The Influence of the Length of the School Day on the Percentage of Students Who Met Expectations and Exceeded Expectations Scores on the 2018 Partnership for Assessment of Readiness for College and Careers for Algebra II

Charles W. Rowan

Dissertation Committee
Daniel Gutmore, Ph.D., Mentor
Christopher Tienken, Ed.D.
Jamil Maroun, Ed.D.

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APPROVAL FOR SUCCESSFUL DEFENSE

Charlie W. Rowan has successfully defended and made the required modifications to the text of the doctoral dissertation for the **Ed.D.** during this **Spring** Semester.

DISSERTATION COMMITTEE
(please sign and date)

Dr. Daniel Gutmore — **Mentor** — **Date** 4/09/21

Dr. Christopher Tienken — **Committee Member** — **Date** 4/09/21

Dr. Jamil Maroun — **Committee Member** — **Date** 4/09/21

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

Abstract

The purpose of this non-experimental, correlational, explanatory, cross-sectional design with quantitative methods was to examine the relationship between the length of the school day and the percentage of students who achieved Met Expectations and Exceeded Expectations scores on the 2018 Partnership for Assessment of Readiness for College and Careers (PARCC) for Algebra II. The study was conducted to explain the influence the length of school day had on Algebra II students who took PARCC in 2018. Additionally, this study examined the influence of staff, student, and school variables such as staff attendance, staff mobility, and percentage of staff with master's degrees or higher, student attendance, the percentage of students on free and reduced lunch, limited English proficiency, the percentage of students with disabilities, and school size. The variable of interest, the length of the school day, was found not to be a statistically significant predictor of achievement on the 2018 PARCC for Algebra II. Of the eight variables included within this study, the percentage of students on free and reduced lunch, limited English proficiency, the percentage of students with disabilities, and the percentage of staff with master's degree or higher were found to be statistically significant predictors of student achievement.

Keywords: Length of School Day, PARCC, Standardized Test, Student Achievement, Algebra II

Acknowledgments

My journey as an educator is different than most. I never dreamed of being a teacher. I never pretended to be a teacher when I was younger. In truth, teaching was not in my top three profession choices. It was not until senior year in high school that I began to welcome the concept of teaching. I realized that if I taught, I could coach soccer. For those that do not know, soccer was and still is a passion of mine. Soccer defines me. Soccer is who I am. Soccer created my work habits. Soccer provided me with opportunities in life that I would not have had otherwise. With that, I want to thank Ken Cherry, Malcolm Murphy, and Brian Woods. Your belief in me as a player and your encouragement allowed me opportunities I am forever grateful for.

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CHAPTER 1

INTRODUCTION

Background

School administrators have responsibilities that exceed the classroom and the brick-and-mortar school itself. One primary responsibility is raising student achievement, as measured by the results of state-mandated high-stakes standardized assessments. Education bureaucrats at the state and federal levels believe that lengthening the school year, school day, or both will increase student achievement. This is not a new concept. *A Nation at Risk* (National Council for Excellence in Education), followed by *Prisoners of Time* (Kane, 1994), and *Tough Choices, Tough Times* (National Center on Education and the Economy, 2007), as cited in Pedersen (2012), all included recommendations to school districts to examine ways to modify their traditional school day to address ways of improving student achievement (Pedersen, 2012). The catalyst for changing the traditional American school year is a result of comparing American students' achievement on international tests to that of students from other industrialized nations. Students in other industrialized countries have higher aggregate test scores and spend more time in the classroom (Patall et al., 2010). Between 1991 and 2007, the Center for American Progress found that more than 300 initiatives to extend the learning time were launched in high-poverty and high minority schools in 30 states (Patall et al., 2010).

President Barack Obama, on March 10, 2009, while speaking to the Hispanic Chamber of Commerce about the American education system, stated, "I'm calling for us . . . to rethink the school day to incorporate more time," while Secretary of Education Arne Duncan said,

> I think the school day is too short, the school week is too short and the school year is too short. You look at all the creative schools that are getting dramatically better results. The

> common denominator of all of them is they're spending more time. (Patall et al., 2010, p. 401)

Governor Chris Christie, in his 2014 State of the State, declared that

> Our school calendar is antiquated both educationally and culturally. Life in 2014 demands something more for our students. It is time to lengthen both the school day and school year in New Jersey. If student achievement is lagging at the exact moment when we need improvement more than ever to compete in the world economy, we should take these steps—every possible step—to boost student achievement. And one key step is to lengthen the school day and the school year. So, working with Commissioner Cerf, I will present to you shortly a proposal to increase the length of both the school day and the school year in New Jersey. This is a key step to improve student outcomes and boost our competitiveness. We should do it now. (Christie, 2014)

Advocates for increasing the length of the school day or school year believe in the production function theory. The production function theory, as defined by Pritchett and Filmer (1999), is "an expression for the maximum amount of output possible for an amount of inputs. By applying this metaphor to education one can talk of an 'educational production function' which is determined by an underlying, undoubtedly extremely complex, pedagogical processes" (Pritchett & Filmer, 1999, p. 224). The production function theory studies the relationship between inputs and outputs.

The idea that the longer one spends attending to something, as developed by John B. Carroll and his hypothesis of "time on task," has spurred a great deal of research attempting to show that learning is directly related to the amount of time one spends on a particular task (Cobb,

1972; Lahaderne, 1968; McKinney, Mason, Perkerson, & Clifford, 1975; Samuels & Turnure, 1974; Frederick, Walberg, & Rasher, 1979; as cited in Godwin et al., 2016, p. 812). The time-on-task hypothesis asserts that learning is a function of the amount of time one allocates to a particular learning task. Fisher et al. (2014) stated, "With respect to student achievement, this idea has been formalized in the time-on-task hypothesis: All else being equal, the more opportunities one has to learn (i.e., the longer one focuses on an activity), the better the learning outcomes (Bloom, 1976; Carroll, 1963)" (p. 1362). Critics of the production function argue that the production function theory is flawed. In the article "The Aggregate Production Function: 'Not Even Wrong,'" Felipe and McCombie (2014) cited several economists who do not believe in the production function. The authors stated, "It is a concept that is fundamentally theoretically flawed: it is 'not even wrong' in that it cannot be empirically tested" (p. 81). While the arguments against the production function are recognized, for this study, I will use the production function concept.

On the other hand, one can use Urie Bronfenbrenner's ecological theory when examining student achievement. Just because students spend more time at school during the day or longer into the summer does not mean they will learn. Bronfenbrenner (1979) stated,

> The ecological environment is conceived as a set of nested structures, each inside the next, like a set of Russian dolls. At the innermost level is the immediate setting containing the developing person. This can be the home, the classroom, or as often happens for research purposes—the laboratory or the testing room. (p. 3)

Bronfenbrenner's theory states that

> Human development is the process through which the growing person acquires a more extended, differentiated and valid conception of the ecological environment, and becomes

> motivated and able to engage in activities that reveal the properties of, sustain, or restructure that environment at levels of similar or greater complexity in form and content. (Bronfenbrenner, 1979, p. 27)

Problem Statement

High school administrators are evaluated, in part, through student scores on the state-mandated standardized tests of mathematics and English language arts. However, little empirical research exists on the influence of the length of school time on high school PARCC results. Time is a resource for school districts. If the school day or school year were to be lengthened, this would require school districts to increase salaries and increase the school operating budget. School administrators have a limited amount of money to allocate.

Patall et al. (2010), in their review of the literature, concluded that there is a deficient amount of information when analyzing the relationship between the length of the school day or length of the school year and student achievement. Prior research on the length of the school day and its impact on student achievement in New Jersey has focused on the high-stakes tests NJASK and HSPA, but there has not been any research done on the length of the school day and its impact on the Partnership for Assessment of Readiness for College and Careers (PARCC). Further research is needed to examine whether the push for a longer school year or a longer school day is warranted. This study will answer the question of why, for the following reasons: administrators are charged with raising student achievement, and test scores are part of their evaluation. School administrators are held accountable for test scores, and therefore, one theory, the simple production function, states more time on task will result in better scores. This study aims to fill the literature gap and explore the influence the length of the school day has on student achievement, specifically in Grade 11 in the state of New Jersey.

Purpose of Study

The purpose of this study is to explain the influence of the length of the school day on student achievement in Algebra II Mathematics as measured by the PARCC in New Jersey

Research Question

Research Question 1: What is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II when controlling for staff, student, and school variables?

Null Hypothesis

Null Hypothesis 1: No statistically significant relationship exists between the length of the school day and the Algebra II score on the 2018 PARCC when controlling for staff, student, and school variables.

Independent Variables

The independent variables chosen for this study were staff, student, and school. Staff variables consisted of staff attendance, staff mobility, and staff percentage with master's degrees or higher. Student variables consisted of student attendance, the percentage of students on free and reduced lunch, limited English proficiency, and the percentage of students with disabilities. The state of New Jersey removed student mobility in 2012 from the NJ DOE Report Card. Finally, the school variables were school size and length of the school day.

Dependent Variable

This study's dependent variable was the PARCC Algebra II Mathematics score. The PARCC is given annually to students in New Jersey.

Significance of Study

Over the last decade, school improvement grants have provided districts with funding to increase the length of the school day or implement extended day programs. In the previous seven years, several dissertations have discussed the impact of increasing the length of the school day. This study extends the research and examines the most recent data and the maturity of the extended day programs from school improvement grants. This quantitative study is significant because it will examine Algebra II data from PARCC 2018.

Limitations of Study

With all research, there are limitations, which are, ultimately, inevitable. For this study, a correlational, explanatory, cross-sectional design with quantitative methods cannot determine cause and effect.

The data for the independent variable English Language Learners (ELLs) was skewed at 3.9; however, the dependent variable was not influenced or impacted in any of the models that either included or did not include the ELLs variable.

Delimitations of Study

Every researcher must make a choice when faced with a problem. In this study, I solely focused on the 2018 PARCC for Algebra II. Only New Jersey public high schools were utilized in the study. The study was conducted only using public, non-vocational, non-charter schools; magnet or private/parochial schools were not utilized. within the study. The total number of high schools listed in this study was 327.

Assumptions

It was assumed that the data provided by the New Jersey Department of Education was valid, accurate, and reliable. It was also assumed that all New Jersey public high schools

provided their students with the proper testing conditions and environment. Finally, it was assumed the data exported from the New Jersey Department of Education's website was accurately exported to Microsoft Excel and properly imported into SPSS.

Definitions of Terms

The terms listed below were retrieved from the New Jersey Department of Education's website:

Length of the school day: This is the amount of time a school is in session for a typical student on a normal school day.

Time on task: Learning is a function of the amount of time one allocates to a particular learning task.

Organization of Study

Chapter 1 provides background information and an overview of the problem related to the influence of the length of the school day on the percentage of Met Expectations and Exceeded Expectations scores on the 2018 PARCC for Algebra II. Chapter 2 provides a review of previous research completed on the impact the length of a school day and a standardized test. Chapter 3 discusses the design for the study. Chapter 4 presents the data and statistical findings from the study. Chapter 5 presents a statistical summary of the findings and recommendations for future researchers.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to explain the influence of the school variable—length of the school day—on student achievement in Algebra II Mathematics on the PARCC. The results of this study provide the amount of variance the target variable of interest (length of the school day) has on the output variables (NJ PARCC Math) when controlling for other predictor variables (staff, student, and school variables). The overarching research question guiding this particular study was: What is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II Mathematics when controlling for staff, student, and school variables?

Literature Research Procedures

The guidelines used for the literature research procedures are from Boote and Beile (2005). It was the intention of the researcher to follow in the footsteps of those who came before. Boote and Beile stated that a thorough, sophisticated literature review is the foundation and inspiration for substantial, useful research (p. 3). Boote and Beile continued to state, "To be useful and meaningful, education research must be cumulative; it must build on and learn from prior research and scholarship on the topic" (p. 3). It was the goal of the researcher to not only read previous research but also examine and digest the literature to help further this study.

The purpose of this chapter is to examine and review previous research and literature. The literature examined addressed the conceptual framework: the production function theory; time-on-task hypothesis; high-stakes testing; and various staff, student, and school variables. The predictor variables are student attendance, percentage of students eligible for free and reduced

lunch (SES), the percentage of students with limited English proficiency, the percentage of students with disabilities, staff mobility, staff attendance, and staff credentials.

Organization of the Literature Review

- Conceptual Framework: Production Function Theory
- Time on Task
- High-stakes Testing
- Reasons Why Schools Choose to Lengthen the School Day

Conceptual Framework: Production Function Theory

The production function framework is the basis of this study. Pritchett and Filmer (1999) define the production function theory as "an expression for the maximum amount of output possible for an amount of inputs" (224). The theory is simple: the more you put into something, the better or more the output. Lawmakers and policy creators believe student achievement is linked to the concept of the production function theory. The more time students spend on learning, the higher their achievement. Pigott et al. (2012) stated education production functions are commonly used to study the relationship between school inputs (predictors) and student outputs (outcomes) (p. 1). For this study, this would be applied to suggest that the longer the school day, the higher the number of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II. This theory is aligned with the concept that an increase in input leads to an increase in output. In this study, the output would be student production as measured by the PARCC for Algebra II, and the input would be the influence of the staff, student, and school variables.

In the last 10 years, studies by Sammarone (2014), deAngelis (2014), and Plevier (2016) have utilized the production function theory for their conceptual framework. These studies

explored the influence the following inputs: staff, student, and school variables had on the output: student achievement as measured by a particular high-stakes test. The notion of lengthening the school day to increase test scores utilizes the production function theory; however, Zhang and Chen (2008) declared,

> Education is different from other kinds of products: is not a change in the 'physical properties' of students. The output of education is the increase in knowledge, qualification, attitudes, perceptions, emotions, that students receive from this kind of production process. (pp. 206–207)

Time on Task

Time is of the essence when it comes to teaching and learning. Typically, teachers and students in New Jersey have 180 school days to master the curriculum set forth for that particular school year. On average, a student in New Jersey spends 405 minutes in school in a day. Over the last decade, politicians throughout the country have discussed lengthening the school day. However, it is important to note that the amount of time a student spends in school compared to the amount of time the students spend "on task" is different.

The concept of the *time-on-task hypothesis* was first coined by John Carroll in 1963. As cited in Godwin et al. (2016), the time-on-task hypothesis asserts that learning is a function of the amount of time one allocates to a particular learning task. Thus, time off-task reduces learning opportunities and is therefore thought to be detrimental to learning (Carroll, 1963)" (p. 1).

During the school day, there are three types of time: allotted time, engaged time, and academic learning time. Aronson et al. (1998) declared allotted time is the amount of time in a given school year or school day. The allotted time is broken into two categories: instructional

time and non-instructional time. Instructional time includes when students partake in academic studies: for example, English, math, science, and social studies. For non-academic studies, this may include physical education, the arts or music. The next type of time is engaged time. Within engaged time, students engage in activities that do not necessarily directly relate to their learning. Aronson et al. explained that students partake in such activities such as roll call, disciplinary issues and interruptions by announcements coming over the public address system. These activities, even though minute and minimal in time, take away from academic learning time. *Engaged time*, according to Aronson et al., is defined as *time on task*. Finally, Aronson et al. explained engaged time as the difference between the time a student spends on engagement versus learning. Aronson et al. stated that there is a difference between the precise period when an instructional activity is perfectly aligned with a student's readiness and learning occur (p. 7). Through their study, Aronson et al. found that time does matter when examining student achievement; however, the type of time is most important.

High-stakes Testing

High-stakes testing is in part the foundation of the modern American educational system. Au (2013) stated, "the modern, high-stakes, standardised testing movement in the United States can effectively be traced back to the publication of A Nation at Risk (National Commission on Excellence in Education, 1983)" (p. 10). *A Nation at Risk* changed the educational landscape of America. With its publication, the "report triggered a wave of reforms: 54 state-level commissions on education were created within a year of its publication" (Au, 2013, p. 3).

High-stakes testing is supported by both major American political parties. The passing of the No Child Left Behind Act (NCLB) in 2002 has created a system that

> relies upon high-stakes testing as the central mechanism for school reform, mandating that all students be tested in reading and math in grades 3–8 and once in high school, with future provisions that students be tested at least once at the elementary, middle, and high school levels in science. (Au, 2013, p. 3)

President Obama selected Arne Duncan as Secretary of Education. Under Duncan's leadership, *Race to the Top* was promoted. According to Kumashiro (2012), as cited in Au (2013), President Obama's selection of Arne Duncan to lead the Department of Education and the subsequent promotion of the federal *Race to the Top* program, which included monies for more testing as part of a broader education reform package promoted the flawed use of tests to evaluate teachers, attacks on teachers unions' right to collective bargaining, and the proliferation of charter schools.

A standard of testing allows educators to examine various skills for their students if done correctly. There are some benefits to high-stakes testing; however, the research and literature show little increase in student achievement and graduation rates. As cited in Nichols et al. (2012),

> Most of the research conducted around the time of NCLB provides scant support for the effectiveness of high-stakes tests in increasing student achievement (Amrein & Berliner, 2002a, b; Braun, 2004; Rosenshine, 2003) or graduation rates (Haney et al., 2004; Heubert & Hauser, 1999; Marchant & Paulson, 2005). (p. 4)

In fact, high-stakes testing can negatively impact school districts across the country. Berliner (2011) explained, "Schools that did not improve rapidly enough to have 100% of their children proficient in reading and mathematics by 2014 could have teachers and administrators fired, be reconstituted or closed" (p. 1). NCLB was replaced with the Every Student Succeeds Act (ESSA). Under ESSA, federally mandated testing was removed and the power of testing was

granted to the states. In the Committee on Education and the Workforce for the U.S. House of Representatives mandated high-stakes testing was discussed. During the discussion, Representative Glenn Thompson explained how students will be tested under ESSA:

> The Every Student Succeeds Act does away with the federally mandated high-stakes testing. Under the law, students will be assessed in the subjects of reading, math, and science. However, States, not the Federal Government, will determine how much those testing outcomes will weigh in a school's performance evaluation. (*Next steps for K–12 education: Upholding the letter and intent of the Every Student Succeeds Act*, 2016, p. 18).

According to the U.S. Department of Education (2017):

> Every Student Succeeds Act "requires states and districts to ensure that all students, including children with disabilities, English learners, and other historically underserved groups, graduate high school ready for college or a career. To measure progress against that goal and maintain a critical focus on educational equity and excellence for all, the law maintains the requirement that states administer to all students annual statewide assessments in reading/language arts and mathematics in grades 3–8 and once in high school, as well as assessments once in each grade span in science for all students and annual English language proficiency assessments in grades K–12 for all English learners. The law also includes important protections to ensure that all students are tested, offered appropriate accommodations when needed, and held to the same high standards. The ESSA also provides several new flexibilities to help states develop innovative approaches to assessments and reduce duplicative, unnecessary testing. (p. 1)

Partnership for Assessment of Readiness for College and Careers

PARCC was instituted during the 2014–2015 school year. The 2018 PARCC Technical Manual claims:

> The PARCC consortium develops and administers next-generation assessments that, compared to traditional K–12 assessments, more accurately measure student progress toward college and career readiness. The assessments are aligned to the Common Core State Standards (CCSS) and include both English language arts/literacy (ELA/L) assessments (grades 3 through 11) and mathematics assessments (grades 3 through 8 and high school). Compared to traditional standardized tests, these assessments are intended to measure more complex skills like critical-thinking, persuasive writing, and problem-solving. (Pearson, 2018, p. 7)

The PARCC replaced the NJASK assessment in Grades 3 through 8 and the High School Proficiency Assessment (HSPA) in high school. According to the State of New Jersey Department of Education (2017), the PARCC assessments were aligned to the Common Core State Standards. They were created to measure students' ability to apply their knowledge of concepts rather than to have them repeat memorized facts. The technical manual states,

> Scale scores were defined for each test as a linear transformation of the IRT theta (θ) scale. The test characteristic curves associated with the performance level setting forms were used to identify the theta values associated with the Level 2 and Level 4 point scores. By defining Level 2 and Level 4 scale scores to be 700 and 750, respectively, the linear relationship between theta and scale scores was established. The result was 201 defined full summative scale score points for each ELA/L and mathematics assessment, ranging from 650 to 850. A scale score of

> 700 is always the minimum for Level 2 performance, and a scale score of 750 is always the minimum for Level 4 performance. (Pearson, 2018, p. 75)

For this study, the scale score for Met Expectations (Level 4) was 760 and Exceeded Expectations (Level 5) was 850.

Extending the School Day

After the publication of *A Nation at Risk*, there were discussions throughout the country on whether to increase the school year or day. Former Secretary of Education Arne Duncan is quoted in Marcotte and Hansen (2010) as saying, "our school day is too short, our week is too short, our year is too short" (p. 53). According to the report *Mapping the Field: A Report on Expanded-Time Schools in America*,

> Expanding learning time has become a leading strategy for closing the achievement and opportunity gaps that plague high-poverty schools in particular. With more time educators are able to deepen the curriculum, embed enrichment classes and activities, and engage in frequent opportunities for teacher collaboration and professional development. (Edwards et al., 2012, p. 2)

A decade after the report *A Nation at Risk*, the National Commission on Time released a report, *Prisoners of Time,* that stated:

> Time is learning's warden. Our time-bound mentality has fooled us all into believing that schools can educate all of the people all of the time in a school year of 180 six-hour days. The consequence of our self-deception has been to ask the impossible of our students. . . . Holding all students to the same high standards means that some students will need more time. (as cited in M*apping the Field,* p. 6).

The assumption, using the production function theory, is that the more time students are in school, the higher their achievement.

Recently, Plevier (2016), Sammarone (2014), and deAngelis (2014) all studied the effects of the influence the length of the school day had on various state assessments. Plevier examined the length of the school day and NJASK in Grades 4 and 5. In her study, Plevier concluded that the independent variable, the length of the school day, did not have a statistically significant relationship to NJASK English Language Arts and Math scores for Grades 4 and 5. Sammarone examined the influence of the length of the school day and NJASK for Grades 6, 7, and 8. Sammarone concluded that the independent variable the length of the school day did not have statistically significant relationships with NJASK math and NJASK English Language Arts scores for Grades 6, 7, and 8. Finally, deAngelis studied the influence of the length of the school day and the High School Proficiency Assessment (HSPA). In her findings the independent variable, length of the school day, was not statistically significant for HSPA Language Arts, however, for HSPA Math, the independent variable, length of the school day, accounted for 1.8% of the variance. Even though there appears to be little research that supports extending the school day, the previous studies focused on NJ ASK, while this study focused on PARCC.

Staff Variables

Staff Attendance

In order for a student to learn at a school, he or she must attend school. The same can be said for a teacher. In order for a student to learn at a school, the teacher must be present and not absent. The major difference between a student's absence and a teacher's absence is simple: when a student is absent, he or she is missing out on instruction. When a teacher is absent, students are missing out on instruction. In an elementary school, this could mean 20 to 25

students are missing out on instruction. If the teacher is employed in a middle to high school, he or she could have up to or more than 100 students missing out on instruction. In one study by Roby (2013) of the Ohio schools, he found that the 30 highest rated schools for teacher attendance scored an average of 103.28 compared to 73.80 of the 30 lowest-ranked schools when comparing performance index (p. 203). In the same article, Roby provided an example of how much instructional time is lost for students based on teacher attendance. Roby stated,

> The example is based on a school housing 500 students and teachers instructing five hours a day for 180 days. . . . For a school housing 500 students, with teacher attendance averaging 87 percent during a school year of 180 days, over 58,000 hours of instructional time loss is evident. (p. 205).

Teacher attendance in a brick-and-mortar school is critical to student learning and student achievement.

When teachers are absent, most school districts provide substitute teachers. In New Jersey, substitute teachers only need sixty college credits to receive a substitute license. The instruction by a substitute, if any instruction takes place, is not the same as instruction by a certified teacher. According to Herrmann and Rockoff (2012),

> our baseline estimates imply that the average difference in daily productivity between regular teachers and temporary substitute is equivalent to replacing a teacher of average productivity with one at the 10th percentile for math instruction or the 20th percentile for English instruction. (p. 750)

Miller et al. (2007), in *Do Teacher Absences Impact Student Achievement? Longitudinal Evidence From One Urban School District*, provide some data on teacher attendance. According to two researchers, as cited in Miller et al.,

> on average, public school teachers in the United States are absent five to six percent of the days' schools are in session...Yet, it exceeds comparable rates of teacher absence report in other industrialized countries: 3.15% in the United Kingdom (Bowers, 2001) and 3.12% in Queensland, Australia (Bradley, Green, and Leeves, 2007). (p. 182)

When comparing teacher attendance rates to those of managerial and professional employees, teacher absence rates are three times higher on average (p. 182). Research suggests that teacher absenteeism can negatively impact student achievement.

Miller et al. (2007) reported in their study that ten additional days of teacher absence reduced students' mathematics achievement in fourth grade by about 3.2% of a standard deviation (p. 196). In a different study, Tingle et al. (2012) examined the effects of teacher attendance and student achievement in a kindergarten through 12th-grade district with 135,638 students enrolled throughout 178 schools (p. 370). According to the authors, "our HLM analyses suggest that teacher absence was negatively related to student academic achievement but the school-level aggregated teacher absence has a positive impact on this relationship" (p. 376). It is common sense that a student cannot learn from a teacher if the teacher is not present for the day.

Staff Mobility

Teachers, regardless of their ability, effectiveness, preparation, attitude towards the teaching profession, or their experience at their school, have the potential to change schools or careers. Anyone who has worked closely with a school or a school district recognizes that teachers will always come and go. Teacher turnover within a school can negatively impact the school. Allensworth et al. (2009) examined teacher mobility in the Chicago Public Schools. According to Allensworth et al., "high turnover rates produce a range of organizational problems for schools, such as discontinuity in professional development, shortages in key subjects, and

loss of teacher leadership" (p. 3). There are several reasons why teachers leave, but the most significant, according to Allensworth et al., is their inexperience. Teachers with less than three years of experience, teachers who teach students with low test scores, teachers who are less effective, and teachers who work in low achieving schools and with a high concentration of poor or minority students are more likely to leave than those with more experience (pp. 3–4).

A variety of factors contribute to teachers' decision to leave their district or the teaching profession. In Georgia, Scafidi et al. (2007) found that new teachers are more likely to leave schools with lower test scores, higher proportions of minorities, and lower income. Betts et al. (2000), as cited in Lankford et al. (2002), found that "teachers in schools with low-achieving students choose to move to higher-achieving schools, leaving many high-poverty districts with vacancies and unqualified instruction" (p. 39). Hanushek et al. (2001) confirmed from their study that schools serving academically disadvantaged students have difficulty in retaining teachers, particularly those early in their careers (p. 34). Lankford et al. (2002) stated, "in urban districts in the New York City Region, for example, 38% of teachers were in the same school five years later, compared to 46% in suburban schools. In the other large metropolitan areas, the corresponding numbers were 29% and 43% for urban and suburban schools respectively" (p. 49). The researchers also found that "thirty-five percent of New York City urban teachers leave the system while no other had separations of higher than twenty-nine percent" (Lankford et al., 2002, p. 49). It is well documented that teachers in lower socioeconomic areas leave their districts faster than teachers who work in higher socioeconomic areas. Lankford et al. (2002) concluded:

> Transfer and quit behavior of teachers is consistent with the hypothesis that more qualified teachers seize opportunities to leave difficult working conditions and

> move to more appealing environments. Teachers are more likely to leave poor, urban schools and those who leave are likely to have greater skills than those who stay. (p. 55)

A major problem for school districts when teachers leave is finding a suitable, qualified replacement. In a recent study, Sutcher et al. (2016) stated:

> Combining estimates of supply and demand, our modeling reveals an estimated teacher shortage of approximately 64,000 teachers in the 2015–16 school year. By 2020, an estimated 300,000 new teachers will be needed per year, and by 2025, that number will increase to 316,000 annually. (p. 1).

In order to close the achievement gap, more research and policies must be implemented to help disadvantaged students and those with low socioeconomic status who tend to see higher teacher mobility rates than students with middle to high socioeconomic status.

Percentage of Staff With Advanced Degrees

All teachers in New Jersey must have obtained, at a minimum, a bachelor's degree, be highly qualified, and pass the Praxis exam. A master's degree or higher is not required to teach. One may think the higher the degree, the more effective the teacher. The research is mixed regarding the correlation between a teacher's degree and student achievement. According to Darling-Hammond (2000), in Teacher Quality and Student Achievement: A Review of State Policy Evidence,

> Some research has suggested that "schools bring little influence to bear upon a child's achievement that is independent of his background and general social context" (Coleman et al., 1966, p. 325; see also Jencks et al., 1972). Other evidence suggests that factors like class size (Glass et al., 1982; Mosteller, 1995),

> teacher qualifications (Ferguson, 1991), school size (Haller, 1993), and other school variables may play an important role in what students learn. (p. 2)

It is widely accepted that teachers have a strong effect on student achievement. Hanushek (1992) suggested that the estimated difference in annual achievement growth between having a good and a bad teacher can be more than one grade-level equivalent in test performance (p. 107).

In one study completed by Clotfelter et al. (2007) "the variable denoting having a graduate degree exerts no 28 statistically significant effects on student achievement and in some cases the coefficient is negative" (p. 27). Clotfelter et al. continued to state in their study that teachers who earned a master's degree prior to teaching or within the first five years of teaching were no less or no more effective than other teachers in raising student achievement, while teachers who earned a master's degree more than five years after they started teaching appeared to be somewhat less effective on average than teachers without a master's degree. One would think a teacher having an advanced degree would encourage higher student achievement; however, the statistics in various studies show no significance of teacher's advanced degree in student achievement. However, Clotfelter et al. "concluded that a variety of teacher credentials matter for student achievement and that the effects are particularly large for achievement in math" (p. 31).

Student Variables

Student Mobility

Student mobility by definition is the movement from one school to another, not including the moving to a school due to grade promotion. According to Grigg (2012),

> Students in the United States frequently change schools (Burkam, Lee, and Dwyer 2009; Pribesh and Downey 1999; Rumberger 2003; South and Haynie 2004), and

> disadvantaged students change schools more frequently than advantaged students (Alexander, Entwisle, and Dauber 1996; Hanushek, Kain, and Rivkin 2004; Kerbow 1996; U.S. General Accounting Office [GAO] 1994, 2010). These changes may harm students (GAO 2010; Mehana and Reynolds 2004; Reynolds, Chen, and Herbers 2009; Rumberger 2003), and school policies and programs may influence how often students change schools (Kerbow 1996; Kerbow, Azcoitia, and Buell 2003; Reynolds et al. 2009). (Grigg, 2012, p. 388)

According to previous research, student mobility impacts student achievement. According to Rumberger (2015),

> Research suggests that the majority of elementary and secondary school children make at least one non-promotional school change over their educational careers. They do so for a variety of reasons. School changes are most often initiated by families and frequently involve a change of residences due to voluntary (for example, changing jobs or moving to a better home) or involuntary (for example, getting evicted or having a family disruption such as a divorce) reasons. But schools can also initiate school changes, such as when students are expelled or when schools are closed. (p. 10)

Rumberger continued to state, "Because school changes, especially involuntary school changes, are often due to or accompanied by other factors associated with school performance (poverty, family stress or disruption, student behavior), it is hard to definitively establish the causal impact of student mobility" (2016, p. 10). Typically, student mobility is caused by factors outside the control of the student; however, the impact can greatly affect student achievement.

According to one study by Heinlein and Shinn (2000), “students with 2 or more moves prior to Grade 3 scored lower than their peers in reading and math achievement in Grade 3 and were less likely to be achieving at grade level, a pattern that persisted to Grade 6” (p. 355). Rumberger (2015) recently stated, “the research literature suggests that changing schools can harm child and adolescent development by disrupting relationships with peers and teachers as well as altering a student’s educational program” (p. 61). Student mobility may have a negative impact on student achievement, and school districts may not have the ability to change student mobility, but a school district can create programs to help students acclimate to the new school.

Student Attendance

Attendance in school is vital to a student’s learning. Every day a student is not present in school, he or she is missing out on instruction, interaction with teachers, and interactions with peers. Chronic absenteeism according to Balfanz and Byrnes (2012), as cited in Gottfried (2010), is an extreme form of missing school, which is often defined as missing at least 18 school days of an academic year, or approximately 10% of the school year, and according to this definition about 10 to 15% of U.S. students would be considered chronically absent. According to Phillips (1995), as cited in Parke and Kanyongo (2012), “Missed educational time in school may lead to poor grades and further absenteeism, leading to a vicious cycle that is a major concern for all educators” (p. 161). In the last two decades, many researchers have examined the impact of school attendance on student achievement. A study completed by Hinz et al. (2003) found that students who were absent 20% of the time scored 20 points lower than students who attended school nearly every day (as cited in Parke and Kanyongo, 2012, p. 162). Another study in Ohio, by Roby (2013), found a strong correlation between schools’ attendance rates and student achievement on the Ohio Proficiency Tests. Lamdin (1996), as cited in Parke and Kanyongo,

found that high levels of student attendance at a school in Baltimore, Maryland, had a positive influence on student performance in reading and mathematics. Gottfried stated, “Lower attendance rates have been cited as detrimental to learning and academic achievement, and an increase in absences in elementary and middle school can be predictive of higher risk factors in both concurrent and future years of education” (p. 435). Poor attendance may lead to poor grades with then may lead to future years of poor attitudes toward school and social issues.

Absenteeism not only has not only an academic effect on the student but also a social effect. Gottfried (2010) stated, “decreased attendance is related to increased alienation from classmates, teachers, and schools” (p. 435). The more a student is absent, the more alienated they feel from their peers or teacher. Johnson (2004) continued to explain that “alienated students experience an inability to cope with unfulfilled social and learning expectations” (p. 180). Absence and social acceptance become a vicious cycle where the student is absent from school and when they return they feel isolated from their peers, teacher, or school, and therefore the student decides to miss more school, thus continuing the cycle.

Percentage of Students Eligible for Free and Reduced-price Lunch (SES)

Over the last several decades many researchers have examined the impact socioeconomic status has on student achievement. It is widely accepted that student achievement is affected by one’s socioeconomic status. In 1954, the Supreme Court ruled “with all deliberate speed” that the notion “separate but equal” is in fact unconstitutional. A decade after the 1954 decision, the Equality of Educational Opportunity, also known as the Coleman Report, was mandated by the Civil Rights Act of 1964. According to the The Coleman Report, as cited in deAngelis (2014):

> Socioeconomic status explained a greater proportion of student test scores than other measures of school resources such as class size and teacher characteristics;

> 49% student background, approximately 42% teacher quality, and 8% class size. The report showed that a school's average student characteristics, such as poverty and attitudes toward school, often had a greater impact on student achievement than teacher and schools and that the average teacher characteristics at a school had a small impact on a school's mean achievement Graziano, 2012, p. 54; Michel, 2004, p. 29; Periera, 2011, p. 53). (p. 49)

According to Tienken (2012), "without a doubt, poverty has a negative influence on student achievement, especially when achievement is measured by state-mandated tests" (Tienken, 2012, p. 105). Students with low socioeconomic status face difficulties throughout the school year and in particular during the summer months. Cooper et al. (2000), as cited in Tienken, stated that "wealthier students maintain their learning progress for the school year and can gain a month to three months of achievement progress during the summer break, whereas students from the lowest socioeconomic backgrounds can lose two to three months of knowledge and skills" (Tienken, 2012, p. 105). Students living in poverty have the potential to lose three months of schooling per year and if this continues for multiple years, students have the potential to be almost a full academic year behind their wealthy peers (Tienken, 2012).

According to the National Center for Children in Poverty, roughly 41% of the 72.4 million children under the age of 18 live in poverty (Koball & Jiang, 2018). The federal poverty threshold for 2016 was the following: $24,339 for a family of four with two children, $19,318 for a family of three with one child, and $16,543 for a family of two with one child (Koball & Jiang, 2018). According to research, families actually need double the dollar amount of the poverty level. Throughout the last decade, Tienken has written and discussed the effects of poverty on student achievement. In his article "Poverty Matters," Tienken (2012) stated,

> Poverty matters. However, poverty matters in different ways on different measures. Education bureaucrats who say poverty should not be an excuse for children 'not learning' are technically correct. Poverty is not an excuse, but it is part of an explanation for ultimate student achievement. (p. 3)

Percentage of Students With Limited English Proficiency

Growing up in America, students around the country learn that "America is a melting pot" of all different kinds of cultures from across the world. The concept of the "melting pot" can still be used today to describe America. Shin and Ortman (2011) stated,

> In 2009, 57.1 million people (20 percent of the population 5 years and older) spoke a language other than English (LOTE) at home. In 1980, there were 23.1 million (11 percent of the population 5 years and older) LOTE speakers. (p. 1).

Shin and Ortman declared that between the years 2010 and 2020, the number of people in the United States speaking a language other than English would increase. In particular, Spanish is the language to be projected to be spoken the most by 2020.

Similar to NCLB, ESSA requires students in Grades 3 through 8 and once in high school to be assessed in reading/language arts and mathematics. Under ESSA, states must administer a single statewide ELLs test in kindergarten through 12th grade. States must make every effort to provide appropriate accommodations to all ELLs. According to the New Jersey Department of Education,

> All ELLs must take the PARCC assessments. The only exception applies to ELLs who entered school in a U.S. state or Washington, D.C., as well as a language assistance program after July 1 of the academic year in which the assessment will be administered. (NJ Department of Education, n.d.)

Wright and Li examined NCLB and its effects on ELLs. According to Wright (2005), as cited in Wright and Li (2008), "an entire school can be labeled as failing if its ELL population fails to make adequate yearly progress towards the mandated goal of all students passing state tests by 2014" (p. 240). Wright and Li conducted a study of two Cambodian newcomers. In their findings, they concluded "before including such students in high-stakes tests, they must be given adequate time to learn the dominant language used as the language of instruction in the schools" (Wright & Li, 2008, p. 263). Wright and Li continued to state, "it is imperative that schools understand the educational background of immigrant language minority students in their home country. This includes the extent to which students had the opportunity to learn" (p. 263). Without background knowledge of their students, schools cannot effectively understand where their students came from and what schooling the students had in their home country. Finally, Wright and Li concluded that ELLs must be given adequate time to learn the dominant language and have adequate opportunities to learn academic content, prior to their participation in testing in the dominant language (p. 263). It is clear that the current high-stakes testing practice for ELLs is doing a disservice to the students. More research needs to be done, and policy must change for ELLs.

Percentage of Students With Disabilities

Students with disabilities deserve the same education as students without disabilities. The Individuals with Disabilities Act (IDEA) states that all students deserve a free appropriate public education. The National Council on Disabilities report *Every Student Succeeds Act and Students With Disabilities* (2018) discussed how prior to NCLB, states had developed an accountability system but excluded students with disabilities from participating in the assessments (p. 13). According to the report, referrals to special education increased and expectations for students

with disabilities were lowered (p. 13). As a result of these issues, the Individuals with Disabilities Act, in 1997, "required that states include students with disabilities in state assessment systems, including through the of alternate assessments" (National Council on Disability, 2018, p. 13). NCLB, in 2001, put forth three requirements: that students with disabilities be held to the same expectations as students without disabilities; that schools publicly report the performance of students with disabilities; and that schools be held accountable for the performance of students with disabilities, just for any other subgroup (National Council on Disability, 2018, pp. 13–14).

According to the Council for Exceptional Children's Standards Framing Workgroup (2017), "the wide achievement gap between students with disabilities and their developing peers has persisted each since data have been collected" (p. 2). According to the U.S. Department of Education (2016), as cited in the Council for Exceptional Children's 2017 report, "on regular assessments based on grade-level academic achievement standards in reading, for example, only twenty-three percent to thirty-two percent of students with disabilities in grade three through eight were found to be proficient" (p. 2). The Council for Exceptional Children continued to state that during 2013–2014, a total of 66.1% of students ages 14 through 21 who exited IDEA, Part B services graduated with a regular high school diploma, with another 18.5% dropping out of school (Council for Exceptional Children's Standards Framing Workgroup, 2017, p. 2). Sanford et al. (2011) stated, "When comparing students with disabilities to their peers, students with disabilities are less likely to continue onto postsecondary schooling and when employed they earn lower mean hourly wages (as cited in Council for Exceptional Children's Standards Framing Workgroup, 2017).

In 2015, President Obama signed into law ESSA, which reauthorized the Elementary and Secondary Education Act (ESEA) and replaced NCLB. Under ESSA, students with disabilities should be included in state accountability systems and be held to the same standards as students without disabilities.

School Variables

School Size: Total Enrollment

School size is one aspect of education that has been debated for decades. The debate centers on which is better: small or big. According to Gershenson and Langbein (2015), in *The Effect of Primary School Size on Academic Achievement*,

> the school consolidation movement in the United States in the middle of the 20th century was predicated on the notion that larger schools could offer more specialized instruction, increase administrative efficiency, and reduce per-student costs by exploiting economies of scale. (p. 135S)

The authors continued to state, "the movement successfully eliminated about 70% of schools and increased the average school enrollment from less than 100 to about 440 between 1930 and 1970" (p. 135S). Additionally, they explained that the benefits of larger schools come at a cost, as larger schools have higher rates of student absenteeism and social disorder may hinder cognitive and social development (p. 135S). A study conducted by Lee et al. (2000), as cited in Weiss et al. (2009), in *Big School, Small School: (Re)Testing Assumptions about High School Size, School Engagement and Mathematics Achievement,* found "although relations were more positive and intimate in smaller schools, this situation did not always benefit all students, particularly those who preferred the anonymity of large schools due to the fact of their reputations or those of their families followed them at school" (p. 164).

Barker and Gump (1964), as cited in North Carolina's State Board of Education's report *School Size and Its Relationship to Achievement and Behavior* (McMillen, 2000), "Based on their analysis, they concluded that smaller schools offered students a better opportunity to get involved in activities (e.g., sports, band, clubs, etc.) because activities in smaller schools tended to be 'undermanned.'" (p. 6). On the contrary, Contant (1967), as cited in North Carolina's State Board of Education's report on *School Size and its Relationship to Achievement and Behavior* declared "smaller schools were not able to offer as diverse a curriculum as larger schools, leading the author to conclude that high school enrollments smaller than 750 students could not deliver an efficient, comprehensive educational program" (McMillen, 2000, p. 6). Since these two studies, research on school size has continued. In another study, Goodland, as cited in North Carolina's State Board of Education report, stated, "existing data do not adequately support large schools. Specifically, he stated that elementary schools should not be larger than 300 students, and junior and senior high schools should have 500–600 students at most" (McMillen, 2000, p. 7). Weiss et al. (2009), in *Big School, Small School: (Re)Testing Assumptions about High School Size, School Engagement, and Mathematics Achievement*, found that

> moderately sized cohorts appear to provide the greatest advantage for all students. Our findings support the general literature pointing to beneficial school sizes ~600 students and additionally show that student-grade *cohorts* begin to exhibit negative effects when they grow beyond 400 students. (p. 173)

One may assume smaller is better, but the research over the last several decades has provided inconsistent results. Moving students from larger schools to smaller schools may not be the answer to the question. Carolan (2012), in *An Examination of the Relationship Among High School Size, Social Capital, and Adolescents' Mathematics Achievement*, summarized the

discussion between big and small: “in general, the research on the appropriate size of school unit for student benefit has yielded inconsistent results; there is little agreement about what specific size works best for adolescents” (p. 584).

Length of School Day

The concept of extending the length of the school day is not a new one. Many politicians want to extend the school day or school year. President Obama was very clear when he said the following:

> Children [in the United States] spend over a month less in school than children in South Korea—every year. That’s no way to prepare them for a 21st-century economy. That’s why I’m calling for us not only to expand effective after-school programs, but to rethink the school day to incorporate more time—whether during the summer or through expanded-day programs for children who need it. (as cited in Long [2013], Cross-National Educational Inequalities and Opportunities to Learn: Conflicting Views of Instructional Time, p. 352)

President Obama is not the only politician who believes in extending the school year or school day. Discussions about extending the school day or school year have taken place over the last several decades. According to Patall et al. (2010), “Adding time to the school year or day is at the top of the list of measures that have been hypothesized to improve achievement among U.S. students” (p. 401). As previously stated, those in favor of lengthening the school day or school year argue that American students are behind their international counterparts. According to Gonzalez et al. (2004), as cited in Patall et al.,

> much of the current concern over the association between time in the classroom and achievement has been fueled by international comparisons showing that students in other

> industrialized nations have higher achievement test scores than students in the United States and that students of countries outperforming U.S. students often spend more time in school (Organization for Economic Cooperation and Development [OECD]. (p. 402)

It is easy to think that having students spend more time in the classroom or in school will result in higher test scores.

Many policymakers believe lengthening the school day or school year will improve test scores; however, that is not necessarily the case. The results are mixed. According to Pattall et al. (2010),

> after years of debate among educators, policymakers, and researchers, and numerous natural tests in which schools have extended time and observed later outcomes, there is still little consensus regarding (a) the relationship between the length of school days and years and academic achievement or (b) whether lengthening the school year or year is an effective intervention for enhancing student achievement. (p. 403)

One does not have to look far to find out how policymakers at the highest level believe the time is the key strategy for school improvement. According to Kolbe et al. (2012), in *Time and Learning: A National Profile*,

> The U.S. Department of Education guidelines for several American Recovery and Reinvestment Act grant programs, including Race to the Top and Investing in Innovation (i3), as well as Title I School Improvement Grant (SIG) Funds, consider time to be the key strategy for school improvement. (p. 2)

One of the most valuable points Kolbe et al. made in their research was that policymakers and school leaders are making decisions to increase the school day or school year without basic

information on the effects of lengthening the school day or year. There is a great deal of missing information and research on the effects of lengthening the school day or school year.

In another study, Long (2014) evaluated the length of the school day and student achievement, and he refuted the validity of politicians' use of international data when arguing for increasing the length of the school day or school year. Long stated,

> Educational reformers use international evidence to argue that increasing the number of days in school and the length of the school day will improve academic achievement. However, the international data used to support these claims (1999 Third International Math and Science Survey and 2000 Program for International Student Assessment) show no correlation between time in school and achievement. (p. 351)

Long continued to state:

> Many politicians and educational reformers make claims about the effectiveness of instructional time based on very broad measures of instructional time, such as the length of the school year, a convenience sample of only a couple countries, or U.S. studies of only a handful of schools (e.g., A Nation at Risk report and reports of Knowledge Is Power Program [KIPP] school success). (p. 352)

Politicians are using only particular data to make their argument. According to Long, "cross-sectional studies of nationally representative random samples of schools and a broader selection of countries found that instructional time has limited or no effect on academic achievement" (p. 352). In his findings, Long concluded:

> In my improved analysis of the 2000 PISA, based on a three-level model of country, school, and student traits, I found no effect of reading instruction, only a

> small effect of math instruction on math achievement, and no effect of math instruction at the country or school levels. If one's analysis ends with PISA 2000 or TIMSS 1999, there is no international evidence for increased instructional time and Coleman et al. (1966), Karweit (1976), and Baker et al. (2004) are correct; Carroll (1963) and Berliner (1990) might have overstated the case for instructional time; and the National Commission on Educational Excellence (1983) and Obama (2009) are wrong. (p. 378)

According to Long, there is not sufficient evidence that state policies should change to require school districts to increase the length of either the school day or the school year.

Recently, two studies were conducted that examined the impact the length of the school day had on student achievement. Sammarone (2014) and Plevier (2016) conducted research on this topic. Sammarone examined the length of the school day and its impact on NJASK scores for Grades 6, 7, and 8 in language arts and mathematics. In her study, she found the independent variable, length of the school day, to be statistically significant variable, but the *R*-square contribution of the variable was minimal. Plevier examined NJASK scores for Grades 4 and 5 in language arts and mathematics. In her study, Plevier did not find the independent variable, the length of the school year, to be statistically significant.

Conclusion

This study was inspired by previous researchers, specifically deAngelis (2014), Sammarone (2014), and Plevier (2016), and continued the investigation into the impact the variable length of school day has on student achievement and in particular the impact the influence of the length of the school day on the percentage of Met Expectations and Exceeded Expectations scores on the 2018 PARCC for Algebra II. The researchers that have come before

me thoroughly examined how the length of the school day affected student achievement on standardized tests. Each researcher has examined how variables and their effect on student achievement. These variables include but are not limited to staff attendance, staff mobility, percentage of staff with master's degree or higher, student attendance, student mobility, students with disabilities, students with limited English proficiency, student socioeconomic status, and length of the school day. The one relevant variable not explored thoroughly in the previous studies was time on task. As previously discussed, the time-on-task hypothesis asserts that "learning is a function of the amount of time one allocates to a particular learning task. Thus, time off-task reduces learning opportunities and is therefore thought to be detrimental to learning (Carroll, 1963)" (as cited in Godwin et al., 2016, p. 1). Alfie Kohn, in *The Homework Myth: Why Our Kids Get Too Much of a Bad Thing*, criticized the concept of time on task. Kohn (2015) stated,

> Let's begin by conceding that the statement "People need time to learn things" is true. The problem is that it's a trivial truth, one that doesn't tell us much of practical value. On the other hand, the assertion "More time usually leads to better learning" is considerably more interesting. It's also demonstrably false, however, because there are enough cases where more time *doesn't* lead to better learning. In the real world, the loose connection between these two variables doesn't mean very much.

The review of the literature was used to provide a background on why this study will be completed. Teixeira (2007), as cited in Long (2014) concluded,

> In the United States and other countries, there is a strong popular opinion that increased instructional time increases achievement. A 2007 Gallup/Phi Delta Kappa poll in the

> United States found that 96% of respondents thought that increased instructional time was an effective strategy for reducing the gap between high and low achievers (Teixeira, 2007). (p. 353)

In spite of what was cited in the literature review, I am continuing this study to provide policymakers, school districts, and school administrators with information and data on how the length of the school day impacts student achievement.

CHAPTER 3

METHODOLOGY

For this study, I utilized a non-experimental, correlational, explanatory, cross-sectional design with quantitative methods to examine the relationship between the length of the school day and the percentage of students who achieved Met Expectations and Exceeded Expectations scores on the 2018 PARCC for Algebra II. The study was conducted to explain the influence the length of school day had on Algebra II students who took PARCC in 2018 while controlling for other staff, student, and school variables.

Research Question

What is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Mathematics when controlling for staff, student, and school variables?

Null Hypothesis

No statistically significant relationship exists between the length of the school day and the Mathematics scores on the 2018 PARCC when controlling for staff, student, and school variables.

Reliability and Validity

Test validity and reliability are critical for data collection and data analysis. According to the PARCC's 2018 technical report,

> The Standards for Educational and Psychological Testing, issued jointly by the American Educational Research Association [AERA], American Psychological Association [APA], and National Council on Measurement in Education [NCME] (2014), reports: "Validity refers to the degree to which evidence and theory

> support the interpretations of test scores for proposed uses of tests. Validity is, therefore, the most fundamental consideration in developing tests and evaluating tests. The process of validation involves accumulating relevant evidence to provide a sound scientific basis for the proposed score interpretations (p. 11)." (Pearson, 2018)

The report continued to state that "The purpose of test validation is not to validate the test itself but to validate interpretations of the test scores for particular uses" (Pearson, 2018, p. 117). In regard to reliability, the 2018 Technical Report defined reliability in this way:

> Reliability focuses on the extent to which differences in test scores reflect true differences in the knowledge, ability, or skill being tested rather than fluctuations due to chance. Thus, reliability measures the consistency of the scores across conditions that can be assumed to differ at random, especially which form of the test the test taker is administered and which persons are assigned to score responses to constructed-response questions. (p. 73)

Cronbach's coefficient alpha is used to calculate the variance raw score. In the technical report,

> Cronbach's alpha and stratified alpha coefficients are influenced by test length, test characteristics and sample characteristics (Lord & Novick, 1968; Tavakol & Dennick, 2011; Cortina, 1993). As test length decreases and samples become smaller and more homogeneous, lower estimates of alpha are obtained (Tavakol & Dennick, 2011; Pike & Hudson, 1998). (Pearson, 2018, p. 75)

The Standard Error of Measure (SEM), according to the 2018 technical report,

> quantifies the amount of error in the test scores. SEM is the extent by which students' scores tend to differ from the scores they would receive if the test were perfectly reliable. As the SEM increases, the variability of students' observed scores is likely to increase across repeated testing. Observed scores with large SEMs pose a challenge to the valid interpretation of a single test score. (Pearson, 2018, p. 73)

Table 1 shows the coefficient alpha scores and the standard error of measurement as reported by the Final Technical Report for 2018 Administration.

Table 1

2018 PARCC Algebra II Coefficient Alpha and SEM

Test	Coefficient Alpha Score	Standard Error of Measurement (SEM)
Algebra II	.93	3.68

Research Design

In this study, a non-experimental, correlational, explanatory, cross-sectional design with quantitative methods was utilized. According to Johnson (2001), research in education is limited due to nonmanipulable independent variables needing further study in the field of education. Johnson (2001) stated, "Nonexperimental research may also be important even when experiments are possible as a means to suggest or extend experimental studies, to provide corroboration, and to provide increased evidence of external validity of previously established experimental findings" (p. 3). Correlational research, as defined by Gay et al. (2012), "involves collecting data to determine whether, and to what degree, a relationship exists between two more quantified variables" (p. 203). Gay et al. continued to state: "the purpose of a correlational study

may be to determine relations among variables (i.e., a relationship study) or to use relations to make a prediction (i.e., a prediction study)" (p. 204).

Sample Population

The sample population for this study was drawn from the New Jersey Department of Education 2018 School Report Card Data. The study was conducted only using public, non-vocational, non-charter schools in New Jersey; magnet or private/parochial schools were omitted from this study. The sample in this study included schools from all eight District Factor Groups (DFGs) as defined by the New Jersey Department of Education. The purpose of the DFGs is to compare students' performance on statewide assessments across demographically similar school districts. The categories are updated every 10 years when the Census Bureau releases the latest Decennial Census data. The following variables are utilized when calculating DFGs:

1. Percent of adults with no high school diploma
2. Percent of adults with some college education
3. Occupational status
4. Unemployment rate
5. Percent of individuals in poverty
6. Median family income.

The DFG classifications are listed as A, B, CD, DE, EF, GH, I, J. DFG A represents districts with the lowest socioeconomic status while DFG J represents districts with the highest socioeconomic status.

Data Collection

Data for this study were collected via the New Jersey Department of Education website Performance Report Card for 2018. Only data from all public, non-charter and non-vocational

high schools that tested Algebra II PARCC were utilized in the study to determine the effect the length of the day had on the Algebra II PARCC scores for 2018. The data were retrieved from the NJ DOE website, downloaded, and organized into spreadsheet files for Microsoft Excel and Google Sheets. The following data were retrieved:

1. County code
2. County name
3. District code
4. District name
5. School name
6. DFG
7. Valid scores
8. Percentage of students who met PARCC level
9. Length of school day (minutes)
10. Staff attendance
11. Staff retention/mobility
12. Percentage of staff with master's degree or higher
13. School size
14. Economically disadvantaged students
15. Students with disabilities
16. ELLs

The 2018 PARCC had a range of scores from 650 through 850. The cut score for Met Expectations in 2018 was 750 through 807 and the cut score for Exceeded Expectations was 808 through 850.

Data Analysis

For this study, I used a simultaneous multiple regression using IBM's SPSS statistical software package. To ensure the sample size was large enough, I used the formula set forth by Field (2013) as 50+8(k), with k representing the number of predictor variables, as an appropriate method to calculate the sample size. Field wrote as follows:

> The simplest rule of thumb is that the bigger the sample size, the better: the estimate of R that we get from regression is dependent on the number of predictors, k, and the sample size, N. In fact, expected R for random data is k/(N-1) . . . . Obviously for random data we'd want the expected R to be 0 (no effect) and for this to be true we need large samples. (p. 313)

The study was conducted only using public, non-vocational, non-charter schools; magnet or private/parochial schools were not utilized. within the study. Any student taking the 2018 Algebra II PARCC assessment in a vocational, charter, magnet, or private/parochial school was not eligible for this study. The sample size of 327 did provide enough power to run the analysis.

Table 2

Power: Expected* R *for Random Data

Dependent Variable	Number of Predictors	Sample Size	Expected *R* (*k* /N-1)
Algebra II PARCC	8	327	.024

The data were downloaded from the New Jersey Department of Education website, organized and formatted into Google Sheets, and then saved into Microsoft Excel. Once the data were cleaned and ready, I imported the data to SPSS. I ran descriptive statistics to check the mean, minimum, maximum, range, and standard deviation. To ensure the population was normally distributed, tests of normality were conducted. I then ran a simultaneous multiple

regression to examine the relationship between the independent variables of staff attendance, staff mobility, and percentage of staff with master's degrees or higher; student attendance, the percentage of students on free and reduced lunch, limited English proficiency, the percentage of students with disabilities, school size; and length of the school day. For this study, eight variables were used to establish the significant predictor variables that predicted the greatest amount of variance in scores for the 2018 PARCC for Algebra II. The following model was created and utilized for the study.

1. Simultaneous Multiple Regression Models

- Model I – Algebra II PARCC – All staff, student, and school variables

Dependent Variable

The dependent variable for this study was the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Mathematics. For the purpose of this study, student achievement was measured by the percentage of students who Met Expectations with a score between 750–807 (Level 4) or Exceeded Expectations with a score from 808–850 (Level 5).

Conclusion

The purpose of this study was to examine the relationship between the length of the school day and student achievement on the 2018 PARCC for Algebra II. For this study, a correlational, explanatory, cross-sectional design with quantitative methods used data from the New Jersey Department of Education State Report Card. This study utilized data from the 2018 PARCC for Algebra II. The researcher utilized IBM's SPSS software to determine the significance relationships between variables the length of the school day and student achievement on the high-stakes test of the 2018 PARCC for Algebra II.

There is a lack of literature and research on the correlation between the length of the school and student achievement on high-stakes tests. The decision to increase the length of the school day or the school year has significant costs associated with it. Financially, school districts would need to increase their school budget, and socially, students would be limited in after-school activities and athletics. The results of this study are intended to provide stakeholders, policymakers, community members, and school officials with information to make informed decisions based on research.

CHAPTER 4

ANALYSIS OF THE DATA

This non-experimental, correlational, explanatory, cross-sectional study with quantitative methods was conducted to examine the relationship between the length of the school day and percentage of students who Met Expectations and Exceeded Expectations on the 2018 PARCC for Algebra II. The study was conducted to explain the influence the length of school day had on Algebra II students who took the PARCC in 2018, while controlling for other staff, student, and school variables. The study addressed the research question and tested the null hypothesis.

Research Question

What is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Mathematics when controlling for staff, student, and school variables?

Null Hypothesis

No statistically significant relationship exists between the length of the school day and the Mathematics scores on the 2018 PARCC when controlling for staff, student, and school variables.

Purpose

The purpose of this study was to examine the relationship between the length of the school day and student achievement on the 2018 PARCC for Algebra II. This study extends the research previously done by researchers on whether the length of the school day has a direct impact on student achievement on high-stakes testing. Over the course of the last decade, school improvement grants have provided districts with funding to increase the length of the school day

or implement extended day programs. Over the last seven years, there have been several dissertations that discussed the impact of increasing the length of the school day.

Data

Data for this study were collected via the New Jersey Department of Education website Performance Report Card for 2018. Only data from all public, non-charter, and non-vocational high schools that tested Algebra II via PARCC were utilized in the study to determine the effect the length of the school day had on the Algebra II PARCC scores for 2018. The data were retrieved from the NJ DOE website, downloaded, and organized into spreadsheet files for Google Sheets, and then downloaded to Microsoft Excel files for IBM's SPSS. It was my intention to find out if the length of the school day has a statistically significant influence on student achievement on the 2018 PARCC for Algebra II while controlling for staff, student, and school variables.

For this study, only public, non-vocational, non-charter schools; magnet or private/parochial schools were not utilized. No middle schools were used for this study. All data for this study are at the school level. Schools from every DFG were represented in the study. The total number of high schools for this study was 327. Therefore, the sample used for this study was powerful enough to run. Using Field's (2013) suggested expected *R* for random data, k / (N - 1), the "Expected *R*" values were close to 0. (See Table 3.)

Table 3

Power: Expected* R *for Random Data

Dependent Variable	Number of Predictors	Sample Size	Expected *R* (*k* /N - 1)
Algebra II PARCC	8	327	.024

Variables

The dependent or outcome variable used for this study was the 2018 PARCC scores for Algebra II. Research in the field suggests the following variables influence student achievement and therefore were used as the independent or predictor variables for this study. Staff variables included staff attendance, staff mobility, and the percentage of staff with master's degrees or higher. Student variables included student attendance, the percentage of students on free and reduced lunch, limited English proficiency, and the percentage of students with disabilities. School variables included length of the school day and school size, as defined by total student enrollment.

Table 4

Independent Variables Used in the Study

Variable	Label	Description
Staff Attendance	Staff Attendance	Staff attendance rate
Staff Mobility	Staff Mobility	Staff mobility rate
Percentage of Staff with a Master's Degree or Higher	Percentage of Staff with a Master's Degree or Higher	Percentage of staff with advanced degrees
Student Attendance	Student Attendance	Student attendance rate
Percentage of Students on Free and Reduced Lunch	Percentage of Students on Free and Reduced Lunch	Percentage of students who receive free or reduced lunch
Limited English Proficiency	Limited English Proficiency	Percentage of Limited English Proficiency/ELL students
Percentage of Students with Disabilities	Percentage of Students with Disabilities	Percentage of students with an IEP
Length of the School Day	Length of the School Day	Length of the school day in minutes
School Size	School Size	Total number of students in the school

Procedure

The data set, once organized and formatted in Microsoft Excel, was imported into IBM's SPSS and descriptive statistics were run to check the mean, minimum, maximum, range, and standard deviation.

Table 5

Descriptive Statistics for Dependent Variables in Each Model

Variable	N	Mean	Median	Standard Deviation
Percentage of students who Met or Exceeded Expectations	327	27.729	23.300	20.226

The sample did provide adequate power to run the analysis. There was a check for normality of the data through a check of skewness. To check for normality, the "Explore" command was run in SPSS and the skewness was checked for each variable. The normality of the dependent variable was at acceptable limits at .902 because all of the variables, except for the variable ELLs, were greater than 1.0.

Table 6

Assumption Check for 2018 PARCC Algebra II

Variable	Skewness Metric
Percentage of Students who Met or Exceeded	.902
Length of School Day	.691
Staff Attendance	-4.859
Staff Retention/Mobility	-1.437
Percentage of Staff With Master's Degree or Higher	.112
School Size	.938
Economically Disadvantaged Students	.646
Students With Disabilities	.337
English Language Learners	3.267

The next step in the process was that I ran a Pearson *R* correlation matrix to check for initial relationships among variables and potential multicollinearity. The dependent variable is weakly correlated to our variable of interest, which is the length of the school day. Correlation is statistically significant but ($p = .000$) at .240. Next, I ran a simultaneous multiple regression using all independent variables and the dependent variable.

Table 7

Variables Entered/Removed

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	English Learners, Students with Disabilities, Length of School Day, School Size, Staff Attendance, Percentage of Staff with Master's Degree or Higher, Staff Retention/Mobility, Economically Disadvantaged Students[b]	.	Enter

a. Dependent Variable: Percentage of students who Met or Exceeded

b. All requested variables entered.

Table 8

Correlations

Correlations

		Percentage of students who Met or Exceeded	Length of School Day	Staff Attendance
Percentage of students who Met or Exceeded	Pearson Correlation	1	.240**	.223**
	Sig. (2-tailed)		.000	.000
	N	331	330	330
Length of School Day	Pearson Correlation	.240**	1	.139*
	Sig. (2-tailed)	.000		.011
	N	330	330	329
Staff Attendance	Pearson Correlation	.223**	.139*	1
	Sig. (2-tailed)	.000	.011	
	N	330	329	330
Staff Retention/Mobility	Pearson Correlation	.216**	.075	.131*
	Sig. (2-tailed)	.000	.177	.018
	N	330	329	329
Percentage of Staff with Master's Degree or Higher	Pearson Correlation	.456**	.262**	.144**
	Sig. (2-tailed)	.000	.000	.009
	N	329	328	328
School Size	Pearson Correlation	.184**	.082	.124*
	Sig. (2-tailed)	.001	.139	.024
	N	331	330	330
Economically Disadvantaged Students	Pearson Correlation	-.624**	-.211**	-.330**
	Sig. (2-tailed)	.000	.000	.000
	N	331	330	330
Students with Disabilities	Pearson Correlation	-.357**	-.115*	-.106
	Sig. (2-tailed)	.000	.036	.053
	N	331	330	330
English Learners	Pearson Correlation	-.337**	-.079	-.155**
	Sig. (2-tailed)	.000	.150	.005
	N	331	330	330

Correlations

		Staff Retention/Mobility	Percentage of Staff with Master's Degree or Higher	School Size
Percentage of students who Met or Exceeded	Pearson Correlation	.216**	.456**	.184**
	Sig. (2-tailed)	.000	.000	.001
	N	330	329	331
Length of School Day	Pearson Correlation	.075	.262**	.082
	Sig. (2-tailed)	.177	.000	.139
	N	329	328	330
Staff Attendance	Pearson Correlation	.131*	.144**	.124*
	Sig. (2-tailed)	.018	.009	.024
	N	329	328	330
Staff Retention/Mobility	Pearson Correlation	1	.125*	.277**
	Sig. (2-tailed)		.024	.000
	N	330	329	330
Percentage of Staff with Master's Degree or Higher	Pearson Correlation	.125*	1	.139*
	Sig. (2-tailed)	.024		.011
	N	329	329	329
School Size	Pearson Correlation	.277**	.139*	1
	Sig. (2-tailed)	.000	.011	
	N	330	329	331
Economically Disadvantaged Students	Pearson Correlation	-.309**	-.378**	-.108*
	Sig. (2-tailed)	.000	.000	.050
	N	330	329	331
Students with Disabilities	Pearson Correlation	-.089	-.136*	-.181**
	Sig. (2-tailed)	.108	.014	.001
	N	330	329	331
English Learners	Pearson Correlation	-.187**	-.104	.021
	Sig. (2-tailed)	.001	.060	.699
	N	330	329	331

Correlations

		Economically Disadvantaged Students	Students with Disabilities	English Learners
Percentage of students who Met or Exceeded	Pearson Correlation	-.624**	-.357**	-.337**
	Sig. (2-tailed)	.000	.000	.000
	N	331	331	331
Length of School Day	Pearson Correlation	-.211**	-.115*	-.079
	Sig. (2-tailed)	.000	.036	.150
	N	330	330	330
Staff Attendance	Pearson Correlation	-.330**	-.106	-.155**
	Sig. (2-tailed)	.000	.053	.005
	N	330	330	330
Staff Retention/Mobility	Pearson Correlation	-.309**	-.089	-.187**
	Sig. (2-tailed)	.000	.108	.001
	N	330	330	330
Percentage of Staff with Master's Degree or Higher	Pearson Correlation	-.378**	-.136*	-.104
	Sig. (2-tailed)	.000	.014	.060
	N	329	329	329
School Size	Pearson Correlation	-.108*	-.181**	.021
	Sig. (2-tailed)	.050	.001	.699
	N	331	331	331
Economically Disadvantaged Students	Pearson Correlation	1	.111*	.516**
	Sig. (2-tailed)		.043	.000
	N	331	331	331
Students with Disabilities	Pearson Correlation	.111*	1	-.120*
	Sig. (2-tailed)	.043		.029
	N	331	331	331
English Learners	Pearson Correlation	.516**	-.120*	1
	Sig. (2-tailed)	.000	.029	
	N	331	331	331

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Research Question 1 Analysis

What is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Mathematics when controlling for staff, student and school variables?

To better understand the relationship between the length of the school day and the percentage of students who Met or Exceeded Expectations on the 2018 PARCC for Algebra II, a simultaneous multiple regression analysis was run with all variables to establish the significance of the relationship between the length of the school day and the 2018 PARCC scores for Algebra II. The model summary (Table 9) shows the *R* square of this model is .532 and the adjusted *R* square is .520. The adjusted *R* square value provides the amount of the variance that can be explained by the outcome variable, the percentage of students who met or exceeded the expectations for the 2018 PARCC for Algebra II when controlling for all predictors: staff attendance, staff mobility, percentage of staff with master's degrees or higher, student attendance, the percentage of students on free and reduced lunch, limited English proficiency, the percentage of students with disabilities, , school size, and length of the school day. This model predicts that 52% of the variance, in total, Met or Exceeded Expectations on the 2018 PARCC for Algebra II.

Table 9

Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.729[a]	.532	.520	14.0127592

a. Predictors: (Constant), English Learners, Students with Disabilities, Length of School Day, School Size, Staff Attendance, Percentage of Staff with Master's Degree or Higher, Staff Retention/Mobility, Economically Disadvantaged Students

The 2018 PARCC for Algebra II ANOVA table indicates that the regression was statistically significant ($F(8,318) = 45.149$, $p < .000$).

Table 10

ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70922.207	8	8865.276	45.149	.000[b]
	Residual	62441.659	318	196.357		
	Total	133363.866	326			

a. Dependent Variable: Percentage of students who Met or Exceeded

b. Predictors: (Constant), English Learners, Students with Disabilities, Length of School Day, School Size, Staff Attendance, Percentage of Staff with Master's Degree or Higher, Staff Retention/Mobility, Economically Disadvantaged Students

The simultaneous regression provided that economically disadvantaged students, students with disabilities, the percentage of staff with master's degrees and higher, and ELLs were statistically significant predictors for student achievement on the 2018 PARCC for Algebra II. Each predictor variable in this study had a unique variance as a predictor. To determine the effect size of each variable, the standardized beta was squared. The variable economically disadvantaged students was found to be the most statistically significant predictor variable of the overall model, with 17.7% of the model explained by economically disadvantaged students. The negative beta ($\beta = -.421$, $p < .000$) indicates that as a school's free and reduced-price lunch population increases, the percentage of students who Met or Exceeded Expectations decreases. The next predictor variable, students with disabilities, was a statistically significant predictor at 7.23%. The negative beta ($\beta = -.269.$, $p < .000$) indicates that as a school's percentage of students with disabilities increases, the percentage of students who Met or Exceeded Expectations decreases. The third predictor of variance was the percentage of staff with master's degrees and higher at 5.2%. The positive beta ($\beta = -.229.$, $p < .000$) indicates that as the school's percentage

of staff with master's degrees and higher increases, the percentage of students who Met or Exceeded Expectations increases. Finally, the last predictor of variance, ELLs, was a statistically significant predictor of variance at 1.84%. The negative beta (β = -.136. p < .000) indicates that as the school's percentage of ELLs increases, the percentage of students who Met or Exceeded Expectations decreases.

Table 11

Coefficients

Coefficients[a]

Model		Sig.	Collinearity Statistics	
			Tolerance	VIF
1	(Constant)	.326		
	Length of School Day	.254	.905	1.105
	Staff Attendance	.694	.875	1.143
	Staff Retention/Mobility	.672	.839	1.192
	Percentage of Staff with Master's Degree or Higher	.000	.800	1.250
	School Size	.112	.863	1.158
	Economically Disadvantaged Students	.000	.513	1.951
	Students with Disabilities	.000	.928	1.078
	English Learners	.004	.655	1.526

a. Dependent Variable: Percentage of students who Met or Exceeded

Null Hypothesis 1

No statistically significant relationship exists between the length of the school day and the Algebra II score on the 2018 PARCC when controlling for staff, student, and school variables.

I retain my null hypothesis that there is not a significant relationship between the length of the school day and the 2018 PARCC Algebra II scores when controlling for staff, student, and school variables. In the simultaneous multiple regression, the length of the school day was a significant predictor variable on the 2018 PARCC at ($\beta = .046$. $p > .254$).

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Education reform is discussed at the local, county, state, and federal levels regularly. From school districts to the United States Department of Education, stakeholders are urging for reform. One topic related to education reform is increasing the length of the school day. The proposal is that the longer students are in school, the higher will be their achievement on high-stakes tests. The current state of education in the United States, due to the COVID-19 pandemic, is one that no one saw coming. The concept of hybrid and remote learning for more than a year was unfathomable in February of 2020. Currently, school districts are meeting to discuss summer school in order to close the achievement gap or learning loss. Now, more than ever, it is important to examine the data on the length of the school day and student achievement.

In the last decade, prominent political figures have called on the United States to increase the length of the school day and school year. President Barack Obama, Secretary of Education Arne Duncan, and Governor Chris Christie all called for increasing the amount of time students spend in school per day and per year (Patall et al., 2010, p. 401; State Department of New Jersey, 2015, para. 1). In the winter of 2019, the world was hearing about a potential pandemic, and by March of 2020, the United States and much of the world was hit by the COVID-19 pandemic. Major metropolitan cities closed, and life came to a standstill. Schools around the country shut down, and plans to continue learning started to take shape in the United States. According to Alrutz (2020),

> By April 7, 2020, every state and territory of the United States, including Washington, D.C., took measures to close schools in response to the pandemic caused by COVID-19, known colloquially as “the coronavirus.” These measures ranged from a recommendation

> for school closures to executive orders closing schools for the remainder of the 2019–2020 academic year. (p. 146)

States were given autonomy to close schools. The federal government did not require schools to close. In New Jersey, in his Executive Order 104, Governor Phil Murphy (Executive Order 104, 2020), stated:

> All public, private, and parochial preschool program premises, and elementary and secondary schools, including charter and renaissance schools, shall be closed to students beginning on Wednesday, March 18, 2020, and shall remain closed as long as this Order remains in effect. (p. 5)

When schools in New Jersey officially closed on March 18, most thought it would be two weeks to "slow the spread," as many suggested. Two weeks turned into the remainder of the school year, and many school districts stayed closed until the spring of 2021, offering only remote learning. A typical school district is not accustomed to teaching through a computer. Teachers and students are accustomed to learning with technology but not through technology. Students understand how to access Google Apps for Education, but learning through Google Meet is different from learning directly from their teacher face to face. On March 27, 2020, the federal government provided states with financial assistance with COVID-19 known as the Coronavirus Aid, Relief, and Economic Security (CARES) Act. According to Alrutz (2020),

> The CARES Act minimally addressed the legal obligations of K–12 institutions, focusing most of its education information on institutes of higher education. However, the act provided an Education Stabilization Fund of over thirty billion dollars, dividing funding between K–12 institutions, higher education institutions, non-public schools, and discretionary funding for the governor of each state to

> provide support to local educational agencies in need of specific relief. The law does provide that a state applying for funding must maintain support for education comparable to the state's average support in the three years prior, although the measure of support is purely financial rather than measuring educational efficacy. Further, the Department of Education delayed its release of guidance for when or how the money is being distributed, despite calls from state governors for its rapid distribution. (p. 148).

The COVID-19 pandemic has affected education across the country. Some students will return to their schools in September of 2021 for the first time since March of 2020. The loss of learning for all students is real. The solution to this problem for districts is to not increase the length of the school day.

Purpose

This non-experimental, correlational, explanatory, cross-sectional study with quantitative methods was conducted to examine the relationship between the length of the school day and percentage of students who Met Expectations and Exceeded Expectations on the 2018 PARCC for Algebra II. The length of the school day is not statistically significant when controlling for staff variables which included staff attendance, staff mobility, and the percentage of staff with master's degrees or higher; student variables which included student attendance, the percentage of students on free and reduced lunch, the percentage of students with limited English proficiency, and the percentage of students with disabilities; and finally school variables which included length of the school day and school size, as defined by total student enrollment.

Research Question and Answer

The overarching question for this study was what is the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II when controlling for staff, student and school variables?

Null Hypothesis 1

No statistically significant relationship exists between the length of the school day and the Algebra II score on the 2018 PARCC when controlling for staff, student, and school variables.

Answer

After running a simultaneous multiple regression and analyzing the results, the null hypothesis for this research question is sustained. There is no statistically significant relationship between the length of the school day and the Algebra II score on the 2018 PARCC when controlling for staff, student, and school variables.

To achieve the above results, a correlational, explanatory, cross-sectional study with quantitative methods was conducted. The eight predictor variables were included in the regression analysis and included based on previous research on the significance of the length of the school day and student achievement for high-stakes testing. The dependent variable or outcome variable, the length of the school day, was the 2018 PARCC. The *R* square value of the simultaneous regression yielded .532. The regression found that the dependent variable, the length of the school day, was not statistically significant at ($p = .254$). The regression did find that four of the eight predictor variables were statistically significant. The four variables were economically disadvantaged students ($p = .000$), students with disabilities ($p = .000$), percentage of staff with masters' degree or higher ($p = .000$,) and ELLs ($p = .004$). Every one of these

variables was found to be a statistically significant predictor of scores on the 2018 Algebra II PARCC.

The literature on the length of the school day and high-stakes testing is abundant; however, research does not provide enough evidence that there is a statistically significant relationship between the length of the school day and student achievement on high-stakes testing. Within the last year, COVID-19 has drastically changed education globally. Schools across the United States shut down in March 2020, and some are even still shut down and only permitting remote or virtual instruction. The Center on Reinventing Public Education conducted a survey in June 2020 and found that

> Nationally, nearly all districts—85 percent—made sure their students received some form of grade- and subject- specific curriculum in packets; assignments posted in Google Classroom, Canvas, or some other platform; or guidance to complete segments of online learning software. (Gross & Opalka, 2020)

The study also included that

> More affluent school districts are more likely to require live video instruction from teachers. While expectations around synchronous, or real-time, teaching are uncommon across the board (expected in 21.8 percent of districts), only 14.5 percent of school districts with the highest concentration of students receiving free or reduced-price lunch expect teachers to provide live instruction. The most affluent 25 percent of districts in our sample are twice as likely to expect real-time teaching. (Gross & Opalka, 2020)

In the last year, learning across the country varied. Some schools provided real-time teaching from the onset of the pandemic and eventually moved to in-person learning, while some districts are still teaching students remotely. Learning loss by students during the last year is very real;

however, studies like this one conducted by the Center on Reinventing Public Education will be used by stakeholders from local to federal to enact a longer school day or school year. As this study and previous studies predicted, there is no statistically significant relationship between the length of the school day and student achievement on high-stakes tests. However, there is a connection between time and the outcome on high-stakes tests. It is not so much the length of the time but the quality of the time in the classroom. There is a difference between instructional minutes and time on task. Every school district has a schedule with a set number of minutes within a given class period. Depending on the bell schedule, it can range from 40 minutes a period to 80 minutes a period every other day. Within those periods, a student's time on task varies greatly. A student could potentially have more time on task in a 40-minute period than in an 80-minute period. Darling-Hammond et al. (2020), in *Restarting and Reinventing School: Learning in the Time of COVID and Beyond*, in describing Priority 7: Provide Expanded Learning Time stated, "The U.S. public education system's 6-hour day and 180-day year cannot, on its own, offset the gap in out-of-school learning opportunities between students from more and less affluent families" (p. 70). More time for students does not necessarily mean higher student achievement. In order to increase achievement, school districts, school administrators, and policymakers must find other solutions. Lengthening the school day is not the solution.

Implications and Recommendations for Practice

In this study, there was no statistically significant relationship between the length of the school day and the percentage of students who Met or Exceeded Expectations on the PARCC. The superintendent of schools and the board of education make educated decisions that are best for their students, families, teachers, staff, and administrators. Increasing the length of the school day or even the school year is an option that many believe is the answer to increasing student

achievement. However, one must recognize that increasing the length of the school day or school year also increases the financial cost to the school district. According to Aronson, Zimmerman, and Carlos (1998), as cited in Plevier (2016),

> In regard to increased time in school, it is imperative that administrators and legislators understand and examine all the financial, as well as non-financial, costs associated with this reform initiative. According to one estimate, lengthening the school year by one day would cost states between $2.3–$121.4 million dollars.

The empirical data on increasing the length of the school day does not provide districts with sufficient evidence that increasing the school day leads to an increase in student achievement. The cost of increasing the length of the school day or school year does not yield the results needed to justify the increase. Instead of increasing the length of the school day or year, school districts must find different ways to increase student achievement.

In this study, two predictor variables that impacted the variance were economically disadvantaged students and percentage of staff with a master's degree or higher. According to this study, the variable economically disadvantaged students accounted for 17.7% of the variance which is consistent with the literature. Economically disadvantaged students need something more than just a longer school day. According to Sammarone (2014),

> Since research proves that socioeconomic status is the strongest predictor of achievement, a school leader of a low SES school should keep in mind the constructs necessary that will reach the students and community as well as keeping the staff motivated. (p. 291)

A school leader in a low socioeconomic status community must find ways to improve life for not only the students but also the families. This can be done through a variety of ways. The first way a school leader can help economically disadvantaged families is by providing meals. Currently.

during the COVID-19 pandemic, school meals are available to all students who choose to pick up meals. Students receive meals for multiple days and the weekend. By providing meals to students, the burden of working after school may not be needed, and students can put the focus on their studies instead of working. School administrators should work with local community food banks, churches, or even local businesses to help economically disadvantaged students. Students in need of help must be supported. School administrators must find a way to build relationships with community organizations and community members. The best asset for a school district is its community members. School administrators must get creative and work with all stakeholders to increase student achievement. The responsibility for increasing student achievement cannot be placed solely on the school leader. School leaders need assistance with increasing student achievement, and the best place for assistance is the community.

In this study, staff members with a master's degree or higher accounted for 5.2% of the variance. Unfortunately, in many school districts, when cuts are made in contracts, tuition reimbursement for teachers who want to pursue a higher degree is one of the first expenditures to be removed. Instead of cutting reimbursements or programs for teachers to earn higher degrees, school districts should consider providing more opportunities for teachers to earn a higher degree in their content area. Providing staff with an opportunity to immerse themselves in a program focused solely on their content area and best teaching practices can provide teachers with the knowledge to help increase student achievement. Just as school districts create academies for their students with a particular focus on a topic or pathway to a profession, school districts can do the same for their staff with advanced degrees. School districts should partner with local colleges and universities and create pathways for teachers to obtain advanced degrees. School districts could have contract language that requires teachers to remain in the district for a certain

number of years once the degree is conferred to ensure the district receives the benefit of the advanced degree.

Implications and Recommendations for Policy

It is very easy for an outsider, someone outside of education and who has not read the research, to believe that increasing the length of the school day will solve the student achievement issue. The concept of the production function of the more you put into something the more you get out of it does not work in education. As stated previously, the production function theory, as defined by Pritchett and Filmer (1999), is "an expression for the maximum amount of output possible for an amount of inputs. By applying this metaphor to education one can talk of an 'educational production function' which is determined by an underlying, undoubtedly extremely complex, pedagogical processes" (Pritchett & Filmer, 1999, p. 224). The production function theory studies the relationship between inputs and outputs. Increasing the length of the school day for students and staff will not yield better results. Some may argue that doing this will reduce student achievement and reduce teacher effectiveness. If policy makers want to improve student achievement, they must look at all of the research. The research states that if one wants to improve student achievement, then all work must go towards alleviating childhood poverty. Currently, during the COVID-19 pandemic, some students must make a choice: attend school through the computer or work to support their families and pay bills because their parents may have lost their jobs due to the pandemic. If policymakers are serious about improving student achievement, they must do something about the standard of living and helping those in poverty with raising children. On March 11, 2021, the third stimulus package was signed. The third stimulus package provided a child tax credit. This credit will provide families with an early tax credit of $300 per month for children 5 years old and younger and

$250 per month for children aged 6 to 17 starting on July 1. This money will help families with the financial demand of raising children. According to Alrutz (2020),

> Several states have passed spending bills to maintain funding for school nutrition, but only New Jersey has passed a law to specifically address school meals during the pandemic. New Jersey Assembly Bill 3840, enacted on March 20, 2020, requires school districts to provide meals or vouchers to eligible students throughout the closures caused by the pandemic. (pp. 146–147)

This money provides families with financial relief. Instead of providing local and state governments with money and giving them free range on how to spend the money or provide the money to local governments or school districts, the federal government must provide policies and procedures on how the money should be allocated and spent. Too many times, money is provided to districts, and it is spent frivolously.

Future Research

In this study, student achievement was analyzed based on the length of the school day. The main idea of the influence of the length of the school day on the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II when controlling for staff, student and school variables was determined. No statistically significant relationship was found between the length of the school day and the percentage of students who Met or Exceeded Expectations on the 2018 PARCC test for Algebra II; however, this study cannot provide all of the answers regarding student achievement and the length of the school day. Future research should be conducted on the relationship between the length of the school day and student achievement on high-stakes tests. Recommendations are as follows:

1. Recreate this study for all years of the PARCC for Algebra II for New Jersey.

2. Recreate this study for all years of the PARCC for Algebra II across the nation.
3. Conduct a study that focuses on time on task rather than the length of the school day for New Jersey Algebra II students and New Jersey Student Learning Assessments (formally known as *Partnership for Assessment of Readiness for College and Careers*) Algebra II.

Conclusion

The findings from this study prove that there is no statistically significant relationship between the length of the school day and 2018 PARCC test scores for Algebra II when controlling for student, staff, and school variables. This study demonstrates to stakeholders from the local through the federal levels that increasing the length of the school day will not have an impact on student achievement and that instead of promoting local or state policy on increasing the length of the school day, efforts should be made to improve other factors within the community. It is easy to say "just increase the length of the school day or school year to improve student achievement." This is not the answer. The African proverb "It takes a village to raise a child" could not be truer when it comes to educating our children. All stakeholders must work together to improve student achievement. It cannot be the sole responsibility of the parent, teacher, school administrators, superintendent, boards of education, state department of education, or federal government. We all must accept this responsibility if we want a better future.

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