings suggest that the placement of general education students in inclusive classroom settings has the potential to negatively impact student achievement at the high school level in Language Arts. Furthermore, Easley Brown (2015) identified that extended time in an inclusion model for general education students continues to negatively impact the Language Arts performance of those general education students involved in the inclusive classroom model on the Grade 11 HSPA (β= -.117, t= -2.085, $p=.038$). As school leaders and educators determine general education student placement in inclusive classrooms, it is imperative to ensure that the same general education students are not placed in that model in consecutive years because it has the potential to negatively impact student achievement.

Research conducted by St. John (2015) focused on the influence of placement in a co-teaching inclusive classroom on student achievement in Grades 6-8 on the 2014 New York State Language Arts and Mathematics assessments. According to St. John (2015), general education students who were not placed in a co-taught inclusive Mathematics class had greater academic success and achievement than their general education peers placed in a co-taught environment (β = -.342, t=-6.617, p<.001). Placement in the co-teaching inclusive classroom had a negative impact on general education student achievement in Language Arts as well ($\beta = -.154$, $t = -4.342$, $p < .001$). This research provides additional depth on the impact of inclusion with a second teacher in the classroom to provide support and instruction. Brown (2015) and St. John (2015) identified a common concern related to the impact on general education student placement in inclusive settings on student achievement.

The current research study on the impact of instructional time on student performance in Grades 3, 4, and 5 on the 2011 Language Arts and Mathematics Assessments must account for the variation in student performance based on the type of classroom setting in which students are educated (i.e., inclusive or non-inclusive classroom settings). Special education programming has the potential to impact special education as well as general education student learning and achievement. Therefore, it is imperative that researchers are cognizant of the potential negative and/or positive effects of certain special education programming on the entire student population in a school.

Limited English Proficiency and Student Achievement

The Equal Education Opportunities Act (EEOA) requires public schools in the United States to establish equality in educational opportunities for all school age students regardless of English proficiency, race, gender, or origin (Miller & Katsiyannis, 2014). According to the National Center for Education Statistics (2015), approximately 4.4 million in public education were identified as being English Language Learners (ELL) during the 2011-2012 school year. Although English Language Learners are faced with certain challenges associated with acclimating to a new language and culture, many students from homes with parents from other countries outperform students who were born in the United States (Garrett & Holcomb, 2005). Therefore, it is important to simultaneously support and challenge English Language Learners based on their individual levels of proficiency with language acquisition as well as other academic skills.

Cota (1997) found that the amount of English students have had in the country prior to completing standardized assessments in reading is a positive significant relationship (r = .40, p<.01). Immersing students in the language through discussions, read alouds, and other literacy-based tasks will assist them with the transition to standardized assessments. When examining Limited English Proficiency data, it is imperative to identify the duration a student has been in the United States when examining data.

Students with Limited English Proficiency (LEP) are expected to complete standardized assessments in the state with necessary accommodations (i.e., dictionary in their native language, directions read in native language, etc.). Abedi and Hejri (2004) analyzed the differences between accommodated and non-accommodated LEP students in the National Assessment of Educational Progress (NAEP) but found that the differences were not statistically significant (t=.64, p=.523). Regardless of accommodations, the academic achievement of students categorized as Limited English Proficiency is comparable.

In order to increase the academic success of students who are learning English as a second language, school districts should provide early intervention strategies to ensure that students receive the support to assist them in successfully transitioning to a new language (Garrett & Holcomb, 2005). Educational leaders and staff members who proactively establish school programs and interventions for English Language Learners will increase student success during the initial transition because the interventions will be made available to the students as soon as they are deemed necessary, in turn positively impacting student achievement.

Socioeconomic Status and Student Achievement

The State of New Jersey has established programs and supports to provide equity in education for students through Title I funds as well as other funding. Title I funding is designed to support the needs of students from low-income homes by supplementing school fiscal resources for academic support predominantly in core content areas, Mathematics and Language Arts. The National Center for Education Statistics states that 21 million children in the United States benefited from Title I funds in the 2009-10 school year. The school students attend becomes increasingly more perilous when a child is faced with low socioeconomic status (SES). Ready (2010) explains that students with a low socioeconomic status who have opportunities to attend better schools potentially benefit more than students with average to high socioeconomic status who attend the same school. “Compared to high SES children with good attendance, low SES children with good attendance gain almost 8% more literacy skills per month during kindergarten and almost 7% more per month during first grade” (Ready, 2010, p. 280). Consequently, when examining student NJASK test scores in Grades 3, 4, and 5 and instructional time, it is imperative to demonstrate awareness of the potential impact of SES on the data.

Students enter public education with their own strengths and challenges as individuals. Those strengths and challenges coupled with financial constraints have a potentially negative impact on student achievement and educational progress. According to Demeris et al. (2007), the socioeconomic status of students impacts student achievement. “The correlation of the number of students with special needs with SES (-.158) was negative and statistically significant” (Demeris et al., 2007, p. 620). Therefore, students with special education needs and low SES are at a more significant disadvantage than their general education peers who experience SES issues.

Jez and Wassmer (2013) found that adding one additional minute of instructional time had a more significant impact on students of low socioeconomic status (p= .01; .0042) than on their general education peers (p= .01; .0031). Socioeconomically disadvantaged student performance on the Academic Performance Index (API) increased 0.0042 points for each additional instructional minute added to the school year. Thus, students from socioeconomically disadvantaged homes benefit more than their general education peers from additional instructional time.

Socioeconomically disadvantaged students make more significant gains than their high SES peers. According to Alexander, Entwisle, and Olson (2001), students from economically disadvantaged homes had a mean monthly growth in Reading of 4.78 points during the school year, while the high SES peers had a mean monthly growth of 4.67 points. Students of economically disadvantaged families experience minimal achievement gains during the summer. These students gain .02 mean monthly points, whereas their peers who are one standard deviation above the SES average gain 3.28 mean monthly points on the CAT-V Reading standardized assessment (Alexander et al., 2001). The students gain -.36 mean monthly points, whereas their peers who are one standard deviation above the SES average gain 1.18 mean monthly points on the CAT-M Math standardized assessment (Alexander et al., 2001). Students of middle to high socioeconomic status families have other enriching opportunities outside of school to enhance their learning. The placement of low socioeconomic students and the amount of instructional time received is most critical to students of socioeconomically disadvantaged homes.

Staff Variables

Faculty Attendance and Student Achievement

When examining the impact of extended instructional time on student performance, researchers evaluate the impact of staff variables on student performance. As stated previously, student attendance is a critical factor when evaluating student achievement. Student absenteeism has potentially negative ramifications ranging from content gaps to significant social and emotional issues. Educators are the next sphere of influence beyond the student in the school setting. Educators build relationships with their students to cultivate a productive learning environment, in turn enhancing student performance.

According to Podgursky (2003), the average percentage of teacher absences per year is 5%-6%. During an average school year, educators are absent for approximately nine days of school instruction, which equates to nearly two weeks of instructional time. Substitute teachers replace the absent classroom teacher, which potentially influences instructional delivery and student performance. Researchers have studied the effect of teacher absenteeism on student performance and achievement.

One such study found that fourth grade student performance in an urban school district in northern United States of America on a standardized Mathematics assessment was negatively impacted by teacher absenteeism because the substitutes were not trained in the new Mathematics techniques (Miller, Murnane, and Willett, 2008). Miller et al. (2008) found that the Ordinary Least Squares (OLS) estimates were statistically significant ($p< .01$; -0.0032). Educator attendance had a significant effect on student Mathematics achievement in fourth grade. In addition, the data analysis identifies that teacher attendance has less of an impact on Language Arts performance than Mathematics performance. Although Language Arts and

Mathematics require scaffolded instruction, the training in Mathematics is programmatically specific, which requires instructional delivery to be provided by an educator trained in the program, which explains the more significant impact of teacher absenteeism on Mathematics achievement than Language Arts achievement. Furthermore, although students may be receiving a specific amount of instructional time as stated on the New Jersey State Report Card, the data from Miller et al. (2008) address the variation in instructional delivery based on whether the trained classroom teacher leads the lesson or it is led by a substitute teacher in the absence of the trained classroom teacher.

The Miller et al. (2008) study identifies the significant impact of teacher attendance on student achievement. When examining student achievement on the New Jersey Assessment of Skills and Knowledge (NJASK) in Grades 3, 4, and 5, it is imperative to consider the ramifications of teacher attendance on the data ascertained through the study on the influence of instructional time on student achievement.

Faculty Mobility and Student Achievement

The classroom educators are the school employees who have the most direct impact on student achievement as they are the instructional leaders in the classroom guiding students through thought provoking investigation, inquiry, and learning on a daily basis. Building meaningful relationships is an essential component of successful classrooms because it establishes the vital foundation for social, emotional, and academic growth. Teacher mobility is a major issue. Approximately 30% of novice teachers leave the profession in the first five years (Darling-Hammond & Sykes, 2003). Research indicates that effective teachers require five years of practice in evaluating student performance to be effective (Rivkin, Hanushek, & Kain, 2005). Consequently, those teachers who leave the profession within the first five years never experience the feeling of effectively improving student performance. It is imperative to evaluate the reasons teachers leave and the impact that teacher mobility has on student achievement.

Ronfeldt, Loeb, and Wyckoff (2013) analyzed turnover at the school-by-grade-by-year level to provide a more specific method of examining various factors. The study focused on the effect of teacher mobility on student achievement in fourth and fifth grade. "Student math scores are 8.2% to 10.2% of a standard deviation lower in years when there was 100% turnover as compared to years when there was no turnover at all" (Ronfeldt et al., 2013, p. 18). Respectively, student Mathematics and Language Arts performance and achievement is impacted by teacher mobility (Mathematics lagged attrition –.086, $p< .01$, Language Arts lagged attrition–.049, $p< .01$). The results presented from this study demonstrate the negative and statistically significant impact of teacher mobility on student performance, especially in low performing districts.

Additionally, research has been conducted by Graziano (2012), which identified that faculty mobility had weak significant impact on student Mathematics achievement (r = -.180, $\alpha \leq .001$) and Language Arts achievement (r = -.169, $\alpha = .001$). The results of the study conducted by Graziano demonstrate the impact of faculty mobility on student performance on standardized assessments.

Certain factors have been analyzed to determine their effect on teacher mobility including classroom autonomy, administrative support, and behavioral climate. Kukla-Acevedo (2009) found that results from the multinomial logistic model, as well as the binomial logistic model, identify that administrative support is a statistically significant factor impacting teacher mobility, in turn impacting student achievement (0.745, $p< .01$). Therefore, novice educators must have significant support from building level administrators, in turn minimizing teacher mobility and potentially increasing student achievement. When examining the impact of instructional time on student performance in Grades 3, 4, and 5 in Mathematics and Language Arts, it is necessary to monitor teacher mobility, as it is a contributing factor that impacts student performance.

Faculty and Administration Credentials and Effectiveness and Student Achievement

Classroom educators are the instructors who lead learning in all content areas, especially in Language Arts and Mathematics. Understanding the impact of teacher knowledge and effectiveness on student achievement is essential when examining student achievement. Heck (2007) suggests that an educator with effectiveness that is considered to be one standard deviation above average educator performance would impact student performance in Reading and Mathematics for students of low socioeconomic status or English Language Learners and reduce the achievement gap by 60% (reading 3.789 and math 2.783; $p < .05$). English Language Learners and students from low SES status should be placed with highly effective teachers to increase student success and academic achievement.

Heck (2008) found that students who have two consecutive years of teachers who are one standard deviation above average effectiveness have increased student achievement.

> For reading achievement, the standardized effect for the first teacher was 0.078 ($p< 0.01$), and the standardized effect for the second teacher was 0.058 ($p< 0.01$). For math, the first teacher's standardized effect was 0.080 ($p< 0.01$), and the second teacher's standardized effect was 0.096 ($p< 0.01$)." (Heck, 2008, p. 241)

Teacher effectiveness impacts student performance (Heck, 2007, 2008).

According to Ottmar, Rimm-Kaufman, Larsen, and Berry (2015), teachers who utilized highly effective Mathematics teaching strategies had increased student achievement on the Mathematics assessment (effect size= .21, $p< .05$). Additionally, Ottmar et al.'s (2015) research ascertained that teachers who employ Responsive Classroom techniques used more effective strategies for teaching Mathematics (effect size = 0.26, $p < .01$). These data align with the other research which identifies the positive impact of strong teacher knowledge and effectiveness on student achievement (Heck, 2007, 2008). Employing highly effective educators has a significant impact on student achievement.

School Variables

School Size and Student Achievement

Policymakers, board of education members, and educational leaders often focus on the impact of class size when researchers have found that class size does not have a statistically significant impact on student achievement (Borland & Howsen, 2003). Conversely, school size is a topic that should be a focus of policymakers, board of education members, and educational leaders because it has been found to impact student achievement more than class size. Borland and Howsen (2003) assert that increased school size and school competition positively impacts student achievement (0.02, $p < 0.05$). Using an equation for optimal school size, they found that student achievement at the elementary school level increases up to a population of 760 students and then begins to decrease beyond that number (Borland & Howsen, 2003).

Conversely, Leithwood and Jantzi (2009) affirm that smaller schools of approximately 300 students or less are more beneficial to students with specific learning needs and/or socioeconomic challenges. Students are more likely to participate in extracurricular activities in a small school (Leithwood & Jantzi, 2009). This information supports the importance of assessing school size when analyzing student performance. As educational leaders address student achievement, it is critical to examine the impact of school size on student performance.

Length of School Day and Student Achievement

Time is the nucleus of a variety of instructional dialogues in education. In education there are two sub categories regarding time; length of school day and instructional time. As stated on the New Jersey State Report Card, length of school day refers to the total number of minutes students are in school including homeroom as well as lunch and recess. Farbman and Kaplan (2005) assert that extending the day and/or school year provides educators with the time necessary to increase the depth of content covered. Challengers of the extended school day or school year argue that students will have less time to participate in extracurricular activities (Patall, Cooper, & Batts Allen, 2010). Other researchers focus on the need to evaluate the plans for the extended day and/or year to ensure that the time is used effectively (Silva, 2007). Extending the school day requires cautious analysis of the allocation of the time from the extended school.

Sammarone (2014) researched the influence of the length of the school day of student achievement on the New Jersey Assessment of Skills and Knowledge in Grades 6, 7, and 8.

> Although school day length was a statistically significant predictor variable in all six models, the *R* squared contribution of this variable was consistently small, ranging from 0.2% to 1.2%. This illustrated that the length of the school day has a minimal influence on the NJ ASK passing percentage rates in Grades 6, 7, and 8.” (Sammarone, 2014, p. 258)

Therefore, it is important to consider length of school day when examining student achievement even though it is not a major factor impacting student achievement.

Instructional Time and Student Achievement

Instructional time is a common discussion in the arena of public education because many policymakers, board of education members, and educational leaders believe that increasing instructional time leads to a direct increase in student achievement. According to Dalton and Morton (2007), instructional time has increased by approximately 102 minutes per week from 1987 to 2004. Instructional time focuses on academic instruction provided by certificated staff members. The instructional minutes for this study were obtained from The New Jersey State Report Card for each district which delineates the distinction between length of school day and amount of instructional time by explaining each category. Length of school day refers to the total number of minutes a school is in session for a typical full day including lunch and recess, while instructional time focuses on the number of instructional minutes a student receives during that school day.

Certain researchers have found that extending the school year and increasing instructional time did not have a statistically significant impact on student achievement. Konstantopoulos (2006) found that length of school year did not have a statistically significant impact on standardized test scores. Furthermore, Long (2014) asserted that when examining the PISA 2000 survey, the impact of instructional time on student learning was insignificant.

Alternatively, according to Jez and Wassmer (2013), increasing instructional time in California public schools has a positive and statistically significant impact on student achievement (.0031, $p < .01$). When examining the Academic Performance Index (API) for California, the researchers found that each additional minute of instruction increases API score by .0031 (Jez & Wassmer, 2013). In order for the instruction to impact student achievement, it must be meaningful instructional time.

Another study examined the effect of additional instructional time for first grade students in Language Arts, specifically reading instruction, in Oregon and Texas in which students received 30 or 60 minutes of additional instructional time each day (Harn, Linan-Thompson, & Roberts, 2008). Students receiving the additional hour of intensive instructional time had more significant growth from the fall to spring than students receiving the additional 30 minutes of instructional time per day. Harn et al. (2008) found the Oral Reading Fluency (ORF) and Nonsense Word Fluency (NWF) effect sizes to represent the greatest differences based on the additional hour of instructional time per day (ORF n^2 =.194, p = .001; NWF n^2=.165, p = .002). These data exemplify the significance of targeted instructional time on student achievement.

Other studies have examined the effect of extending the instructional day with strategic academic programs to assist students. Chicago Public Schools developed the Lighthouse Program which was an afterschool program which provided struggling students with additional Language Arts and Mathematics instruction. According to Farmer-Hinton, Sass, and Schroeder (2009), students who attended the program all three years had consistent results with students who did not attend the program (β= -0.031). Students who did not have the program in the first two years but had it in the third year experienced growth (β= 0.271). Students who attended the program for the first two years only had a significant decrease in growth in the third year (β= -0.116). Farmer-Hinton et al. (2009) assert that increasing instructional time had a positive impact on student achievement.

The amount of instructional time students receive requires significant attention in policy and student achievement discussions. The plans and preparation for utilizing the additional instructional time play an integral role in whether the intended increase in student achievement is obtained. Research has been conducted in other areas of the impact of instructional time on student achievement, but there is a lack of research and data on the influence of instructional time on student achievement in Grades 3, 4, and 5.

CHAPTER III

METHODOLOGY

As previously stated, the purpose of this study was to determine the strength and direction of the relationship between instructional time and student achievement in Grades 3, 4, and 5 on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts Literacy (LAL) and Mathematics. The research questions were developed to explore the strength and direction of the relationship between instructional time and student performance on the New Jersey Assessment of Skills and Knowledge for the 2010-2011 school year in LAL and Mathematics. The primary overarching research question for this study is as follows: What is the influence of instructional minutes on the 2011 Grade 3, 4, and 5 Language Arts and Mathematics NJASK scores?

In order to address the overarching research questions as well as the sub questions, I conducted a quantitative research study on the influence of instructional time on student achievement in Grades 3-5 in Language Arts and Mathematics on the 2011 New Jersey Assessment of Skills and Knowledge (NJASK). The 2011 New Jersey State Report Card data of all public elementary schools in New Jersey were used for the data collection. Since this study focuses on students in Grades 3, 4, and 5, the school report card data that were used were only the data regarding instructional minutes for Grades 3, 4, and 5 students in New Jersey.

Research Design

This research was conducted using a cross-sectional, non-experimental explanatory quantitative research design. The purpose was to establish the strength and direction of the relationship between instructional time and the academic achievement of students in Grades 3, 4, and 5 based on the data collected from the 2011 New Jersey State Report Card and New Jersey

Assessment of Skills and Knowledge for Language Arts and Mathematics. The theoretical or conceptual framework for this study is Production/Function Theory. The products that are produced are a direct function of what is put into the process. This theory acts as the foundation for the methodology used to conduct this study.

The statistical methods used to conduct the study were multiple regression and hierarchical multiple regression. As stated by Witte and Witte (2010), multiple regression is used when there are several predictor variables entered at the same time; whereas, when using hierarchical regression, the variables are included in a specific sequence. "It is preferable to use the hierarchical method when one has an idea about the order in which one wants to enter predictors and wants to know how prediction by certain variables improves on prediction by others" (Leech, Barrett, & Morgan, 2011, p. 106).

When analyzing data using a multiple regression, there are a few requirements. "For multiple regression, the dependent or outcome variable should be an interval or scale level variable, which is normally distributed in the population from which it is drawn" (Leech et al., 2011, p. 106). The data obtained for this research were the 2011 NJASK in Mathematics and Language Arts for students in Grades 3, 4, and 5, which is aggregate student performance in Language Arts and Mathematics for each school in the study. The NJASK is a referenced assessment in which scores are reported using a scale which ranges from 100 to 300 points. Students who score between 100 and 199 are considered to be Partially Proficient. Students who score between 200 and 249 points are considered to be Proficient. Students who score between 250 and 300 are considered to be Advanced Proficient. Since a scale variable is used, the first criterion for multiple regression is met.

Multiple regression has certain requirements for independent variables as well. "The independent variables should be mostly interval- or scale-level variables, but multiple regression can also have dichotomous variables, which are called dummy variables" (Leech et al., 2011, p. 106). There are independent variables that relate to student, staff, and school. Student variables relate to attendance, mobility, special education, limited English proficiency, and socioeconomic status. Staff variables include attendance, mobility, and credentials of faculty and administration. School variables relate to total enrollment, instructional time, and length of school day for students in Grades 3, 4, and 5. The objective is to determine which variables had a statistically significant relationship to the scores of the New Jersey Assessment of Skills and Knowledge for students in Grades 3, 4, and 5 on the 2011 assessment.

Research Questions

Research Question 1: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in LAL measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 2: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in LAL as measured by NJASK4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 3: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in LAL as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 4: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in Mathematics as measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 5: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in Mathematics as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 6: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in Mathematics as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypotheses

Null Hypothesis 1: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 2: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 3: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 4: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 5: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 6: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 Mathematics scores when controlling for educator, student, and school variables.

Sample Population/Data Source

The sample population for this study included public elementary schools in the State of New Jersey who participated in the 2011 Language Arts and Mathematics New Jersey Assessment of Skills and Knowledge for Grade 3, 4, and 5. In order for schools to be included in the study, the school configuration aligned with one of the following categories: preschool through fifth grade, kindergarten through fifth grade, or a Grade 3, 4, and 5 building. Furthermore, the schools must participate in state reporting because the information for this study was obtained from the New Jersey State Report Card. Any schools that did not participate in state reporting to the New Jersey Department of Education were excluded from this study. Additionally, the school district must have administered the 2011 NJASK to their students.

Data Collection

The data collected for this study were retrieved from the New Jersey Department of Education website. The data regarding student performance on the 2011 NJASK were retrieved by going to the NJDOE website and accessing the data tab. The necessary data for this study were located under the tab “Assessment Reports for years 1996 to 2014.” After accessing the 2011 assessment reports, it was imperative to examine each grade level individually by downloading the NJASK 2011 State Summary as an Excel spreadsheet. The information regarding the total number of students assessed, as well as proficiency levels, can be found when examining the NJASK 2011 State Summary (see Table 1). The data from the NJDOE Excel spreadsheet for each grade level contain information related to the school and district under the tabs “Total and Instructional Group,” “Migrant,” and “Economic.”

A. County, district, and school code

B. County, district, and school name

C. District factor group (DFG)

D. Total enrolled and total valid scores for each content area

E. Percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

F. Total mean score for Mathematics and Language Arts

G. General Education (GE) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

H. Special Education (SE) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

I. Limited English Proficiency (LEP) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

J. Migrant (Migr Y) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

K. Economically Disadvantaged (ED) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

In addition to the 2011 NJASK data, information from the 2011 School Report Card was required for information on the number of instructional hours and minutes each school reported. Data retrieval was conducted using the New Jersey Department of Education website. When examining the data tab, information for the 2010-2011 school year was available by downloading the 2011 Report Card Data in a Microsoft Excel format. At that point, it was imperative to retrieve the necessary instructional time data, which was coded by hour and minute (e.g., FINSTIMH= instructional time for full time students—hour; FINSTIMM= instructional time for full time students—minutes). This information was critical in determining whether there was a correlation between instructional time and student achievement on the 2011 NJASK.

Table 2

Statewide Student Proficiency Levels by Grade and Content Area for 2011 NJASK

2011 NJASK Mathematics Scores			
Grade Level	Partially Proficient	Proficient	Advanced Proficient
3	21.1 %	40.5 %	38.4 %
4	20.7 %	47.2 %	32.1 %
5	19.4 %	41.1 %	39.5 %
2011 NJASK Language Arts Scores			
Grade Level	Partially Proficient	Proficient	Advanced Proficient
3	37.0 %	55.8 %	7.2 %

4	37.3 %	55.5 %	7.2 %
5	39.1 %	54.8 %	6.1 %

Data Analysis

The research study used simultaneous multiple regression, in which all predictors entered into the regression equation at the same time. Using this method of analysis, I was able to identify whether or not a relationship exists between each variable and the results. Hierarchical multiple regression was used to provide specific information about individual variables through the sequence of variables added to the equation. The regression equation used in this study was the following:

$$Y=a+b_1X_1+ b_2X_2+ b_3X_3+ b_4X_4+ b_5X_5+e.$$

The symbol *a* represents the regression constant or the value of Y when X=0, also known as the Y intercept. The Beta (*b*) is the regression coefficient for each variable. The independent variables included are instructional time, attendance, mobility, special education, limited English proficiency, and socioeconomic status.

Based on the initial data analysis, further analysis was conducted using factorial analysis of variance (ANOVA) and/or factorial analysis of covariance (ANCOVA). As stated by Leech et al. (2011), the factorial ANOVA is used when there are two or three independent variables with few categories, whereas the ANCOVA controls for differences between the groups that are included in the study.

Dependent Variables

The dependent or outcome variable was obtained from the publicly published New Jersey Assessment of Skills and Knowledge (NJASK) scores for students in Grades 3, 4, and 5. The dependent or outcome variable is the aggregate student performance by school in Grades 3, 4, and 5 on the 2011 NJASK LAL and Mathematics. The NJASK is a criterion-referenced assessment that reports composite scores in both LAL and Mathematics. The composite scores are scaled scores ranging from 100 to 300. The NJASK scores are broken down into three categories: Partially Proficient in which the score is less than 200, Proficient in which the score is between 200 and 249, and Advanced Proficient in which the score is 250 or above.

The unit of analysis is school. The potential sample includes all public elementary schools in the state of New Jersey whose students participated in the NJASK 3-5 LAL and Mathematics assessments for the 2010-2011 school year. The data were obtained from the NJDOE website. The data are valid and reliable since they were collected by the NJDOE through evaluation of the completed NJASK 3, NJASK 4, and NJASK 5 assessments in LAL and Mathematics.

Instrumentation

New Jersey Assessment of Skills and Knowledge (NJASK)

The New Jersey Assessment of Skills and Knowledge assesses student knowledge in Language Arts Literacy and Mathematics. Language Arts focuses on a writing assessment that includes two prompts: a persuasive/speculative prompt and an explanatory/expository prompt. The reading portion of the Language Arts assessment focuses on working with text, as well as analyzing text. The Mathematics assessment includes number and numerical operations, geometry and measurement, patterns and algebra, and data analysis, probability, and discrete math.

State mandated standardized testing is a reality in the current system of education. The New Jersey Assessment of Skills and Knowledge (NJASK) is a standardized criterion referenced assessment that was administered to public school students in Grades 3 and 4 in the State of New Jersey from 2004 to 2014. The New Jersey Assessment of Skills and Knowledge (NJASK) is an assessment that was administered to public school students in Grades 5, 6, and 7 in the State of New Jersey from 2006 to 2014. The New Jersey Assessment of Skills and Knowledge (NJASK) is an assessment that was administered to public school students in Grade 8 in the state of New Jersey from 2008 to 2014.

The NJASK reported composite scores in Language Arts Literacy (LAL) and Mathematics. The composite scores were based on proficiency levels: Partially Proficient, Proficient, and Advanced Proficient. Students were considered Partially Proficient (PP) if they scored between 100 and 199. Students were considered Proficient (P) if they scored between 200 and 249. Students were considered Advanced Proficient (AP) if they scored between 250 and 300. Each year data were compiled with individual student scores, as well as school and district averages. Policymakers, boards of education members, community members, school administrators, and teachers met to discuss data obtained from the NJASK state report, which was and is still located on the New Jersey Department of Education website.

Grade 3

As stated on the New Jersey Department of Education's website under the NJASK Executive Summary, students in Grade 3 were administered the 2011 NJASK between May 9, 2011, and May 12, 2011. For Language Arts NJASK3, there were 100,389 valid scores. The breakdown of scores across the State of New Jersey for that year by proficiency in Language Arts was as follows: 37.0% Partially Proficient, 55.8% Proficient, and 7.2% Advanced Proficient. For Mathematics NJASK 3, there were 100,722 valid scores. The breakdown of scores by proficiency in Mathematics was as follows: 21.1% Partially Proficient, 40.5% Proficient, and 38.4% Advanced Proficient.

Grade 4

As stated on the New Jersey Department of Education's website under the NJASK Executive Summary, students in Grade 4 were administered the 2011 NJASK between May 9, 2011, and May 13, 2011. For Language Arts NJASK 4, there were 101,844 valid scores. The breakdown of scores across the state of New Jersey for that year by proficiency in Language Arts was as follows; 37.3% Partially Proficient, 55.5% Proficient, and 7.2% Advanced Proficient. For Mathematics NJASK4, there were 102,186 valid scores. The breakdown of scores by proficiency in Mathematics was as follows: 20.7% Partially Proficient, 47.2% Proficient, and 32.1% Advanced Proficient.

Grade 5

As stated on the New Jersey Department of Education's website under the NJASK Executive Summary, students in Grade 5 were administered the 2011 NJASK between May 9, 2011, and May 12, 2011. For Language Arts NJASK5, there were 102,320 valid scores. The breakdown of scores across the State of New Jersey for that year by proficiency in Language Arts was as follows: 39.1% Partially Proficient, 54.8% Proficient, and 6.1% Advanced Proficient. For Mathematics NJASK5, there were 102,626 valid scores. The breakdown of scores by proficiency in Mathematics was as follows: 19.4% Partially Proficient, 41.1% Proficient, and 39.5% Advanced Proficient.

The New Jersey State Report Card

The New Jersey State School Report Card data collection requires school districts to report the number of instructional hours and minutes for each school. This information was retrieved using the data tab on the NJDOE website; information for the 2010-2011 school year was available by downloading the 2011 Report Card Data in a Microsoft Excel format. On the New Jersey State School Report Card instructional time is referred to as time in the classroom with a certified teacher providing additional content-specific instruction.

Reliability and Validity

Data must be both reliable and valid in order to be utilized as the backbone of a study. This study uses data from the New Jersey State Report Card as well as data from the 2011 New Jersey Assessment of Skills and Knowledge for Grades 3, 4, and 5. The data obtained from the New Jersey Assessment of Skills and Knowledge (NJASK) have been evaluated and the data on testing reliability and validity have been published in the 2011 NJASK Technical Report. The report identifies a standard score range for each assessment (see Table 3).

Table 3

NJASK Score Ranges

Proficiency Level	Proficiency Score
Partially Proficient	100-199
Proficient	200-249
Advanced Proficient	250-300

According to the 2011 NJASK Technical Report, New Jersey's Office of State Assessments (OSA), Measurement Incorporated (MI) is responsible for creating test questions, scoring all test questions, and providing test score reports to all stakeholders. Standardized test data are considered to be reliable if the results are consistent over multiple assessments with the same students and test questions. “Consistency of individual student performance was estimated using Cronbach’s coefficient alpha (NJASK Technical Report, 2011, p. 123). See Table 4 for the Cronbach’s coefficient alpha results by grade level and content area.

Table 4

NJASK Cronbach's Alpha Coefficient Summary by Assessment Content

Grade/Content	**Total Student Population**	**Cronbach's Alpha Coefficient**
Language Arts		
NJASK 3	99,695	0.81
NJASK 4	101,188	0.84
NJASK 5	101,611	0.87
Mathematics		
NJASK 3	100,026	0.90
NJASK 4	101,532	0.90
NJASK 5	101,919	0.92

The NJASK assessment for Language Arts has multiple choice, constructed responses, and writing tasks. The NJASK assessment for Mathematics assesses students’ ability to construct responses to explain thinking in Mathematics. The 2011 NJASK Technical Report identifies the percentage of accuracy amongst response readers coded as exact agreement, adjacent agreement, or resolution needed (see Table 5). When examining the data related to the consistency between readers for open-ended responses, it is evident that less than 1% of responses for each grade level and content area, respectively, required resolution. The remainder of the responses fell into the category of exact agreement or adjacent agreement. In order for a response rating to qualify as adjacent, it must be within one point of the other reader (NJASK Technical Report, 2011). These data speak to the reliability of score interpretations.

Table 5

Multiple Reader Consistency

Grade/Content	**% Exact Agreement**	**% Adjacent Agreement**	**% Resolution Needed**
3/ Math	96.1	3.4	0.4
3/ LA	74.4	25.0	0.4
4/ Math	96.6	3.1	0.2
4/ LA	73.0	26.0	0.8
5/ Math	96.2	3.5	0.2
5/ LA	73.1	26.3	0.4

Measurement Incorporated (MI) explicitly explains the protocol for determining assessment questions. Since all tests are constructed using the same format, question types, and question totals, the content of the assessment has validity.

> To use an existing instrument, describe the established validity of scores obtained from past use of the instrument. This means reporting efforts by authors to establish validity in quantitative research—whether one can draw meaningful and useful inferences from scores on the instruments.” (Creswell, 2014, p. 160)

The New Jersey Core Curriculum Content Standards were used to guide the development of questions for the NJASK assessments in Grades 3-8. All test items were reviewed by New Jersey's content review committee and sensitivity review committee (NJASK Technical Report, 2011). These committees are comprised of stakeholders in education, which improves the validity of the assessment.

Conclusion

Chapter IV includes an analysis of the results from the data analysis introduced in Chapter III. The analysis of results provides essential information to determine the strength and direction of the relationship between instructional time and student achievement in Grades 3, 4, and 5 on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts Literacy (LAL) and Mathematics.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

This research was conducted using a cross-sectional, non-experimental explanatory quantitative research design to explain the influence of school, staff, and student variables on student achievement in third, fourth, and fifth grade in Language Arts and Mathematics across the state of New Jersey. This study provides descriptive research on the strength and direction of the relationship between instructional time and the academic achievement of students in grades 3, 4, and 5 based on the data collected from the 2011 New Jersey State Report Card and the 2011 New Jersey Assessment of Skills and Knowledge for Language Arts and Mathematics. The overarching research question, subsidiary research questions, and null hypotheses for the study are listed below.

Research Questions

Overarching Research Question

What is the influence of instructional minutes on the 2011 Grade 3, 4, and 5 Language Arts and Mathematics proficiency percentages on the New Jersey Assessment of Skills and Knowledge scores controlling for educator, student, and school variables?

Subsidiary Research Questions

Research Question 1: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in LAL measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 2: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in LAL as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 3: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in LAL as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 4: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in Mathematics as measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 5: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in Mathematics as measured by NJASK4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Research Question 6: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in Mathematics as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypotheses

Null Hypothesis 1: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 2: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 3: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 LAL scores when controlling for educator, student, and school variables.

Null Hypothesis 4: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 5: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 Mathematics scores when controlling for educator, student, and school variables.

Null Hypothesis 6: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 Mathematics scores when controlling for educator, student, and school variables.

The purpose of this study was to determine the strength and direction of the relationship between instructional time and student achievement in Grades 3, 4, and 5 on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts Literacy and Mathematics. Other research studies have focused on the impact of instructional time on student achievement in middle school and high school, but there is a lack of research and literature on the impact of increasing instructional time for students in third, fourth, and fifth grade in the K-5 setting. This study adds to the current literature on the impact of instructional time in relation to student achievement.

Descriptive Statistics of the Sample

The data collected for this study were retrieved from the New Jersey Department of Education website. The data regarding student performance on the 2011 NJASK were retrieved by going to the NJDOE website and accessing the data tab. The necessary data for this study were located under the tab “Assessment Reports for years 1996 to 2014.” After accessing the 2011 assessment reports, it was imperative to examine each grade level individually by downloading the NJASK 2011 State Summary as an Excel spreadsheet. The information regarding the total number of students assessed, as well as proficiency levels can be found when examining the NJASK 2011 State Summary (See Table 1). The data from the NJDOE Excel spreadsheet for each grade level contain information related to the school and district under the tabs “Total and Instructional Group,” “Migrant,” and “Economic.”

1. County, district, and school code
2. County, district, and school name
3. District factor group (DFG)
4. Total enrolled and total valid scores for each content area
5. Percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)
6. Total mean score for Mathematics and Language Arts
7. General Education (GE) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

8. Special Education (SE) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)
9. Limited English Proficiency (LEP) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)
10. Migrant (Migr Y) students—percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)
11. Economically Disadvantaged (ED) students- percentage of students Partially Proficient (PP), Proficient (P), and Advanced Proficient (AP)

In addition to the 2011 NJASK data, information from the 2011 School Report Card was required for information on the number of instructional hours and minutes each school reported. Data retrieval was conducted using the New Jersey Department of Education website. When examining the data tab, information for 2010-2011 school year was available by downloading the 2011 Report Card data in a Microsoft Excel format. At that point, it was imperative to retrieve the necessary instructional time data, which was coded by hour and minute (e.g., FINSTIMH= instructional time for full time students—hour; FINSTIMM= instructional time for full time students—minutes). The hours and minutes had to be converted to total minutes to run the analysis in SPSS. This information was critical in determining whether there was a correlation between instructional time and student achievement on the 2011 NJASK assessment for Language Arts and Mathematics.

The schools included in the study were public elementary schools in the state of New Jersey who participated in the 2011 New Jersey Assessment of Skills and Knowledge in third, fourth, and fifth grade in Language Arts and Mathematics. In order for schools to be included in this study, they had to have third, fourth, and fifth grade students who completed the assessment in the same school. The school composition included school buildings composed of Grades K-5, Grades 1-5, Grades 2-5, or Grades 3-5. Any schools which had missing information on the reporting forms for the New Jersey State Report Card were removed from the data set. Once the data were cleaned and compiled, the total number of schools which fit the inclusion criteria was 223 schools across all grade levels of interest (i.e., Grades 3-5) in both subject areas.

As stated on the NJDOE website, District Factor Group data are comprised of data regarding graduation rates, college education, occupational status, unemployment rate, socioeconomic status, and median family income. The sample of 223 schools for this study included schools from each District Factor Group (DFG). District Factor Groups include A, B, CD, DE, FG, GH, I, and J. A DFG of A refers to the poorest or lowest socioeconomic school districts which include, but are not limited to, Abbott school districts which qualify for specific funding, while the I and J districts are considered to be the wealthiest or more affluent school districts. Each DFG grouping was coded with a specific number in SPSS (see Table 6).

Table 6

District Factor Group (DFG) Descriptions and SPSS Codes

DFG Code	**SPSS Variable Code**	**# of Schools**	**Valid Percent**
A	1	39	17.5
B	2	45	20.2
CD	3	25	11.2
DE	4	27	12.1
FG	5	32	13.9

GH	6	27	12.1
I	7	22	9.9
J	8	7	3.1

Variables

The dependent or outcome variable was obtained from the publicly published New Jersey Assessment of Skills and Knowledge (NJASK) scores for students in Grades 3, 4, and 5. The dependent or outcome variable is the aggregate student performance by school in Grades 3, 4, and 5 on the 2011 NJASK LAL and Mathematics. The independent or predictor variable of interest was instructional time, which can be defined as the exact amount of time a school dedicates to instruction during a normal school day.

Student control variables included the socioeconomic status or the percentage of students receiving free and reduced lunch, student attendance, student mobility, Limited English Proficiency (LEP), and percentage of students receiving special education services.

Educator control variables included educator attendance, and educator mobility as well as credentials of the educators and administrators at the school.

School control variables included total size of the student population for that school and the total number of instructional minutes per day.

Once the data were interpreted and cleaned to meet the inclusion criteria of the research study, the data from Microsoft Excel were transferred to IBM SPSS Statistics 23 for analysis. Initially, each variable needed to be identified, labeled, and coded (see Table 7).

Table 7

SPSS Codes, Labels, and Measures

SPSS Variable Name	**Descriptive Label**	**Measure**
dfg	District Factor Group	Nominal
fattend	Faculty Attendance	Scale
ftothighdegree	Faculty Higher Degree	Scale
fmobility	Faculty Mobility	Scale
stmobility	Student Mobility	Scale
stattend	Student Attendance	Scale
stdis	Student Disabilities	Scale
slep	Student LEP	Scale
schdaytot	Length of School Day Total Minutes	Scale
schinstrtot	Length of Instructional Time Total Minutes	Scale
totenroll	Total School Enrollment	Scale
gr3laed	grade 3 LA Economically Disadvantaged	Scale
gr3latotpp	Grade 3 LA Total Partially Proficient	Scale
gr3latotp	Grade 3 LA Total Proficient	Scale
gr3maed	Grade 3 MA Economically Disadvantaged	Scale

gr3matotpp	Grade 3 MA Total Partially Proficient	Scale
gr3matotp	Grade 3 MA Total Proficient	Scale
gr4laed	Grade 4 LA Economically Disadvantaged	Scale
gr4latotpp	Grade 4 LA Total Partially Proficient	Scale
gr4latotp	Grade 4 LA Total Proficient	Scale
gr4maed	Grade 4 MA Economically Disadvantaged	Scale
gr4matotpp	Grade 4 MA Total Partially Proficient	Scale
gr4matotp	Grade 4 MA Total Proficient	Scale
gr5laed	Grade 5 LA Economically Disadvantaged	Scale
gr5latotpp	Grade 5 LA Total Partially Proficient	Scale
gr5latotp	Grade 5 LA Total Proficient	Scale
gr5maed	Grade 5 MA Economically Disadvantaged	Scale
gr5matotpp	Grade 5 MA Total Partially Proficient	Scale
gr5matotp	Grade 5 MA Total Proficient	Scale

Procedure

Prior to completing the analysis, it was necessary to determine whether the number of schools in the sample had adequate power to run the analysis. The sample provided adequate power to run multiple regression analysis as per guidelines posited by Field (2013). The expected *R* for a random set of data is calculated using the formula *k*/ (*N*-1), which in this case was 10/223-1. For a random set of data, the expected *R* should be as close to zero as possible. In this case, expected *R* across all grade levels and subjects was .045.

Using the IBM SPSS Statistics 23 program, separate outputs were run for each grade level and content area. Initially, all of the variables were entered in a simultaneous multiple regression analysis to determine the significance of each independent variable. It was the intention of the researcher to determine if instructional time had a statistically significant impact on student achievement in third, fourth, and fifth grade on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts and Mathematics.

The researcher examined the data to ensure that it met the assumptions of regression. According to Morgan et al. (2013), ". . . the relationship between each of the predictor variables and the dependent variable is linear, the errors are normally distributed, and the variance of the residuals (difference between actual and predicted scores) is constant" (p. 164). The data met the assumptions for regression. Table 8 provides a summary of the descriptive statistics of the sample including the mean, standard deviation, and skewness statistic for each variable. The skewness statistic for each variable of the data sample is in acceptable ranges of 2 or less.

When examining faculty variables, the mean percentage of faculty attendance across all schools was approximately 95%. The mean percentage of faculty who hold a higher degree of a M.A., Ed.S., or doctorate was approximately 45%. The faculty mobility rate was approximately 4%.

When examining student variables, the mean student attendance across all schools was approximately 95%, which was approximately the same mean percentage as faculty attendance. The student mobility mean was approximately 12%. The mean percentage of students with special education needs was approximately 14%, while students with limited English proficiency averaged approximately 7%.

School level variables included length of school day in minutes, length of instructional time in minutes, and total school enrollment. The average length of the school day across all schools was approximately 386 minutes, while the average length of instructional time was approximately 339 minutes. The average school enrollment across all schools was 471 students. Additionally, the percentage of students who were considered economically disadvantaged across all three grade levels was approximately 47%. The economically disadvantaged percentage may seem high at 47%, but it is important to note that of the 223 schools in the study approximately 61% of the schools were from the four lowest District Factor Groups (DFGs).

Table 8

Descriptive Statistics of the Sample

Variable	**Mean Statistic**	**Std. Deviation Statistic**	**Skewness Statistic**
Faculty Attendance	95.69	2.05	-1.197
Faculty Higher Degree	45.13	15.88	.198
Faculty Mobility	4.35	5.21	1.48
Student Mobility	12.69	7.98	.96
Student Attendance	95.13	1.26	-1.22
Student Disabilities	14.18	6.02	0.30
Student LEP	7.42	7.74	1.81
Length of School Day- Total Minutes	386.74	13.02	0.37
Length of Instructional Time-	339.70	16.61	1.28

Total Minutes			
Total School Enrollment	471.33	180.92	1.20
Economically Disadvantaged	46.99	28.94	0.10

The Durbin-Watson statistic, mean, and standard deviation for the dependent variables are presented in Table 9. The Durbin-Watson statistic tests to make sure that the regression residuals are not correlated with a value of between 1 and 3, ensuring that this assumption has been met. The Durbin-Watson statistic for third grade Language Arts regression was 1.557 and Mathematics regression was 1.659, which fell in the appropriate range. The Durbin-Watson statistic for Grade 4 Language Arts regression was 1.334 and Mathematics regression was 1.497. The Durbin-Watson statistic for fifth grade Language Arts regression was 1.617 and Mathematics regression was 1.482, which fell into the appropriate range.

The mean score for the data set was based on the percentage of students who were Proficient. For this study, the total percentage of Proficient students included scores in the range of Proficient (200-249) and Advanced Proficient (250-300). Based on the 223 schools in the sample, the average percentage of third grade students who achieved proficiency was approximately 58% in Language Arts and approximately 74% in Mathematics. The average percentage of fourth grade students who achieved proficiency was approximately 58% in Language Arts and approximately 76% in Mathematics. The average percentage of fifth grade students who achieved proficiency was approximately 57% in Language Arts and approximately 78% in Mathematics (see Table 9).

Table 9

Descriptive Statistics of the Dependent Variables Used in the Regression Analyses

Variable	**Mean**	**Standard Deviation**
NJASK Grade 3 Language Arts (Total Proficient and Advanced Proficient)	58.17	17.90
NJASK Grade 3 Mathematics (Total Proficient and Advanced Proficient)	74.90	16.79
NJASK Grade 4 Language Arts (Total Proficient and Advanced Proficient)	58.39	18.05
NJASK Grade 4 Mathematics (Total Proficient and Advanced Proficient)	76.36	14.69
NJASK Grade 5 Language Arts (Total Proficient and Advanced Proficient)	57.02	18.72
NJASK Grade 5 Mathematics (Total Proficient and Advanced Proficient)	78.49	14.28

Simultaneous multiple regression was run for each dependent variable. The first regression output for each dependent variable included all of the posited predictor variables, which included faculty attendance, faculty higher degree, faculty mobility, student mobility, student attendance, student with disabilities, student LEP, length of instructional time, total school enrollment, and economically disadvantaged. Then the statistical output was analyzed to determine which variables created potential multicollinearity issues, if any, by analyzing the VIF and tolerance levels. If need be, the regressions were then rerun with the relevant predictor variables included after multicollinearity was mitigated (see Table 10).

Table 10

Variables Included in the Regression Rerun

Dependent Variable	**Predictor Variables Included**
NJASK Grade 3 Language Arts (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student LEP, student, disabilities, Grade 3 LA economically disadvantaged, instructional time
NJASK Grade 3 Mathematics (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student LEP, student, disabilities, Grade 3 MA economically disadvantaged, instructional time
NJASK Grade 4 Language Arts (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student LEP, student, disabilities, student attendance, student mobility, Grade 4 LA economically disadvantaged, instructional time
NJASK Grade 4 Mathematics (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student, disabilities, student attendance, Grade 4 MA economically disadvantaged, instructional time
NJASK Grade 5 Language Arts (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student LEP, student, disabilities, student attendance, student mobility, Grade 5 LA economically disadvantaged, instructional time
NJASK Grade 5 Mathematics (Total Proficient and Advanced Proficient)	Faculty mobility, faculty attendance, faculty higher degree, student LEP, student, disabilities, student attendance, student mobility, Grade 5 LA economically disadvantaged, instructional time

Research Question 1: Analysis and Results

Research Question 1: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in LAL measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The *R* Square was .612, which indicates that 61.2% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.557 (see Table 11). Since the Durbin-Watson was between 1 and 3, the residuals were found not to be correlated (Field, 2013). The ANOVA indicated that the overall regression model was statistically significant (F (10, 212) = 33.459, p, .001) when all variables were included in the model (see Table 12).

Table 11

Initial Simultaneous Multiple Regression Model Summary for Grade 3 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.782[a]	.612	.594	11.41080	1.557

a. Predictors: (Constant), gr3laed, fmobility, totenroll, schinstrtot, stdis, ftothighdegree, fattend, slep, stattend, stmobility

b. Dependent Variable: gr3latotp

Table 12

Initial Simultaneous Multiple Regression ANOVA for Grade 3 Language Arts

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	43565.650	10	4356.565	33.459	.000[b]
	Residual	27603.754	212	130.206		
	Total	71169.404	222			

a. Dependent Variable: gr3latotp

b. Predictors: (Constant), gr3laed, fmobility, totenroll, schinstrtot, stdis, ftothighdegree, fattend, slep, stattend, stmobility

The Coefficients table was used to determine variables of significance in the initial simultaneous multiple regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was approximately 2.26, the VIF for third grade economically disadvantaged was approximately 2.86, and the VIF for student attendance was approximately 1.99. According to Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the simultaneous multiple regression was rerun without student attendance and student mobility (see Table 16).

Table 13

Initial Simultaneous Multiple Regression Coefficients Table for Grade 3 Language Arts

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	27.376	91.147		.300	.764					
	fattend	-.046	.409	-.005	-.113	.910	.285	-.008	-.005	.835	1.198
	ftothighdegree	.159	.053	.141	3.009	.003	.344	.202	.129	.835	1.198
	fmobility	.000	.151	.000	-.001	.999	-.028	.000	.000	.947	1.056
	stmobility	-.029	.144	-.013	-.201	.841	-.535	-.014	-.009	.442	2.263
	stattend	.612	.861	.043	.712	.478	.482	.049	.030	.502	1.990
	stdis	-.292	.139	-.098	-2.099	.037	.104	-.143	-.090	.838	1.194
	slep	.060	.123	.026	.489	.625	-.291	.034	.021	.643	1.555
	schinstrtot	-.011	.049	-.010	-.217	.828	.047	-.015	-.009	.880	1.137
	totenroll	-.002	.005	-.024	-.519	.605	-.064	-.036	-.022	.880	1.137
	gr3laed	-.452	.045	-.729	-10.064	.000	-.761	-.569	-.430	.349	2.864

a. Dependent Variable: gr3latotp

The second simultaneous multiple regression included all variables except student mobility and student attendance due to potential multicollinearity issues. The Durbin-Watson was 1.557, indicating that the residuals were found not to be correlated (see Table 14). The ANOVA indicated that the overall regression model was statistically significant (F (8, 214) = 41.966, p, .001) when all variables were included in the model (see Table 15). The R Square was

.611, which means that approximately 61% of the variance can be explained by the variables included in the regression analysis.

Since the change in *R* square from Model 1 to Model 2 was minimal, it was determined that the second model was more stable and a better predictive model. It could be posited that since the 61% of overall sample included schools on the lower end of the SES spectrum, strong relationships between SES, student attendance, and student mobility were causing the multicollinearity issues in Model 1. Since the literature substantiates that schools with low SES tend to have lower student attendance and higher student mobility, the use of SES in the model basically served as a proxy for these two variables. Consequently, in order to eliminate the multicollinearity issues between those two variables and create a more stable model, those variables were dropped from the regression.

Table 14

Simultaneous Multiple Regression Rerun Model Summary for Grade 3 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.781[a]	.611	.596	11.37816	1.557

a. Predictors: (Constant), gr3laed, fmobility, totenroll, schinstrtot, stdis, ftothighdegree, fattend, slep

b. Dependent Variable: gr3latotp

Table 15

Simultaneous Multiple Regression Rerun ANOVA for Grade 3 Language Arts

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	43464.416	8	5433.052	41.966	.000[b]
	Residual	27704.988	214	129.463		
	Total	71169.404	222			

a. Dependent Variable: gr3latotp

b. Predictors: (Constant), gr3laed, fmobility, totenroll, schinstrtot, stdis, ftothighdegree, fattend, slep

The Coefficients table was used to determine variables of significance in the second simultaneous multiple regression model. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 16).

Table 16

Simultaneous Multiple Regression Rerun Coefficients Table for Grade 3 Language Arts

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	81.097	43.961		1.845	.066					
	fattend	-.012	.406	-.001	-.028	.977	.285	-.002	-.001	.843	1.186
	ftothighdegree	.158	.052	.140	3.017	.003	.344	.202	.129	.843	1.186

fmobility	.004	.151	.001	.028	.978	-.028	.002	.001	.948	1.055
stdis	-.308	.137	-.103	-2.244	.026	.104	-.152	-.096	.856	1.168
slep	.088	.119	.038	.736	.462	-.291	.050	.031	.689	1.452
schinstrtot	-.005	.049	-.004	-.098	.922	.047	-.007	-.004	.896	1.115
totenroll	-.002	.004	-.024	-.540	.590	-.064	-.037	-.023	.917	1.090
gr3laed	-.476	.034	-.767	-13.929	.000	-.761	-.690	-.594	.601	1.665

a. Dependent Variable: gr3latotp

The hierarchical regression was completed using the Enter method (see Table 17). The first model included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to disabilities and LEP. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.557 (see Table 18), indicating that the residuals were found not to be correlated. The F Change statistic was 14.51 in Model 1, 12.47 in Model 2, 198.55 in Model 3, and .001 in Model 4. The significant F change for Model 1 was $p< .001$, Model 2 was $p< .001$, Model 3 was $p< .001$, and Model 4 was $p > .05$.

The R square change for Model 1 was .166, which means that approximately 16% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree which were included in the first step of the hierarchical regression analysis. The R square change for Model 2 was .086, which means that approximately an additional 8% of the variance can be explained when student with disabilities and student LEP were included in the second step of the hierarchical regression analysis. The R square change for Model 3 was .358, which means that approximately an additional 35% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. The *R* square change for Model 4 was .000, which means that 0% of the variance can be explained by total number of instructional minutes, which was included in the fourth step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significant influence on a school's overall third grade Language Arts performance.

Table 17

Hierarchical Regression Model for Grade 3 Language Arts

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	fmobility, ftothighdegree, fattend[b]	.	Enter
2	slep, stdis[b]	.	Enter
3	gr3laed[b]	.	Enter
4	schinstrtot[b]	.	Enter

a. Dependent Variable: gr3latotp

b. All requested variables entered.

Table 18

Hierarchical Regression Model Summary for Grade 3 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.407[a]	.166	.154	16.46431	.166	14.516	3	219	.000	
2	.502[b]	.252	.235	15.66424	.086	12.471	2	217	.000	
3	.781[c]	.610	.599	11.33309	.358	198.555	1	216	.000	
4	.781[d]	.610	.597	11.35940	.000	.001	1	215	.980	1.557

a. Predictors: (Constant), fmobility, ftothighdegree, fattend

b. Predictors: (Constant), fmobility, ftothighdegree, fattend, slep, stdis

c. Predictors: (Constant), fmobility, ftothighdegree, fattend, slep, stdis, gr3laed

d. Predictors: (Constant), fmobility, ftothighdegree, fattend, slep, stdis, gr3laed, schinstrtot

e. Dependent Variable: gr3latotp

The best predictive model was Model 3. The *R* square for Model 3 was .610, which means that 61% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, student disabilities, student LEP, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictors in Model 3 were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 19).

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor is economically disadvantaged students. Approximately 58% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.763, p< .001). The second largest significant predictor is faculty higher degree. Approximately 2% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.145, p< .005). The last significant predictor is student disabilities. Approximately 1% of the variance of Model 3 can be explained by the predictor for student disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.103, p< .05).

Table 19

Hierarchical Regression Coefficients Table for Grade 3 Language Arts

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-142.444	52.282		-2.725	.007					
	fattend	1.942	.552	.222	3.518	.001	.285	.231	.217	.956	1.047

	ftothighdegree	.335	.071	.297	4.702	.000	.344	.303	.290	.956	1.046
	fmobility	-.073	.212	-.021	-.345	.730	-.028	-.023	-.021	1.000	1.000
2	(Constant)	-126.352	49.898		-2.532	.012					
	fattend	1.835	.526	.210	3.491	.001	.285	.231	.205	.954	1.048
	ftothighdegree	.349	.068	.309	5.100	.000	.344	.327	.299	.937	1.067
	fmobility	-.130	.202	-.038	-.640	.523	-.028	-.043	-.038	.996	1.004
	stdis	-.077	.184	-.026	-.417	.677	.104	-.028	-.024	.905	1.105
	slep	-.695	.142	-.300	-4.892	.000	-.291	-.315	-.287	.915	1.092
3	(Constant)	75.901	38.850		1.954	.052					
	fattend	.011	.402	.001	.028	.978	.285	.002	.001	.855	1.170
	ftothighdegree	.163	.051	.145	3.192	.002	.344	.212	.136	.875	1.142
	fmobility	-.004	.147	-.001	-.026	.980	-.028	-.002	-.001	.992	1.008
	stdis	-.306	.134	-.103	-2.286	.023	.104	-.154	-.097	.891	1.122
	slep	.078	.116	.034	.668	.505	-.291	.045	.028	.713	1.403
	gr3laed	-.473	.034	-.763	-14.091	.000	-.761	-.692	-.599	.616	1.624
4	(Constant)	76.356	43.004		1.776	.077					
	fattend	.011	.403	.001	.027	.979	.285	.002	.001	.852	1.174
	ftothighdegree	.163	.051	.145	3.185	.002	.344	.212	.136	.875	1.142
	fmobility	-.003	.150	-.001	-.020	.984	-.028	-.001	-.001	.956	1.046
	stdis	-.305	.137	-.103	-2.232	.027	.104	-.150	-.095	.857	1.167
	slep	.078	.117	.034	.665	.507	-.291	.045	.028	.704	1.420
	gr3laed	-.473	.034	-.763	-13.996	.000	-.761	-.690	-.596	.610	1.639
	schinstrtot	-.001	.048	-.001	-.025	.980	.047	-.002	-.001	.913	1.095

a. Dependent Variable: gr3latotp

Null Hypothesis 1: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK3 LAL scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's third grade Language Arts performance on the 2011 NJASK.

Research Question 2: Analysis and Results

Research Question 2: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in LAL as measured by NJASK 4 for 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The *R* square was .692, which indicates that 69.2% of the variance of the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.334 (see Table 20). Since the Durbin-Watson was between 1 and 3, the residuals were not found to be correlated. The ANOVA indicated that the overall regression model was statistically significant ($F (10, 212) = 47.711$, $p < .001$) when all variables were included in the model (see Table 21).

Table 20

Simultaneous Multiple Regression Model Summary for Grade 4 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.832[a]	.692	.678	10.24607	1.334

a. Predictors: (Constant), grade 4 LA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student LEP, Student Attendance, Student Mobility

b. Dependent Variable: grade 4 LA Total Proficient

Table 21

Simultaneous Multiple Regression ANOVA for Grade 4 Language Arts

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	50087.755	10	5008.776	47.711	.000[b]
	Residual	22256.155	212	104.982		
	Total	72343.910	222			

a. Dependent Variable: grade 4 LA Total Proficient

b. Predictors: (Constant), grade 4 LA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student LEP, Student Attendance, Student Mobility

The Coefficients table was used to determine variables of significance in the initial Simultaneous Multiple Regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of students with disabilities ($p < .001$), and percentage of student attendance ($p < .05$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was approximately 2.25, the VIF for student attendance was 2.05, and the VIF for fourth grade economically disadvantaged was approximately 3.02 (see Table 22). According to

Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the tolerances were calculated using the formula 1-R^2, which in this case was 1-.692=.308. Although the variance inflation factors listed above were over 2, they met the tolerance requirement.

Table 22

Simultaneous Multiple Regression Coefficients Table for Grade 4 Language Arts

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-91.097	82.334		-1.106	.270					
	Faculty Attendance	.027	.365	.003	.074	.941	.300	.005	.003	.845	1.183
	Faculty Higher Degree	.180	.047	.158	3.833	.000	.347	.255	.146	.850	1.176
	Faculty Mobility	.000	.136	.000	.002	.999	-.032	.000	.000	.944	1.059
	Student Mobility	-.069	.129	-.030	-.531	.596	-.594	-.036	-.020	.444	2.253
	Student Attendance	1.720	.784	.120	2.194	.029	.576	.149	.084	.488	2.047
	Student Disabilities	-.419	.126	-.140	-3.311	.001	.093	-.222	-.126	.817	1.224
	Student LEP	.103	.113	.044	.907	.365	-.291	.062	.035	.614	1.630
	Length of Instructional Time Total Minutes	.010	.044	.009	.230	.818	.062	.016	.009	.879	1.138
	Total School Enrollment	-.003	.004	-.026	-.647	.518	-.057	-.044	-.025	.877	1.140

grade 4 LA Economically Disadvantaged	-.447	.041	-.726	-10.966	.000	-.790	-.602	-.418	.331	3.019

a. Dependent Variable: grade 4 LA Total Proficient

The hierarchical regression was completed using the Enter method (see Table 23). The first model included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to LEP, disabilities, attendance, and mobility. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.339 (see Table 24); the residuals were not found to be correlated. The *F* change statistic was 15.475 in Model 1, 38.214 in Model 2, 120.632 in Model 3, and .101 in Model 4. The significant *F* change for Model 1 was $p < .001$, Model 2 was $p < .001$, Model 3 was $p < .001$, and Model 4 was $p > .05$.

The *R* square change for Model 1 was .175, which means that approximately 17% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree, which were included in the first step of the hierarchical regression analysis. The *R* square change for Model 2 was .343, which means that approximately an additional 34% of the variance can be explained when student with disabilities, student LEP, student mobility, and student attendance were included in the second step of the hierarchical regression analysis. The *R* square change for Model 3 was .174, which means that approximately an additional 17% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. The *R* square change for Model 4 was .000, which means that 0% of the variance can be explained by total number of instructional minutes, which was included in the fourth step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significance on a school's overall fourth grade Language Arts performance.

Table 23

Hierarchical Regression Model for Grade 4 Language Arts

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Faculty Mobility, Faculty Higher Degree, Faculty Attendance[b]	.	Enter
2	Student LEP, Student Disabilities, Student Attendance, Student Mobility[b]	.	Enter
3	grade 4 LA Economically Disadvantaged[b]	.	Enter
4	Length of Instructional Time Total Minutes[b]	.	Enter

a. Dependent Variable: grade 4 LA Total Proficient

b. All requested variables entered.

Table 24

Hierarchical Regression Model Summary for Grade 4 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.418[a]	.175	.164	16.50935	.175	15.475	3	219	.000	
2	.720[b]	.518	.502	12.73836	.343	38.214	4	215	.000	
3	.832[c]	.692	.680	10.21054	.174	120.632	1	214	.000	
4	.832[d]	.692	.679	10.23207	.000	.101	1	213	.751	1.339

a. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance

b. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility

c. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility, grade 4 LA Economically Disadvantaged

d. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility, grade 4 LA Economically Disadvantaged, Length of Instructional Time Total Minutes

e. Dependent Variable: Grade 4 LA Total Proficient

The best predictive model was Model 3. The *R* square for Model 3 was .692, which means that 69% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, student disabilities, student LEP, student attendance, student mobility, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictors in Model 3 were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of students with disabilities ($p < .005$), and percentage of student attendance ($p < .05$).

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor is economically disadvantaged students. Approximately 52% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.722, p< .001). The second largest significant predictor was faculty with higher degrees. Approximately 2% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.164, p< .001). The third most significant predictor was students with disabilities. Approximately 1% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.135, p< .005). The last significant predictor was student attendance. Approximately 1% of the variance in Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.127, p< .05).

Table 25

Hierarchical Regression Coefficients Table for Grade 4 Language Arts

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-156.273	52.425		-2.981	.003		
	Faculty Attendance	2.088	.554	.237	3.772	.000	.956	1.047
	Faculty Higher Degree	.338	.071	.297	4.733	.000	.956	1.046
	Faculty Mobility	-.087	.213	-.025	-.407	.685	1.000	1.000
2	(Constant)	-464.185	90.442		-5.132	.000		
	Faculty Attendance	.644	.445	.073	1.447	.149	.879	1.138
	Faculty Higher Degree	.251	.057	.221	4.438	.000	.904	1.106
	Faculty Mobility	-.155	.165	-.045	-.942	.347	.996	1.004
	Student Mobility	-.602	.145	-.266	-4.144	.000	.544	1.837
	Student Attendance	4.877	.891	.339	5.471	.000	.584	1.713
	Student Disabilities	-.136	.150	-.045	-.908	.365	.896	1.117
	Student LEP	-.550	.118	-.236	-4.652	.000	.873	1.145
3	(Constant)	-100.948	79.682		-1.267	.207		
	Faculty Attendance	.044	.361	.005	.122	.903	.859	1.165
	Faculty Higher Degree	.186	.046	.164	4.072	.000	.889	1.125
	Faculty Mobility	5.019E-5	.133	.000	.000	1.000	.985	1.015
	Student Mobility	-.054	.127	-.024	-.429	.668	.460	2.173
	Student Attendance	1.822	.767	.127	2.377	.018	.507	1.972
	Student Disabilities	-.406	.123	-.135	-3.302	.001	.860	1.163
	Student LEP	.092	.111	.040	.829	.408	.632	1.582

	Grade 4 LA Economically Disadvantaged	-.445	.041	-.722	-10.983	.000	.334	2.997
4	(Constant)	-103.049	80.124		-1.286	.200		
	Faculty Attendance	.052	.363	.006	.143	.886	.855	1.170
	Faculty Higher Degree	.186	.046	.164	4.064	.000	.889	1.125
	Faculty Mobility	-.008	.135	-.002	-.057	.954	.952	1.050
	Student Mobility	-.053	.127	-.023	-.419	.676	.460	2.175
	Student Attendance	1.789	.776	.124	2.306	.022	.498	2.010
	Student Disabilities	-.414	.126	-.138	-3.286	.001	.820	1.220
	Student LEP	.091	.112	.039	.812	.418	.631	1.585
	Grade 4 LA Economically Disadvantaged	-.445	.041	-.723	-10.963	.000	.333	3.003
	Length of Instructional Time Total Minutes	.014	.044	.013	.317	.751	.893	1.119

a. Dependent Variable: grade 4 LA Total Proficient

Null Hypothesis 2: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 LAL scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's fourth grade Language Arts performance on the 2011 NJASK.

Research Question 3: Analysis and Results

Research Question 3: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in grade 5 on the standardized assessment in LAL as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The *R* square was .706, which indicates that 70.6% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.617 (see Table 26). The Durbin-Watson was between 1 and 3, indicating that the residuals were found not to be correlated. The ANOVA indicated that the overall regression model was statistically significant (F (10, 212) = 51.015, $p < .001$) when all variables were included in the model (see Table 27).

Table 26

Simultaneous Multiple Regression Model Summary for Grade 5 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.840[a]	.706	.693	10.38198	1.617

a. Predictors: (Constant), grade 5 LA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

b. Dependent Variable: grade 5 LA Total Proficient

Table 27

Simultaneous Multiple Regression ANOVA for Grade 5 Language Arts

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	54986.340	10	5498.634	51.015	.000[b]
	Residual	22850.526	212	107.785		
	Total	77836.865	222			

a. Dependent Variable: grade 5 LA Total Proficient

b. Predictors: (Constant), grade 5 LA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

The Coefficients table was used to determine variables of significance in the initial simultaneous multiple regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were percentage of economically disadvantaged students ($p< .001$), percentage of faculty with higher degrees ($p< .005$), and percentage of students with disabilities ($p< .05$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was approximately 2.26, the VIF for student attendance was 2.03, and the VIF for fifth grade economically disadvantaged was approximately 2.87 (see Table 28). According to Field (2013), on average, the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the tolerances were calculated using the formula $1-R^2$, which in this case was 1-.706=.294. Although the variance inflation factors listed above were over 2, they met the tolerance requirement.

Table 28

Simultaneous Multiple Regression Coefficients Table for Grade 5 Language Arts

Model	Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
	B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	-68.611	83.266		-.824	.411					
Faculty Attendance	.064	.371	.007	.172	.864	.305	.012	.006	.843	1.186
Faculty Higher Degree	.158	.048	.134	3.328	.001	.333	.223	.124	.852	1.174
Faculty Mobility	-.046	.138	-.013	-.333	.739	-.050	-.023	-.012	.943	1.060
Student Mobility	.094	.131	.040	.716	.475	-.559	.049	.027	.442	2.262
Student Attendance	1.405	.791	.094	1.777	.077	.555	.121	.066	.492	2.031
Student Disabilities	-.284	.127	-.091	-2.238	.026	.123	-.152	-.083	.834	1.199
Student LEP	.134	.113	.055	1.192	.234	-.295	.082	.044	.640	1.563
Length of Instructional Time Total Minutes	.020	.045	.018	.452	.652	.080	.031	.017	.879	1.137
Total School Enrollment	-.004	.004	-.036	-.907	.365	-.094	-.062	-.034	.881	1.135
Grade 5 LA Economically Disadvantaged	-.522	.041	-.800	-12.672	.000	-.815	-.657	-.472	.348	2.877

a. Dependent Variable: grade 5 LA Total Proficient

The hierarchical regression was completed using the Enter method (see Table 29). The first model included the faculty variables related to mobility, higher degree, and attendance. The second model added in the student variables related to LEP, disabilities, attendance, and mobility. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.611 (see Table 30), indicating that the residuals were found not to be correlated. The *F* change statistic was 15.026 in Model 1, 32.534 in Model 2, 160.546 in Model 3, and .333 in Model 4. The significant *F* change for Model 1 was $p < .001$, Model 2 was $p < .001$, Model 3 was $p < .001$, and Model 4 was $p > .05$.

The *R* square change for Model 1 was .171, which means that approximately 17% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree. The *R* square change for Model 2 was .313, which means that approximately an additional 31% of the variance can be explained when student with disabilities, student LEP, student mobility, and student attendance were included in the second step of the hierarchical regression analysis. The *R* square change for Model 3 was .221, which means that approximately an additional 22% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. The *R* square change for Model 4 was .000, which means that 0% of the variance can be explained by total number of instructional minutes which was included in the fourth step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significant influence on a school's overall fifth grade Language Arts performance.

Table 29

Hierarchical Regression Model for Grade 5 Language Arts

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Faculty Mobility, Faculty Higher Degree, Faculty Attendance[b]	.	Enter
2	Student LEP, Student Disabilities, Student Attendance, Student Mobility[b]	.	Enter
3	grade 5 LA Economically Disadvantaged[b]	.	Enter
4	Length of Instructional Time Total Minutes[b]	.	Enter

a. Dependent Variable: grade 5 LA Total Proficient

b. All requested variables entered.

Table 30

Hierarchical Regression Model Summary for Grade 5 Language Arts

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.413[a]	.171	.159	17.16828	.171	15.026	3	219	.000	

2	.695[b]	.483	.467	13.67586	.313	32.534	4	215	.000	
3	.840[c]	.705	.694	10.36147	.221	160.546	1	214	.000	
4	.840[d]	.705	.693	10.37765	.000	.333	1	213	.565	1.611

a. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance

b. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility

c. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility, grade 5 LA Economically Disadvantaged

d. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, Student Attendance, Student Mobility, grade 5 LA Economically Disadvantaged, Length of Instructional Time Total Minutes

e. Dependent Variable: grade 5 LA Total Proficient

The best predictive model was Model 3. The *R* square for Model 3 was .705, which means that approximately 70% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, students with disabilities, student LEP, student mobility, student attendance, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictors in Model 3 were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of student attendance ($p < .05$), and percentage of students with disabilities ($p < .05$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was approximately 2.16 and the VIF for fifth grade economically disadvantaged was approximately 2.87 (see Table 31). According to Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the tolerances were calculated using the formula $1-R^2$, which in this case was 1-.705=.295. Although the variance inflation factors listed above were over 2, they met the tolerance requirement.

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor was economically disadvantaged students. Approximately 63% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.798, p< .001). The second largest significant predictor was faculty with higher degrees. Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.141, p< .001). The third most significant predictor was student attendance. Approximately 1% of the variance of Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge increases (β= .104, p< .05). The last significant predictor was students with disabilities. Approximately .7% of the variance in Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.085, p< .05).

Table 31

Hierarchical Regression Coefficients Table for Grade 5 Language Arts

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-172.138	54.518		-3.157	.002					
	Faculty Attendance	2.246	.576	.246	3.901	.000	.305	.255	.240	.956	1.047
	Faculty Higher Degree	.331	.074	.281	4.465	.000	.333	.289	.275	.956	1.046
	Faculty Mobility	-.155	.221	-.043	-.700	.485	-.050	-.047	-.043	1.000	1.000
2	(Constant)	-508.098	97.099		-5.233	.000					
	Faculty Attendance	.836	.478	.091	1.749	.082	.305	.118	.086	.879	1.138
	Faculty Higher Degree	.245	.061	.208	4.037	.000	.333	.265	.198	.904	1.106
	Faculty Mobility	-.228	.177	-.064	-1.293	.197	-.050	-.088	-.063	.996	1.004
	Student Mobility	-.518	.156	-.221	-3.324	.001	-.559	-.221	-.163	.544	1.837
	Student Attendance	5.111	.957	.343	5.341	.000	.555	.342	.262	.584	1.713
	Student Disabilities	-.024	.161	-.008	-.150	.881	.123	-.010	-.007	.896	1.117
	Student LEP	-.578	.127	-.239	-4.550	.000	-.295	-.296	-.223	.873	1.145
3	(Constant)	-79.673	80.965		-.984	.326					
	Faculty Attendance	.081	.367	.009	.221	.825	.305	.015	.008	.856	1.169
	Faculty Higher Degree	.167	.046	.141	3.591	.000	.333	.238	.133	.888	1.126

	Faculty Mobility	-.042	.135	-.012	-.312	.755	-.050	-.021	-.012	.984	1.016
	Student Mobility	.117	.128	.050	.912	.363	-.559	.062	.034	.461	2.167
	Student Attendance	1.548	.778	.104	1.990	.048	.555	.135	.074	.508	1.970
	Student Disabilities	-.263	.124	-.085	-2.131	.034	.123	-.144	-.079	.875	1.143
	Student LEP	.124	.111	.051	1.114	.266	-.295	.076	.041	.656	1.525
	Grade 5 LA Economically Disadvantaged	-.520	.041	-.798	-12.671	.000	-.815	-.655	-.471	.348	2.875
4	(Constant)	-84.120	81.457		-1.033	.303					
	Faculty Attendance	.097	.369	.011	.262	.793	.305	.018	.010	.851	1.175
	Faculty Higher Degree	.167	.047	.142	3.587	.000	.333	.239	.133	.888	1.126
	Faculty Mobility	-.057	.137	-.016	-.413	.680	-.050	-.028	-.015	.950	1.052
	Student Mobility	.118	.129	.050	.921	.358	-.559	.063	.034	.461	2.168
	Student Attendance	1.491	.785	.100	1.899	.059	.555	.129	.071	.499	2.002
	Student Disabilities	-.279	.127	-.090	-2.202	.029	.123	-.149	-.082	.836	1.197
	Student LEP	.120	.111	.049	1.074	.284	-.295	.073	.040	.653	1.531
	Grade 5 LA Economically Disadvantaged	-.521	.041	-.798	-12.658	.000	-.815	-.655	-.471	.348	2.875
	Length of Instructional Time Total Minutes	.026	.044	.023	.577	.565	.080	.040	.021	.895	1.117

a. Dependent Variable: Grade 5 LA Total Proficient

Null Hypothesis 3: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 LAL scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that total number of instructional minutes was not a significant predictor of the explained variance in a school's fifth grade Language Arts performance on the 2011 NJASK.

Research Question 4: Analysis and Results

Research Question 4: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in Mathematics as measured by NJASK 3 for 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The R square was .222, which indicates that 22.2% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.661 (see Table 32). The Durbin-Watson was between 1 and 3, indicating that the residuals were found not to be correlated. The ANOVA indicated that the overall regression model was statistically significant (F (10, 212) = 6.050, p,<.001) when all variables were included in the model (see Table 33).

Table 32

Initial Simultaneous Multiple Regression Model Summary for Grade 3 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.471[a]	.222	.185	15.15811	1.661

a. Predictors: (Constant), grade 3 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Student Disabilities, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

b. Dependent Variable: grade 3 MA Total Proficient

Table 33

Initial Simultaneous Multiple Regression ANOVA for Grade 3 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	13901.735	10	1390.173	6.050	.000[b]
	Residual	48710.905	212	229.768		
	Total	62612.640	222			

a. Dependent Variable: grade 3 MA Total Proficient

b. Predictors: (Constant), Grade 3 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Student Disabilities, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

The Coefficients table was used to determine variables of significance in the initial simultaneous multiple regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were total school enrollment ($p< .05$) and percentage of economically disadvantaged ($p< .001$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was approximately 2.26, the VIF for student attendance was approximately 1.98, and the VIF for economically disadvantaged was approximately 2.85. According to Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the simultaneous multiple regression was rerun without student attendance and student mobility (see Table 37).

Table 34

Initial Simultaneous Multiple Regression Coefficients Table for Grade 3 Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	37.351	120.951		.309	.758		
	Faculty Attendance	-.205	.544	-.025	-.378	.706	.835	1.197
	Faculty Higher Degree	.051	.070	.049	.734	.463	.836	1.197
	Faculty Mobility	-.331	.201	-.103	-1.648	.101	.947	1.056
	Student Mobility	.194	.192	.092	1.013	.312	.441	2.265
	Student Attendance	.551	1.143	.041	.482	.630	.503	1.988
	Student Disabilities	.094	.185	.034	.509	.612	.838	1.193
	Student LEP	.218	.164	.100	1.328	.186	.644	1.553
	Length of Instructional Time Total Minutes	.051	.065	.050	.781	.436	.880	1.137
	Total School Enrollment	-.012	.006	-.133	-2.055	.041	.880	1.137
	Grade 3 MA Economically Disadvantaged	-.275	.060	-.472	-4.610	.000	.350	2.854

a. Dependent Variable: Grade 3 MA Total Proficient

The second simultaneous multiple regression included all variables except student attendance and student mobility due to potential multicollinearity issues. The Durbin-Watson was 1.659, indicating that the residuals were found not to be correlated (see Table 35). The ANOVA indicated that the overall regression model was statistically significant (F (8, 214) = 7.467, p, .001) when the eight variables are included in the model (see Table 36). The R square was .218, which means that approximately 21.8% of the variance can be explained by the variables included in the regression analysis.

Since the change in R square from Model 1 to Model 2 was minimal, it was determined that the second model was more stable and a better predictive model. It could be posited that since 61% of overall sample included schools on the lower end of the SES spectrum, strong relationships between SES, student attendance, and student mobility were causing the multicollinearity issues in Model 1. Since the literature substantiates that schools with low SES tend to have lower student attendance and higher student mobility, the use of SES in the model basically served as a proxy for these two variables. Consequently, in order to eliminate the multicollinearity issues between these two variables and create a more stable model, these variables were dropped from the regression.

Table 35

Simultaneous Multiple Regression Rerun Model Summary for Grade 3 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.467[a]	.218	.189	15.12387	1.659

a. Predictors: (Constant), Student LEP, Length of Instructional Time Total Minutes, Faculty Attendance, Total School Enrollment, Faculty Mobility, Faculty Higher Degree, Student Disabilities, grade 3 MA Economically Disadvantaged

b. Dependent Variable: grade 3 MA Total Proficient

Table 36

Simultaneous Multiple Regression Rerun ANOVA for Grade 3 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	13664.112	8	1708.014	7.467	.000[b]
	Residual	48948.528	214	228.731		
	Total	62612.640	222			

a. Dependent Variable: grade 3 MA Total Proficient

b. Predictors: (Constant), Student LEP, Length of Instructional Time Total Minutes, Faculty Attendance, Total School Enrollment, Faculty Mobility, Faculty Higher Degree, Student Disabilities, grade 3 MA Economically Disadvantaged

The Coefficients table was used to determine variables of significance in the second simultaneous multiple regression model. The variables with statistical significance were percentage of economically disadvantaged ($p< .001$) and total school enrollment ($p< .05$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 37).

Table 37

Simultaneous Multiple Regression Rerun Coefficients Table for Grade 3 Mathematics

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	94.944	58.389		1.626	.105		
	Faculty Attendance	-.227	.540	-.028	-.420	.675	.844	1.185
	Faculty Higher Degree	.045	.070	.042	.643	.521	.844	1.185

Faculty Mobility	-.332	.200	-.103	-1.656	.099	.948	1.055
Student Disabilities	.084	.182	.030	.463	.644	.856	1.168
Length of Instructional Time Total Minutes	.049	.065	.049	.761	.447	.897	1.115
Grade 3 MA Economically Disadvantaged	-.255	.045	-.438	-5.618	.000	.602	1.660
Total School Enrollment	-.014	.006	-.146	-2.311	.022	.917	1.090
Student LEP	.222	.158	.102	1.408	.161	.690	1.450

a. Dependent Variable: grade 3 MA Total Proficient

The hierarchical regression was completed using the Enter method (see Table 38). The first model included the faculty variables related to higher degree, mobility, and attendance. The second model added in the student variables related to disabilities and LEP. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.628 (see Table 39), indicating that the residuals were found not to be correlated. The F change statistic was 4.735 in Model 1, 2.728 in Model 2, 29.625 in Model 3, and 1.153 in Model 4. The significant F change for Model 1 was $p < .005$, Model 2 was $p > .05$, Model 3 was $p < .001$, Model 4 was $p > .05$.

The R square change for Model 1 was .061, which means that approximately 6% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree, which were included in the first step of the hierarchical regression analysis. The R square change for Model 2 was .023, which means that approximately an additional 2% of the variance can be explained when students with disabilities and student LEP were included in the second step of the hierarchical regression analysis. The R square change for Model 3 was .110, which means that approximately an additional 11% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. The *R* square change for Model 4 was .004, which means that approximately .4% of the variance can be explained by the total number of instructional minutes which was included in the fourth step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significant influence on a school's overall third grade Mathematics performance.

Table 38

Hierarchical Regression Model for Grade 3 Mathematics

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Faculty Mobility, Faculty Higher Degree, Faculty Attendance[b]	.	Enter
2	Student LEP, Student Disabilities[b]	.	Enter
3	Grade 3 MA Economically Disadvantaged[b]	.	Enter
4	Length of Instructional Time Total Minutes[b]	.	Enter

a. Dependent Variable: Grade 3 MA Total Proficient
b. All requested variables entered.

Table 39

Hierarchical Regression Model Summary for Grade 3 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.247[a]	.061	.048	16.38556	.061	4.735	3	219	.003	
2	.290[b]	.084	.063	16.25782	.023	2.728	2	217	.068	
3	.441[c]	.194	.172	15.28116	.110	29.625	1	216	.000	
4	.446[d]	.199	.173	15.27576	.004	1.153	1	215	.284	1.628

a. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance

b. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities

c. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, grade 3 MA Economically Disadvantaged

d. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student LEP, Student Disabilities, grade 3 MA Economically Disadvantaged, Length of Instructional Time Total Minutes

e. Dependent Variable: grade 3 MA Total Proficient

The best predictive model was Model 3. The *R* square for Model 3 was .194, which means that 19% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, student disabilities, student LEP, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictor in Model 3 was percentage of economically disadvantaged students ($p < .001$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 40).

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor was economically disadvantaged students. Approximately 17% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.423, p< .001).

Table 40

Hierarchical Regression Coefficients Table for Grade 3 Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-12.887	52.032		-.248	.805		
	Faculty Attendance	.850	.549	.104	1.546	.124	.956	1.047
	Faculty Higher Degree	.180	.071	.170	2.538	.012	.956	1.046
	Faculty Mobility	-.370	.211	-.115	-1.751	.081	1.000	1.000
2	(Constant)	-10.435	51.789		-.201	.840		
	Faculty Attendance	.808	.546	.099	1.481	.140	.954	1.048
	Faculty Higher Degree	.171	.071	.162	2.409	.017	.937	1.067
	Faculty Mobility	-.397	.210	-.123	-1.890	.060	.996	1.004
	Student LEP	-.215	.147	-.099	-1.457	.147	.915	1.092
	Student Disabilities	.256	.191	.092	1.340	.182	.905	1.105
3	(Constant)	94.384	52.349		1.803	.073		
	Faculty Attendance	-.137	.541	-.017	-.253	.801	.856	1.168

	Faculty Higher Degree	.075	.069	.071	1.086	.279	.876	1.141
	Faculty Mobility	-.331	.198	-.103	-1.675	.095	.992	1.008
	Student LEP	.187	.157	.086	1.191	.235	.713	1.402
	Student Disabilities	.137	.181	.049	.756	.450	.891	1.122
	Grade 3 MA Economically Disadvantaged	-.246	.045	-.423	-5.443	.000	.618	1.619
4	(Constant)	68.053	57.792		1.178	.240		
	Faculty Attendance	-.101	.542	-.012	-.187	.852	.853	1.173
	Faculty Higher Degree	.076	.069	.071	1.095	.275	.876	1.142
	Faculty Mobility	-.373	.201	-.116	-1.851	.066	.956	1.046
	Student LEP	.169	.158	.078	1.069	.286	.705	1.419
	Student Disabilities	.098	.184	.035	.532	.596	.857	1.167
	Grade 3 MA Economically Disadvantaged	-.242	.045	-.415	-5.317	.000	.612	1.634
	Length of Instructional Time Total Minutes	.069	.065	.069	1.074	.284	.913	1.095

a. Dependent Variable: grade 3 MA Total Proficient

Null Hypothesis 4: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 Mathematics scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's third grade Mathematics performance on the 2011 NJASK.

Research Question 5: Analysis and Results

Research Question 5: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in Mathematics as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The *R* square was .442, which indicates that 44.2% of the variance in the dependent variable can be predicted by the ten independent variables, including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.461 (see Table 41). The Durbin-Watson was between 1 and 3, indicating that the residuals were found not to be correlated. The ANOVA indicated that the overall regression model was statistically significant (F (10, 212) = 16.790, p<.001) when all variables were included in the model (see Table 42).

Table 41

Initial Simultaneous Multiple Regression Model Summary for Grade 4 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.665[a]	.442	.416	11.23703	1.461

a. Predictors: (Constant), grade 4 MA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student LEP, Student Attendance, Student Mobility

b. Dependent Variable: grade 4 MA Total Proficient

Table 42

Initial Simultaneous Multiple Regression ANOVA for Grade 4 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	21200.424	10	2120.042	16.790	.000[b]
	Residual	26769.411	212	126.271		
	Total	47969.835	222			

a. Dependent Variable: grade 4 MA Total Proficient

b. Predictors: (Constant), grade 4 MA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student LEP, Student Attendance, Student Mobility

The Coefficients table was used to determine variables of significance in the initial simultaneous multiple regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were percentage of economically disadvantaged ($p < .001$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .005$).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was 2.256, the VIF for student attendance was 2.049, and the VIF for economically disadvantaged was 3.027 (see Table 43). According to Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the Simultaneous Multiple Regression was rerun without student LEP and student mobility (see Table 44).

Table 43

Initial Simultaneous Multiple Regression Coefficients Table for Grade 4 Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-22.648	90.272		-.251	.802					
	Faculty Attendance	-.019	.400	-.003	-.047	.963	.228	-.003	-.002	.846	1.182
	Faculty Higher Degree	.112	.052	.121	2.176	.031	.260	.148	.112	.850	1.176
	Faculty Mobility	.120	.149	.043	.805	.422	.023	.055	.041	.944	1.059
	Student Mobility	-.130	.142	-.071	-.916	.361	-.486	-.063	-.047	.443	2.256
	Student Attendance	1.182	.860	.101	1.375	.171	.461	.094	.071	.488	2.049
	Student Disabilities	-.431	.139	-.176	-3.109	.002	.023	-.209	-.160	.818	1.223
	Student LEP	-.084	.125	-.044	-.674	.501	-.277	-.046	-.035	.612	1.635
	Length of Instructional Time Total Minutes	.014	.048	.016	.292	.771	.056	.020	.015	.878	1.138
	Total School Enrollment	-.003	.004	-.040	-.728	.468	-.059	-.050	-.037	.877	1.140
	grade 4 MA Economically Disadvantaged	-.259	.045	-.515	-5.767	.000	-.617	-.368	-.296	.330	3.027

a. Dependent Variable: Grade 4 MA Total Proficient

The second simultaneous multiple regression included all variables except student mobility and student LEP due to potential multicollinearity issues. The Durbin-Watson was 1.497, indicating that the residuals were not found to be correlated (see Table 44). The ANOVA indicated that the overall regression model was statistically significant (F (8, 214) = 20.897, p, .001) when the eight variables were included in the model (see Table 45). The R square was .439, which means that approximately 43% of the variance can be explained by the variables included in the regression analysis.

Since the change in R square from Model 1 to Model 2 was minimal, it was determined that the second model was more stable and a better predictive model. In order to eliminate issues between variables and create a more stable model, student LEP and student mobility were dropped from the regression.

Table 44

Simultaneous Multiple Regression Rerun Model Summary for Grade 4 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.662[a]	.439	.418	11.21814	.439	20.897	8	214	.000	1.497

a. Predictors: (Constant), grade 4 MA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance

b. Dependent Variable: grade 4 MA Total Proficient

Table 45

Simultaneous Multiple Regression Rerun ANOVA for Grade 4 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	21038.665	8	2629.833	20.897	.000[b]
	Residual	26931.170	214	125.847		
	Total	47969.835	222			

a. Dependent Variable: grade 4 MA Total Proficient

b. Predictors: (Constant), grade 4 MA Economically Disadvantaged, Total School Enrollment, Faculty Mobility, Length of Instructional Time Total Minutes, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance

The Coefficients table was used to determine variables of significance in the second multiple regression model. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degree ($p < .05$), and percentage of students with disabilities ($p < .005$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 46).

Table 46

Simultaneous Multiple Regression Rerun Coefficients Table for Grade 4 Mathematics

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-36.754	78.124		-.470	.639		
	Faculty Attendance	-.021	.397	-.003	-.054	.957	.857	1.167
	Faculty Higher Degree	.111	.050	.120	2.214	.028	.891	1.122

Faculty Mobility	.133	.148	.047	.903	.367	.958	1.044
Student Disabilities	-.420	.138	-.172	-3.050	.003	.827	1.209
Student Attendance	1.321	.762	.113	1.734	.084	.620	1.613
Length of Instructional Time Total Minutes	.014	.048	.016	.298	.766	.885	1.130
Total School Enrollment	-.003	.004	-.037	-.691	.490	.936	1.069
Grade 4 MA Economically Disadvantaged	-.290	.034	-.576	-8.450	.000	.564	1.774

a. Dependent Variable: Grade 4 MA Total Proficient

The hierarchical regression was completed using the Enter method (see Table 47). The first model included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to disabilities and attendance. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.509 (see Table 48), indicating that the residuals were found not to be correlated. The F change statistic was 8.121 in Model 1, 21.872 in Model 2, 71.304 in Model 3, and .143 in Model 4. The significant F change for Model 1 was $p < .001$, Model 2 was $p < .001$, Model 3 was $p < .001$, and Model 4 was $p > .05$.

The R square change for Model 1 was .100, which means that approximately 10% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree which were included in the first step of the hierarchical regression analysis. The R square change for Model 2 was .151, which means that approximately an additional 15% of the variance can be explained when student attendance and student with disabilities were included in the second step of the hierarchical regression analysis. The R square change for Model 3 was .186, which means that approximately an additional 18% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. The *R* square change for Model 4 was .000, which means that 0% of the variance can be explained by the total number of instructional minutes which was included in the fourth step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significant influence on a school's overall fourth grade Mathematics performance.

Table 47

Hierarchical Regression Model for Grade 4 Mathematics

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Faculty Mobility, Faculty Higher Degree, Faculty Attendance[b]	.	Enter
2	Student Disabilities, Student Attendance[b]	.	Enter
3	Grade 4 MA Economically Disadvantaged[b]	.	Enter
4	Length of Instructional Time Total Minutes[b]	.	Enter

a. Dependent Variable: Grade 4 MA Total Proficient

b. All requested variables entered.

Table 48

Hierarchical Regression Model for Grade 4 Mathematics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.316[a]	.100	.088	14.03965	.100	8.121	3	219	.000	
2	.501[b]	.251	.234	12.86679	.151	21.872	2	217	.000	
3	.661[c]	.437	.421	11.18226	.186	71.304	1	216	.000	
4	.661[d]	.437	.419	11.20451	.000	.143	1	215	.706	1.509

a. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance

b. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance

c. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance, grade 4 MA Economically Disadvantaged

d. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance, grade 4 MA Economically Disadvantaged, Length of Instructional Time Total Minutes

e. Dependent Variable: grade 4 MA Total Proficient

The best predictive model was Model 3. The R square for Model 3 was .437, which means that 43% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, students with disabilities, student attendance, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictors in Model 3 were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .005$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 49).

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor was economically disadvantaged students. Approximately 32% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.571, $p < .001$). The second largest significant predictor was students with disabilities. Approximately 2% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.164, $p < .005$). The last significant predictor was faculty with higher degrees. Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.127, $p < .05$).

Table 49

Hierarchical Regression Coefficients Table for Grade 4 Mathematics

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-58.348	44.583		-1.309	.192		

	Faculty Attendance	1.307	.471	.182	2.777	.006	.956	1.047
	Faculty Higher Degree	.206	.061	.222	3.391	.001	.956	1.046
	Faculty Mobility	.079	.181	.028	.438	.662	1.000	1.000
2	(Constant)	-437.520	70.473		-6.208	.000		
	Faculty Attendance	.537	.447	.075	1.202	.231	.890	1.123
	Faculty Higher Degree	.162	.056	.174	2.860	.005	.927	1.078
	Faculty Mobility	.066	.166	.023	.398	.691	.999	1.001
	Student Disabilities	-.021	.145	-.009	-.144	.886	.983	1.017
	Student Attendance	4.785	.724	.409	6.610	.000	.903	1.107
3	(Constant)	-41.225	77.160		-.534	.594		
	Faculty Attendance	-.009	.394	-.001	-.023	.982	.866	1.154
	Faculty Higher Degree	.117	.049	.127	2.373	.019	.917	1.091
	Faculty Mobility	.136	.145	.048	.939	.349	.995	1.005
	Student Disabilities	-.402	.134	-.164	-3.006	.003	.871	1.148
	Student Attendance	1.385	.747	.118	1.854	.065	.641	1.561
	Grade 4 MA Economically Disadvantaged	-.287	.034	-.571	-8.444	.000	.570	1.754
4	(Constant)	-43.148	77.481		-.557	.578		
	Faculty Attendance	.001	.395	.000	.002	.999	.863	1.159
	Faculty Higher Degree	.117	.049	.126	2.364	.019	.917	1.091
	Faculty Mobility	.126	.147	.045	.854	.394	.963	1.038
	Student Disabilities	-.413	.137	-.169	-3.012	.003	.831	1.203
	Student Attendance	1.333	.761	.114	1.753	.081	.620	1.612

Grade 4 MA Economically Disadvantaged	-.288	.034	-.573	-8.432	.000	.567	1.764
Length of Instructional Time Total Minutes	.018	.048	.020	.378	.706	.896	1.116

a. Dependent Variable: Grade 4 MA Total Proficient

Null Hypothesis 5: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 Mathematics scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's fourth grade Mathematics performance on the 2011 NJASK.

Research Question 6: Analysis and Results

Research Question 6: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in Mathematics as measured by NJASK 5 for 2010-2011 school year when controlling for educator, student, and school variables?

Initially, a simultaneous multiple regression was used to evaluate the significance of each variable. The *R* square was .493, which indicates that 49.3% of the variance in the dependent variable can be predicted by the ten independent variables including faculty mobility, faculty attendance, faculty higher degree, student attendance, student mobility, student LEP, students with disabilities, total enrollment, economically disadvantaged, and instructional time.

The Durbin-Watson was 1.507 (see Table 50). The Durbin-Watson was between 1 and 3, indicating that the residuals were found not to be correlated. The ANOVA indicated that the overall regression model was statistically significant (F (10, 212) = 20.584, p<.001) when all variables were included in the model (see Table 51).

Table 50

Initial Simultaneous Multiple Regression Model Summary for Grade 5 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.702[a]	.493	.469	10.40989	1.507

a. Predictors: (Constant), grade 5 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

b. Dependent Variable: grade 5 MA Total Proficient

Table 51

Initial Simultaneous Multiple Regression ANOVA for Grade 5 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	22305.589	10	2230.559	20.584	.000[b]
	Residual	22973.557	212	108.366		
	Total	45279.145	222			

a. Dependent Variable: grade 5 MA Total Proficient

b. Predictors: (Constant), grade 5 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student LEP, Student Attendance, Student Mobility

The Coefficients table was used to determine variables of significance in the initial simultaneous multiple regression and also to check for multicollinearity between predictor variables. The variables with statistical significance were percentage of economically disadvantaged (*p*< .001), percentage of student attendance (*p*< .05), and percentage of students with disabilities (*p*< .05).

When examining the VIF (variance inflation factors) column, the VIF for student mobility was 2.260, the VIF for student attendance was 2.033, and the VIF for economically disadvantaged was 2.882. According to Field (2013), on average the VIF should not exceed 2. A VIF over 2 presents potential multicollinearity issues. Based on the potential multicollinearity issues, the simultaneous multiple regression was rerun without student mobility and student LEP (see Table 55).

Table 52

Initial Simultaneous Multiple Regression Coefficients Table for Grade 5 Mathematics

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-78.098	83.556		-.935	.351					
	Faculty Attendance	-.069	.372	-.010	-.186	.852	.251	-.013	-.009	.843	1.187
	Faculty Higher Degree	.089	.048	.098	1.856	.065	.268	.126	.091	.851	1.175
	Faculty Mobility	.010	.138	.004	.074	.941	-.026	.005	.004	.943	1.060
	Student Mobility	-.097	.132	-.054	-.735	.463	-.520	-.050	-.036	.443	2.260
	Student Attendance	1.841	.794	.162	2.319	.021	.534	.157	.113	.492	2.033
	Student Disabilities	-.260	.127	-.110	-2.046	.042	.044	-.139	-.100	.834	1.199
	Student LEP	.146	.113	.079	1.297	.196	-.180	.089	.063	.639	1.565

Length of Instructional Time Total Minutes	.006	.045	.007	.134	.894	.068	.009	.007	.879	1.137
Total School Enrollment	-.002	.004	-.025	-.476	.634	-.053	-.033	-.023	.881	1.135
Grade 5 MA Economically Disadvantaged	-.283	.041	-.569	-6.847	.000	-.653	-.426	-.335	.347	2.882

a. Dependent Variable: Grade 5 MA Total Proficient

The second simultaneous multiple regression included all variables except student mobility and student LEP due to potential multicollinearity issues. The Durbin-Watson was 1.482, indicating that the residuals were not found to be correlated (see Table 53). The ANOVA indicated that the overall regression model was statistically significant (F (8, 214) = 25.427, $p<$ .001) when the eight variables identified were included in the model (see Table 54). The R square was .487, which means that approximately 48% of the variance can be explained by the variables included in the regression analysis.

Since the change in R square from Model 1 to Model 2 was minimal, it was determined that the second model was more stable and a better predictive model. In order to eliminate multicollinearity issues and to create a more stable model, the variables related to student LEP and student mobility were dropped from the regression.

Table 53

Simultaneous Multiple Regression Rerun Model Summary for Grade 5 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.698[a]	.487	.468	10.41509	.487	25.427	8	214	.000	1.482

a. Predictors: (Constant), grade 5 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student Attendance

b. Dependent Variable: grade 5 MA Total Proficient

Table 54

Simultaneous Multiple Regression Rerun ANOVA for Grade 5 Mathematics

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	22065.699	8	2758.212	25.427	.000[b]
	Residual	23213.446	214	108.474		
	Total	45279.145	222			

a. Dependent Variable: grade 5 MA Total Proficient

b. Predictors: (Constant), grade 5 MA Economically Disadvantaged, Faculty Mobility, Total School Enrollment, Length of Instructional Time Total Minutes, Faculty Higher Degree, Student Disabilities, Faculty Attendance, Student Attendance

The Coefficients table was used to determine variables of significance in the second simultaneous multiple regression model. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .05$), percentage of student attendance ($p < .005$), and percentage of students with disabilities ($p < .05$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 55).

Table 55

Simultaneous Multiple Regression Rerun Coefficients Table for Grade 5 Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-133.458	72.985		-1.829	.069		
	Faculty Attendance	-.007	.370	-.001	-.019	.985	.853	1.172
	Faculty Higher Degree	.103	.047	.115	2.217	.028	.890	1.123
	Faculty Mobility	-.010	.137	-.003	-.070	.944	.957	1.045
	Student Attendance	2.319	.708	.204	3.276	.001	.619	1.616
	Student Disabilities	-.281	.126	-.118	-2.233	.027	.853	1.172
	Length of Instructional Time Total Minutes	.012	.045	.014	.271	.787	.887	1.128
	Total School Enrollment	-.001	.004	-.007	-.146	.884	.939	1.065
	Grade 5 MA Economically Disadvantaged	-.268	.032	-.538	-8.285	.000	.568	1.761

a. Dependent Variable: Grade 5 MA Total Proficient

The hierarchical regression was completed using the Enter method (see Table 56). The first model included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to disabilities and attendance. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The Durbin-Watson was 1.484 (see Table 57), indicating that the residuals were found not to be correlated. The *F* change statistic was 9.197 for Model 1, 33.779 for Model 2, 69.201

for Model 3, and .084 for Model 4. The significant *F* change for Model 1 was $p < .001$, Model 2 was $p < .001$, Model 3 was $p < .001$, and Model 4 was $p > .05$.

The *R* square change for Model 1 was .112, which means that approximately 11% of the variance can be explained by faculty attendance, faculty mobility, and faculty higher degree, which were included in the first step of the hierarchical regression analysis. The *R* square change for Model 2 was .211, which means that approximately an additional 21% of the variance can be explained when student disabilities and student attendance were included in the second step of the hierarchical regression analysis. The *R* square change for Model 3 was .164, which means that approximately an additional 16% of the variance can be explained when economically disadvantaged was included in the third step of the hierarchical regression analysis. Therefore, Model 3 was the strongest model, which did not include the variable of interest. Consequently, the variable of interest, which was total minutes of instructional time, had no significant influence on a school's overall fifth grade Mathematics performance.

Table 56

Hierarchical Regression Model for Grade 5 Mathematics

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Faculty Mobility, Faculty Higher Degree, Faculty Attendance[b]	.	Enter
2	Student Disabilities, Student Attendance[b]	.	Enter

3	Grade 5 MA Economically Disadvantaged[b]		.	Enter
4	Length of Instructional Time Total Minutes[b]		.	Enter

a. Dependent Variable: grade 5 MA Total Proficient

b. All requested variables entered.

Table 57

Hierarchical Regression Model Summary for Grade 5 Mathematics

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	*F* Change	*df*1	*df*2	Sig. *F* Change	
1	.335[a]	.112	.100	13.55062	.112	9.197	3	219	.000	
2	.568[b]	.323	.307	11.88765	.211	33.779	2	217	.000	
3	.698[c]	.487	.473	10.36931	.164	69.201	1	216	.000	
4	.698[d]	.487	.471	10.39136	.000	.084	1	215	.772	1.484

a. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance

b. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance

c. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance, grade 5 MA Economically Disadvantaged

d. Predictors: (Constant), Faculty Mobility, Faculty Higher Degree, Faculty Attendance, Student Disabilities, Student Attendance, grade 5 MA Economically Disadvantaged, Length of Instructional Time Total Minutes

e. Dependent Variable: grade 5 MA Total Proficient

The best predictive model was Model 3. The *R* square for Model 3 was .487, which means that 48% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, students with disabilities, student attendance, and economically disadvantaged students.

The Coefficients table from the hierarchical regression analysis was used to determine the significant predictors and the percentage of variance each significant predictor accounted for in the model. The significant predictors in Model 3 were percentage of economically disadvantaged students ($p < .001$), percentage of student attendance ($p < .005$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .05$). When examining the VIF (variance inflation factors) column, there were no VIFs over 2, which satisfied the multicollinearity issues of the first model and provided a better and more stable predictive model (see Table 58).

Squaring the standardized beta for each of the significant predictor variables provides an effect size to determine the amount of variance that can be explained by each significant predictor variable. The largest significant predictor was economically disadvantaged students. Approximately 28% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases ($\beta = -.537$, $p < .001$). The second largest predictor was student attendance. Approximately 4% of the variance of Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases ($\beta = .207$, $p < .005$). The third largest significant predictor was faculty higher degree. Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases ($\beta = .116$, $p < .05$). The last significant predictor is students with disabilities. Approximately 1% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.115, p< .05).

Table 58

Hierarchical Regression Coefficients Table for Grade 5 Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
1	(Constant)	-66.046	43.030		-1.535	.126		
	Faculty Attendance	1.418	.454	.203	3.120	.002	.956	1.047
	Faculty Higher Degree	.203	.059	.225	3.458	.001	.956	1.046
	Faculty Mobility	-.056	.175	-.020	-.319	.750	1.000	1.000
2	(Constant)	-502.086	65.110		-7.711	.000		
	Faculty Attendance	.531	.413	.076	1.287	.200	.890	1.123
	Faculty Higher Degree	.149	.052	.166	2.853	.005	.927	1.078
	Faculty Mobility	-.073	.153	-.027	-.476	.635	.999	1.001
	Student Attendance	5.496	.669	.483	8.218	.000	.903	1.107
	Student Disabilities	.034	.134	.014	.253	.800	.983	1.017
3	(Constant)	-132.871	72.080		-1.843	.067		
	Faculty Attendance	-.010	.366	-.001	-.027	.978	.862	1.160
	Faculty Higher Degree	.105	.046	.116	2.284	.023	.915	1.093
	Faculty Mobility	-.004	.134	-.001	-.029	.976	.995	1.005
	Student Attendance	2.354	.695	.207	3.387	.001	.636	1.571

	Student Disabilities	-.272	.122	-.115	-2.225	.027	.894	1.119
	Grade 5 MA Economically Disadvantaged	-.267	.032	-.537	-8.319	.000	.570	1.753
4	(Constant)	-134.523	72.456		-1.857	.065		
	Faculty Attendance	-.003	.368	.000	-.007	.994	.858	1.165
	Faculty Higher Degree	.105	.046	.116	2.277	.024	.915	1.093
	Faculty Mobility	-.011	.137	-.004	-.081	.935	.962	1.039
	Student Attendance	2.320	.706	.204	3.285	.001	.619	1.616
	Student Disabilities	-.280	.125	-.118	-2.233	.027	.856	1.168
	Grade 5 MA Economically Disadvantaged	-.268	.032	-.538	-8.305	.000	.569	1.758
	Length of Instructional Time Total Minutes	.013	.044	.015	.291	.772	.899	1.113

a. Dependent Variable: Grade 5 MA Total Proficient

Null Hypothesis 6: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 Mathematics scores when controlling for educator, student, and school variables.

The researcher retains the null hypothesis based on the interpretation and analysis of the data in this section. The simultaneous multiple regression and the hierarchical regression demonstrated that total number of instructional minutes was not a significant predictor of the explained variance in a school's fifth grade Mathematics performance on the 2011 NJASK.

Conclusion

In conclusion, the null hypotheses for Grades 3-5 Language Arts and Grades 3-5 Mathematics were retained. The variable of interest, total number of instructional minutes, was not a significant predictor of the explained variance in Grades 3-5 Language Arts and Grades 3-5 Mathematics.

The variables with statistical significance for Grade 3 Language Arts were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$).The variables with statistical significance for Grade 4 Language Arts were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of students with disabilities ($p < .005$), and percentage of student attendance ($p < .05$). The variables with statistical significance for Grade 5 Language Arts were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of student attendance ($p < .05$), and percentage of students with disabilities ($p < .05$).

The variables with statistical significance for Grade 3 Mathematics was percentage of economically disadvantaged students ($p < .001$). The variables with statistical significance for Grade 4 Mathematics were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .005$). The variables with statistical significance for Grade 5 Mathematics were percentage of economically disadvantaged students ($p < .001$), percentage of student attendance ($p < .005$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .05$).

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

CHAPTER V

CONCLUSIONS AND RECCOMENDATIONS

Introduction

Many people make the assumption that increasing instructional time will positively impact student achievement in the classroom. As cited previously in Chapter II, Jami et al. (2012) found that increasing instructional time was only as powerful as the level of instruction students received during additional instructional time. Time has been an ongoing topic in education for decades.

The debate on the impact of extending the school day or increasing instructional time is at the epicenter of many arguments for increasing student achievement. According to Miller (2014) from the Center for American Progress, in 2013, 33 states evaluated the concept of increasing instructional time. This statistic demonstrates the need for policymakers and school officials to examine the data to ensure that data driven decisions are made for schools in New Jersey. Districts believe that by increasing instructional time, there will be an increase in achievement.

Since there was limited research previously conducted on the impact of extending instructional time at the elementary school level, it was my intention to analyze the influence of instructional time on student achievement on the 2011 Language Arts and Mathematics New Jersey Assessment of Skills and Knowledge (NJASK) for students in third, fourth, and fifth grade.

Purpose

The purpose of this study was to explore the strength and direction of the relationship between instructional time and the academic achievement of New Jersey elementary public school students in Grades 3, 4, and 5 based on the data collected from the 2011 New Jersey State Report Card and New Jersey Assessment of Skills and Knowledge for Language Arts and Mathematics. The study included variables related to student, staff, and school. Student variables related to attendance, mobility, disabilities, Limited English Proficiency (LEP), and economically disadvantaged. Staff variables included attendance, mobility, and credentials of faculty and administration. School variables related to total enrollment, instructional time, and length of school day for students in Grades 3, 4, and 5. Other research studies have focused on the impact of instructional time on student achievement in middle school and high school, but there is a lack of research and literature on the impact of increasing instructional time for students in third, fourth, and fifth grades in the K-5 setting. This study adds to the current body of literature on the impact of instructional time in relation to student achievement.

Organization of the Chapter

This chapter focuses on a summary of the research findings including the research questions, null hypotheses, and findings. Additionally, this chapter addresses recommendations for policy, practice, and future research.

Summary of Findings

This study provides evidentiary support regarding the influence of instructional time on student achievement in Language Arts and Mathematics in Grades 3-5 on the 2011 New Jersey Assessment of Skills and Knowledge (NJASK). The overarching research question, subsidiary research questions, null hypotheses, and findings for each research question are listed below.

The overarching research question for the study was the following: What is the influence of instructional minutes on the 2011 Grade 3, 4, and 5 Language Arts and Mathematics proficiency percentages on the New Jersey Assessment of Skills and Knowledge scores controlling for educator, student, and school variables?

Through statistical analysis using simultaneous multiple regressions, as well as hierarchical regressions, it was found that the amount of instructional time for a school did not have a statistically significant impact on student achievement on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts and Mathematics for students in third, fourth, and fifth grade. No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3, NJASK 4, and NJASK 5 Language Arts and Mathematics scores when controlling for educator, student, and school variables.

Subsidiary Research Question 1: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in LAL measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 1: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 LAL scores when controlling for educator, student, and school variables.

Findings for Research Question 1: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that total number of instructional minutes was not a significant predictor of the explained variance in a school's third grade Language Arts performance on the 2011 NJASK.

The first step in answering Research Question 1 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/ outcome variable was

NJASK3 LAL. The *R* square was .612, which indicates that 61.2% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$). The variable of interest, instructional time, was not statistically significant ($\beta = -.010$, $p > .05$).

The second simultaneous multiple regression included all variables except student mobility and student attendance due to potential multicollinearity issues. The *R* square was .611, which means that approximately 61% of the variance can be explained by the variables included in the regression analysis. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$). The variable of interest, instructional time, was not statistically significant ($\beta = -.004$, $p > .05$).

The third step in answering Research Question 1 was to run a hierarchical regression. For the hierarchical regression, the first model included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to disabilities and LEP. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The best predictive model was Model 3. The *R* square for Model 3 was .610, which means that 61% of the variance can be explained by Model 3. Approximately 58% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.763, $p < .001$). Approximately 2% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.145, $p < .005$). Approximately 1% of the variance of Model 3 can be explained by the predictor for student disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.103, $p < .05$). The variable of interest, instructional time, was not statistically significant (β= -.001, $p > .05$).

Subsidiary Research Question 2: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in LAL as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 2: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 LAL scores when controlling for educator, student, and school variables.

Findings for Research Question 2: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's fourth grade Language Arts performance on the 2011 NJASK.

The first step in answering Research Question 2 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/outcome variable was NJASK 4 LAL. The R square was .692, which indicates that 69.2% of the variance of the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .001$), percentage of students with disabilities ($p < .001$), and percentage of student attendance ($p < .05$). The variable of interest, instructional time, was not statistically significant ($\beta = .009$, $p > .05$).

The second step in answering Research Question 2 was to run a hierarchical regression. The first model of the hierarchical regression included the faculty variables related to attendance, mobility, and higher degree. The second model added in the student variables related to LEP, disabilities, attendance, and mobility. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The best predictive model was Model 3. The R square for Model 3 was .692, which means that 69% of the variance can be explained by Model 3. Approximately 52% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.722, $p< .001$). Approximately 2% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.164, $p< .001$). Approximately 1% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.135, $p< .005$). Approximately 1% of the variance in Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.127, $p< .05$). The variable of interest, instructional time, was not statistically significant (β= .013, $p> .05$).

Subsidiary Research Question 3: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in LAL as measured by NJASK 5 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 3: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 LAL scores when controlling for educator, student, and school variables.

Findings for Research Question 3: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that total number of instructional minutes was not a significant predictor of the explained variance in a school's fifth grade Language Arts performance on the 2011 NJASK.

The first step in answering Research Question 3 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/outcome variable was NJASK 5 LAL. The *R* square was .706, which indicates that 70.6% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .005$), and percentage of students with disabilities ($p < .05$). The variable of interest, instructional time, was not statistically significant ($\beta = .018$, $p > .05$).

The second step in answering Research Question 3 was to run a Hierarchical Regression. The first model of the hierarchical regression included the faculty variables related to mobility, higher degree, and attendance. The second model added in the student variables related to LEP, disabilities, attendance, and mobility. The third model included the economically disadvantaged. The fourth model included the variable of interest, which was the total number of instructional minutes during the school day.

The best predictive model was Model 3. The *R* square for Model 3 was .705, which means that approximately 70% of the variance can be explained by Model 3. Approximately 63% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of

Skills and Knowledge decreases (β= -.798, *p*< .001). Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.141, *p*< .001). Approximately 1% of the variance of Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge increases (β= .104, *p*< .05). Approximately .7% of the variance in Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.085, *p*< .05). The variable of interest, instructional time, was not statistically significant (β= .023, *p*> .05).

Table 59

Significant Variables from the Hierarchical Regression Coefficients Table for LAL NJASK for Grades 3-5

NJASK Assessment	**Significant Variable**	**Significance (*p*)**	**Standardized Beta (β)**
NJASK 3 LAL	Percentage of economically disadvantaged students	*p*< .001	β= -.763
	Percentage of faculty with higher degrees	*p*< .005	β= .145
	Percentage of students with disabilities	*p*< .05	β= -.103
NJASK 4 LAL	Percentage of economically disadvantaged students	*p*< .001	β= -.722

	Percentage of faculty with higher degrees	*p*< .001	β= .164
	Percentage of students with disabilities	*p*< .005	β= -.135
	Percentage of student attendance	*p*< .05	β= .127
NJASK 5 LAL	Percentage of economically disadvantaged students	*p*< .001	β= -.798
	Percentage of faculty with higher degrees	*p*< .001	β= .141
	Percentage of students with disabilities	*p*< .05	β= -.085
	Percentage of student attendance	*p*< .05	β= .104

Subsidiary Research Question 4: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 3 on the standardized assessment in Mathematics as measured by NJASK 3 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 4: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 3 Mathematics scores when controlling for educator, student, and school variables.

Findings for Research Question 4: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's third grade Mathematics performance on the 2011 NJASK.

The first step in answering Research Question 4 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/ outcome variable was

NJASK 3 Mathematics. The *R* square was .222, which indicates that 22.2% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were total school enrollment ($p< .05$) and percentage of economically disadvantaged ($p< .001$). The variable of interest, instructional time, was not statistically significant ($\beta= .050$, $p> .05$).

The second step in answering Research Question 4 was to run another simultaneous multiple regression which included all variables except student attendance and student mobility due to potential multicollinearity issues. The *R* square was .218, which means that approximately 21.8% of the variance can be explained by the variables included in the regression analysis. The variables with statistical significance were percentage of economically disadvantaged ($p< .001$) and total school enrollment ($p< .05$). The variable of interest, instructional time, was not statistically significant ($\beta= .049$, $p> .05$).

The third step in answering Research Question 4 was to run a hierarchical regression. The best predictive model was Model 3. The *R* square for Model 3 was .194, which means that 19% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, student disabilities, student LEP, and economically disadvantaged students. Approximately 17% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases ($\beta= -.423$, $p< .001$). The variable of interest, instructional time, was not statistically significant ($\beta= .069$, $p> .05$).

Subsidiary Research Question 5: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 4 on the standardized assessment in Mathematics as measured by NJASK 4 for the 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 5: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 4 Mathematics scores when controlling for educator, student, and school variables.

Findings for Research Question 5: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that the total number of instructional minutes was not a significant predictor of the explained variance in a school's fourth grade Mathematics performance on the 2011 NJASK.

The first step in answering Research Question 5 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/outcome variable was NJASK4 Mathematics. The *R* square was .442, which indicates that 44.2% of the variance in the dependent variable can be predicted by the ten independent variables including faculty attendance, faculty mobility, faculty higher degree, student mobility, student attendance, student LEP, student disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were percentage of economically disadvantaged ($p < .001$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .005$). The variable of interest, instructional time, was not statistically significant ($\beta = .016$, $p > .05$).

The second step in answering Research Question 5 was to run another simultaneous multiple regression which included all variables except student mobility and student LEP due to potential multicollinearity issues. The *R* square was .439, which means that approximately 43% of the variance can be explained by the variables included in the regression analysis. The variables with statistical significance were percentage of economically disadvantaged students ($p < .001$), percentage of faculty with higher degrees ($p < .05$), and percentage of students with disabilities ($p < .005$). The variable of interest, instructional time, was not statistically significant ($\beta = .016$, $p > .05$).

The third step in answering Research Question 5 was to run a hierarchical regression. The best predictive model was Model 3. The *R* square for Model 3 was .437, which means that 43% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, students with disabilities, student attendance, and economically disadvantaged students. Approximately 32% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases ($\beta = -.571$, $p < .001$). Approximately 2% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are Proficient on the New Jersey Assessment of Skills and Knowledge decreases ($\beta = -.164$, $p < .005$). Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students Proficient on the New Jersey Assessment of Skills and

Knowledge increases (β=.127, *p*< .05). The variable of interest, instructional time, was not statistically significant (β= .020, *p*> .05).

Subsidiary Research Question 6: What is the influence of instructional time on the aggregate percentage of students achieving Proficient and Advanced Proficient in Grade 5 on the standardized assessment in Mathematics as measured by NJASK5 for 2010-2011 school year when controlling for educator, student, and school variables?

Null Hypothesis 6: No statistically significant relationship exists between instructional time and the 2010-2011 NJASK 5 Mathematics scores when controlling for educator, student, and school variables.

Findings for Research Question 6: The researcher retains the null hypothesis based on the interpretation and analysis of the data in Chapter IV. The simultaneous multiple regression and the hierarchical regression demonstrated that total number of instructional minutes was not a significant predictor of the explained variance in a school's fifth grade Mathematics performance on the 2011 NJASK.

The first step in answering Research Question 6 was to run a simultaneous multiple regression to evaluate the significance of each variable. The dependent/outcome variable was NJASK 5 Mathematics. The *R* square was .493, which indicates that 49.3% of the variance in the dependent variable can be predicted by the ten independent variables including faculty mobility, faculty attendance, faculty higher degree, student attendance, student mobility, student LEP, students with disabilities, total enrollment, economically disadvantaged, and instructional time. The variables with statistical significance were percentage of economically disadvantaged (*p*< .001), percentage of student attendance (*p*< .05), and percentage of students with disabilities (*p*< .05). The variable of interest, instructional time, was not statistically significant (β= .007, *p*> .05).

The second step in answering Research Question 6 was to run another simultaneous multiple regression which included all variables except student mobility and student LEP due to potential multicollinearity issues. The *R* square was .487, which means that approximately 48% of the variance can be explained by the variables included in the regression analysis. The variables with statistical significance were percentage of economically disadvantaged students (*p*< .001), percentage of faculty with higher degrees (*p*< .05), percentage of student attendance (*p*< .005), and percentage of students with disabilities (*p*< .05). The variable of interest, instructional time, was not statistically significant (β= .014, *p*> .05).

The third step in answering Research Question 6 was to run a hierarchical regression. The best predictive model was Model 3. The *R* square for Model 3 was .487, which means that 48% of the variance can be explained by Model 3. Model 3 variables included faculty attendance, faculty higher degree, faculty mobility, students with disabilities, student attendance, and economically disadvantaged students. Approximately 28% of the variance of Model 3 can be explained by the predictor for economically disadvantaged students. The negative beta indicates that as the percentage of economically disadvantaged increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.537, *p*< .001). Approximately 4% of the variance of Model 3 can be explained by the predictor for student attendance. The positive beta indicates that as the percentage of student attendance increases, the percentage of students Proficient on the New Jersey Assessment of Skills and Knowledge increases (β= .207, *p*< .005). Approximately 1% of the variance of Model 3 can be explained by the predictor for faculty with a master's or doctoral degree. The positive beta indicates that as the percentage of faculty with higher degrees increases, the percentage of students proficient on the New Jersey Assessment of Skills and Knowledge increases (β=.116, $p < .05$). Approximately 1% of the variance of Model 3 can be explained by the predictor for students with disabilities. The negative beta indicates that as the percentage of students with disabilities increases, the percentage of students who are proficient on the New Jersey Assessment of Skills and Knowledge decreases (β= -.115, $p < .05$). The variable of interest, instructional time, was not statistically significant (β= .015, $p > .05$).

Table 60

Significant Variables from the Hierarchical Regression Coefficients Table for Math NJASK for Grades 3-5

NJASK Assessment	**Significant Variable**	**Significance (*p*)**	**Standardized Beta (β)**
NJASK 3 MATH	Percentage of economically disadvantaged students	$p < .001$	β= -.423
NJASK 4 MATH	Percentage of economically disadvantaged students	$p < .001$	β= -.571
	Percentage of faculty with higher degrees	$p < .05$	β= .127
	Percentage of students with disabilities	$p < .005$	β= -.164
NJASK 5 MATH	Percentage of economically disadvantaged students	$p < .001$	β= -.537
	Percentage of faculty with higher degrees	$p < .05$	β= .116
	Percentage of students with disabilities	$p < .05$	β= -.115
	Percentage of student attendance	$p < .005$	β= .207

Discussion

This study presents findings that demonstrate that the amount of instructional time was not a significant predictor of student achievement on the 2011 Language Arts and Mathematics New Jersey Assessment of Skills and Knowledge (NJASK) assessments for third, fourth, and fifth grade students. The findings in this study align with other research which focused on the influence of the length of the school day on student achievement in elementary, middle, and high school. The findings of deAngelis (2014), Sammarone (2014), and Plevier (2016) were consistent with the findings of this research regarding time. deAngelis (2014), Sammarone (2014), and Plevier (2016) focused on the influence of the length of the school day and found the length of the school day had minimal influence on student achievement at the various levels. Konstantopoulos (2006) also found that length of school year did not have a statistically significant impact on standardized test scores. Furthermore, Long (2014) asserted that when examining the PISA 2000 survey, the impact of instructional time on student learning was insignificant.

Other researchers have identified instructional time to have a positive impact on student achievement (Farmer-Hinton et al., 2009). According to Jez and Wassmer (2013), increasing instructional time in California public schools has a positive and statistically significant impact on student achievement (.0031, $p < .01$). Harn et al. (2008) found that students receiving the additional hour of intensive instructional time had more significant growth from the fall to spring than students receiving the additional 30 minutes of instructional time per day.

Although research exists on the potential benefits of increasing instructional time, there are also potential concerns regarding the concept of simply adding instructional minutes. Patall et al. (2010) asserted that an increase in instructional time is only as beneficial as the instruction students receive during that time. Increased instructional time could lead to a misuse of the additional instructional minutes and negative impact on student motivation (Patall et al., 2010). When examining instructional time, it is necessary to evaluate the type and quality of instruction taking place rather than simply equating any form of additional instructional time with an increase in student achievement.

Although instructional time was not a significant predictor in this study, there were other variables of significance (see Tables 59 and 60). The variable that proved to be the most statistically significant for Grades 3, 4, and 5 on the Language Arts and Mathematics NJASK was economically disadvantaged students. This study found the variable for economically disadvantaged to be a statistically significant predictor of student achievement on the 2011 NJASK in Mathematics for Grade 3 ($\beta = -.423$, $p < .001$), Grade 4 ($\beta = -.571$, $p < .001$), and Grade 5 ($\beta = -.537$, $p < .001$). This study found the variable for economically disadvantaged to be a statistically significant predictor of student achievement on the 2011 NJASK in Language Arts for Grade 3 ($\beta = -.763$, $p < .001$), Grade 4 ($\beta = -.722$, $p < .001$), and Grade 5 ($\beta = -.798$, $p < .001$).

These findings align with other research that has found that the socioeconomic status of students impacts student achievement (Demeris et al., 2007; Crowley, 2003; Alexander et al., 2001). The concept that SES is a significant predictor of student achievement has been studied countless times, but we, as educational leaders, must continue to evaluate programs and initiatives to provide support for students of low socio-economic status to increase student achievement and student success.

When examining the data further, the results for the Language Arts and Mathematics research questions varied significantly. For example, with regard to third grade, approximately 61% of the variance could be explained by the model, whereas only 19% of the variance could be explained by the model for Mathematics. The trend that more of the variance could be explained for Language Arts than Mathematics achievement existed across all three grade levels in the study. There are other factors that could potentially impact Mathematics achievement more than Language Arts achievement. According to Ottmar et al. (2015), teachers who utilized highly effective Mathematics teaching strategies had increased student achievement on the Mathematics assessment (effect size= .21, $p < .05$). Therefore, the instructional strategies utilized by a teacher may impact student achievement. Additionally, the Mathematics program and curriculum utilized by a district could potentially have a significant impact on student achievement in Mathematics. To develop a model that accounted for more of the variance in Mathematics achievement, it may be beneficial to examine other variables including Mathematics program and curriculum.

Another variable that proved to be statistically significant for Grades 3, 4, and 5 on the Language Arts section and Grades 4 and 5 on the Mathematics NJASK was the percentage of staff with a higher degree. This study found the variable for faculty with a higher degree to be a statistically significant predictor of student achievement on the 2011 NJASK in Mathematics for Grade 4 ($\beta = .127$, $p < .05$) and grade 5 ($\beta = .116$, $p < .05$). This study found the variable for faculty with a higher degree to be a statistically significant predictor of student achievement on the 2011 NJASK in Language Arts for Grade 3 ($\beta = .145$, $p < .005$), Grade 4 ($\beta = .164$, $p < .001$), and Grade 5 ($\beta = .141$, $p < .001$). In all cases the standardized beta was positive, which demonstrates as the percentage of faculty with a higher degree increases, student achievement also increases. These findings align with other research which identifies the positive impact of strong teacher knowledge and effectiveness on student achievement (Heck, 2007; Heck, 2008).

As educational leaders, continuously providing opportunities for professional development and graduate level education has the potential to positively impact student achievement as identified in this study. Teachers who utilize a plethora of research-based strategies are able to modify their instruction to meet the needs of individual students in their classrooms. Furthermore, educational leaders and educators must collaborate to evaluate the needs of students from economically disadvantaged homes to provide supports to close the achievement gap.

Recommendations for Policy and Practice

The findings from this research study provide policymakers with critical information regarding extending the amount of instructional time in schools. The findings from this study do not demonstrate that instructional time influenced student achievement. As cited by Patall et al. (2010) in Chapter II, extending the school day is not the only intervention that would be required to improve student achievement. Therefore, in order for policymakers to effectively actuate change, it would be necessary to examine some of the other variables that were significant predictors of student achievement.

According to the findings in this study, examining potential programs and interventions for economically disadvantaged students would likely have a more significant impact on student achievement than instructional time. Ready (2010) found that students with low socioeconomic status who have opportunities to attend better schools potentially benefit more than students with average to high socioeconomic status who attend the same school. Additionally, Demeris et al. (2007) found that the socioeconomic status of students impacts student achievement. Based on the findings of Ready and Demeris, I find it to be more imperative to evaluate the programs that exist for low SES students.

Certain programs already exist to support economically disadvantaged students. The Wallace Foundation evaluated after school programs and determined that programs must have specific features to increase effectiveness. Kauh (2011), a researcher from The Wallace Foundation, explained that the afterschool program must provide professional development and training to offer opportunities for staff to learn and develop necessary skills related to the developmental needs of the students. The program must be located in an area that is easily accessible for all participants (Kauh, 2011). Last, the activities selected for the program must encourage students to grow academically through enriching tasks (Kauh, 2011). Simply creating afterschool programs could potentially fall short, which is the reason Kauh emphasizes the importance of judiciously developing those programs. One afterschool program that met Kauh's required features of afterschool programs was the Lighthouse Program developed by the Chicago Public Schools to provide struggling students with additional Language Arts and Mathematics instruction (Farmer-Hinton, Sass, and Schroeder, 2009). Policymakers should assess the needs of the economically disadvantaged school districts to determine the most effective methods of providing support to economically disadvantaged students and school districts to potentially increase student achievement.

Additionally, policymakers should evaluate the fiscal and academic supports currently available for educators who would plan to attend graduate school. This study identified the percentage of faculty with higher degrees to have a positive relationship with student achievement. These data align with the other research which identifies the positive impact of strong teacher knowledge and effectiveness on student achievement (Heck, 2007; Heck, 2008; Ottmar, Rimm-Kaufman, Larsen, and Berry, 2015). Consequently, encouraging educators to continue their educations has the potential to impact student achievement more than instructional time.

It would be prudent for policymakers to examine all statistically significant predictors of student achievement prior to making decisions related to increasing instructional time. It should not be assumed that increasing instructional time will have a positive relationship with student achievement, as the findings in this study indicate that instructional time was not a statistically significant predictor of student achievement for students in third, fourth, and fifth grade on the 2011 New Jersey Assessment of Skills and Knowledge in Language Arts and Mathematics.

The researcher has recommendations for educational practice based on the data that were collected and analyzed through this study. Prior to increasing instructional time, schools should evaluate the programs and supports in place to support the economically disadvantaged students in their schools. Since the percentage of economically disadvantaged students was the most statistically significant predictor of student achievement across third, fourth, and fifth grade in Language Arts and Mathematics on the 2011 NJASK, it would be prudent for policymakers, school officials, educational leaders, and educators to examine all possibilities to provide the most effective resources to support economically disadvantaged students, in turn potentially closing the achievement gap.

Recommendations for Future Research

Based on the findings that the percentage of economically disadvantaged was a statistically significant predictor of student achievement on the 2011 NJASK 3, NJASK 4, and NJASK 5 for Language Arts and Mathematics, as well as attendance, further research should be conducted on the impact of SES and attendance on student achievement in Language Arts and Mathematics. Ready (2010) explained that economically disadvantaged students who attend school on a regular basis have more significant gains. More specifically, researchers may want to examine the potential influence on various programs to support economically disadvantaged related to increasing instructional time. Since economically disadvantaged was consistently the most significant predictor of student achievement in this study with all District Factor Groups included, researchers could conduct a study that investigates how schools perform across their peer groups, as defined by the state of New Jersey, when accounting for instructional time.

The researcher in this study found there to be a lack of specific data on the number of instructional minutes dedicated to Language Arts and Mathematics instruction, respectively. Future research could be conducted on the breakdown of instructional minutes to evaluate the actual number of instructional minutes allotted for each content area. According to Phelps et al. (2012), when examining the average instructional time, students receive approximately 80 minutes of instruction a day in Language Arts and 45 minutes of instruction in Mathematics. Furthermore, researchers may want to examine the quality of the instruction during increased instructional time. An increase in instructional time is only as powerful as the level of instruction students are receiving during additional instructional time (Long, 2014; Jami et al., 2012). Additionally, the researcher found there to be an increase in the explained variance for Mathematics instruction between third and fourth grade. Future researchers may conduct a study that explores potential reasons for the significant shift in the explained variance in Mathematics performance from 22% in Grade 3 to over 43% in Grade 4.

Last, graduate level education of faculty was a significant predictor of student achievement in the NJASK 4 and NJASK 5 in Language Arts and Mathematics. Future research could be completed on the impact of various higher level degrees (i.e., M.A., M.S., Ed.S., Ph.D., or Ed.D.) on student performance by specifically examining the type of degree and student achievement. Researchers have found that high quality educators significantly impact student achievement (Heck 2007, 2008; Ottmar, Rimm-Kaufman, Larsen, & Berry, 2015).

Since graduate level education has proved to have an impact on student achievement, further research could be conducted on the potential impact of high quality professional development on student achievement.

Conclusion

Instructional time is an educational topic that will continue to require additional research to determine whether or not it will increase student achievement, as the findings are inconsistent. Policymakers and educational leaders should examine the research and make informed decisions about policies and programs in schools. The ultimate goal is to provide every student in our schools with the most effective programs and supports to ensure that all students have the tools to be successful in our world.

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