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The Association of the National Assessment of Educational Progress Scores and Variance in State Education Requirements

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THE ASSOCIATION OF THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS SCORES AND VARIANCE IN STATE EDUCATION REQUIREMENTS

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ABSTRACT

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Since the 10th Amendment to the United States Constitution, states have the function to set policy that varies drastically from state to state. This study examines the relationship of state fiscal effort and per pupil expenditure and graduation rates over a 10-year period. Furthermore, this study will look at the relationship between NAEP scores, compulsory attendance, graduation rates, course credit requirements, and hours of instruction. Research is necessary to show a relationship between the varying policies set forth by each state. This research will help policy makers, school leaders, and school localities to assess their own states' policies and outcomes on the variables to determine what needs to change or strengthen to ensure all students are productive members of society after graduation.

This dissertation is dedicated to my beautiful wife, Desiree.

Without you, none of this is possible.

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CHAPTER 1

Introduction

Using an equity perspective, this research compares state educational systems within the U.S. student demographics, the organizational structures, curricula, school financial resources, and student outcomes. Equity is a broad term that is used throughout this paper. Equity is predicated on the principles of fairness and justice for all students and holds that unequal access to resources equates to gaps in achievement (Darling-Hammond, 2007). Equity in schools is referencing the closing of achievement gaps for students, especially those students that have historically performed poorly academically. I make the case that since the 10th Amendment to the Constitution makes U.S. education a state function, 50 states can have substantial variance in their instructional standards and outcomes. At the secondary level, these differences may partially explain U.S. states lagging achievement when compared to other countries. These dissimilarities have contemporary and far-reaching implications as schools aim to prepare tomorrow's workforce for our nation's economic and political future.

From the beginning of our nation, our founding fathers recognized the importance that a well-educated population was essential to the survival of a democratic republic (Mantle-Bromly & Foster, 2005). Public education was never mentioned in the Constitution as a specific power and, historically, education powers and responsibilities have been delegated to state and local governments. Prior to the Constitution being written, the Land Ordinance Act of 1787 included general provisions for the nation to create an education system. In 1791, the 10th Amendment detailed, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people" (U.S. Constitution. Amend 10). The 10th Amendment made education a state responsibility in a time when most people didn't leave their village or state. This provided some unforeseen consequences to modern day education in a global economy. The 10th amendment was a compromise between the states' rights groups and the Federalists to get the constitution ratified. To address the fears of the anti-Federalist groups, this amendment further indicated that the Federal government was a government of enumerated powers (Vile, 2015). This compromise on "states' rights" allowed powers to ratify the U.S. Constitution which continues to drive policy about American children's education in a world that is different from that of its signers.

Unlike many other nations, the U.S. educational system is unusual; most systems in other countries are operated by a national Ministry of Education. The U.S. does not have one educational system, it has 50 state systems, plus Washington D.C. Despite the 10th Amendment, the Federal government has been able to set broad policy that impacts state decision making. Major legislation dates back to the mid-1950s, starting with the landmark case Brown v. Board of Education (1954) that prohibited racial segregation and, eventually, laid the groundwork to the civil rights era. The launch of the Sputnik, the National Defense Education Act (NDEA) in 1957, and the Elementary and Secondary Education Act (ESEA) in 1965 paved the way and manifested into more recent policies, such as, No Child Left Behind (NCLB), and Race to the Top (RTTP). Federal involvement in education has increased since the passage of the ESEA, yet control over financial equity, state standards, and learning outcomes remains a function of the states. ESEA provided educational opportunities to poor and minority children and was passed as part of U.S. President Lyndon Johnson's war on poverty, which was aimed to emphasize equal access to education. During the 1970s, Federal involvement remained consistent by providing educational opportunities for all students. Expanding the focus on civil rights, the Education for All Handicapped Children Act was passed in 1975. The Federal government required states to implement policies to assure students with disabilities received free and appropriate public education. Even though the Federal government forced states to act, inequalities between states still exist today related to the efficiency and effectiveness of closing achievement gaps for minorities, students with disabilities, and students from low socioeconomic backgrounds.

The standards movement in schools began around 1983 in response to A Nation at Risk (National Commission on Excellence in Education, 1983). The report claimed that American schools were falling behind in academic achievement compared to other nations. Within one year, the report spurred several states to implement new graduation requirements, develop curriculum reforms, and create new policies regarding testing. One of the deficiencies that came from the Nation at Risk report was based on a review of state-by-state surveys of high school diploma requirements. It revealed that only eight states required high schools to offer foreign language instruction, but none required students to take the courses (National Commission on Excellence in Education-NCEE, 1983.) Furthermore, it revealed that thirty-five states required only one year of mathematics, and thirty-six required only one year of science for a diploma. A Nation at Risk also exposed the fact that “secondary school curricula have been homogenized, diluted, and diffused to the point that they no longer have a central purpose.” In response to this report, states began to develop new academic criteria and measurements (Viteritti, 2012). The Federal government’s power over state and local agencies had no doubt increased, but is not absolute, as states have the final say over reform initiated by the Federal government.

U.S. public schools continue to be held accountable at all levels; national, state, and local, for ensuring that all students graduate and maintain high academic achievement. Researchers have and continue to examine what school, classroom, teacher, and student level policies affect achievement as well as the degree to which each variable influence learning (Hattie, 2008;

Marzano, 2003). In an effort to examine the different policies that impact education, National Assessment of Educational Progress (NAEP), a nationally normed test, was created and administered to each state. This stemmed from the UN World Declaration on Education for All (1990) where the U.S. agreed to adopt a national system of education that is more closely aligned with a world education system. Within this Declaration, the U.S. agreed to establish procedures for monitoring progress, and NAEP successfully met the stipulation (UNESCO, 2015).

NAEP is federally mandated and is used to assess what students know in a variety of areas which includes reading, writing, mathematics, science, and social studies. The National Assessment Governing Board (NAGB) is an independent agency that provides the policy direction of NAEP, selects the subjects, and develops the framework for each test. NAGB also creates the achievement levels for NAEP (Hombo, 2003). NAEP is helping researchers and policy makers improve the educational system in the U.S. because it provides access to a wealth of data for each state. Some states, such as Virginia, have developed their own state assessments, while other states have adopted the Common Core Standards. The differences that exist within these states do not allow for comparisons to be made. The goal for NAEP was to report on the academic achievement of each state and provide comparative data because there was no consistent way to measure state educational policies. Researchers were not able to compare states to each other by a single measure until the creation of the NAEP assessment. NAEP is a survey of student achievement that measures student progress at the national and state level, which allows now for valid comparisons between states to now be made.

U.S. and International Comparisons

Much of the conversation about educational reform centers on what policies affect student achievement. During the past couple of decades, policymakers have called for changes in curricula: more rigorous standards, more funding, and ways to improve state graduation rates. A recent release, in February 2015, by the Educational Testing Service (ETS), titled *America's Skills Challenge: Millennials and the Future* (Goodman, Sands, & Coley, 2015) offers a grim perspective on the U.S. population as a whole. The study compares persons born after 1980 (ages 16-34 during the study) in the 22 Organization for Economic Cooperation and Development (OECD) countries that took part in the Program for the International Assessment of Adult Competencies (PIAAC). The test measures career-oriented literacy and numeracy skills and problem solving in technology-rich environments. On this assessment, U.S. Millennials scored fifth from last in literacy, last in numeracy, and second from last in problem solving in technology rich-environments. Further disaggregated PIAAC data offer sobering implications for the U.S.: both higher and lower performing American Millennials scored at the bottom of the test compared with their peers in other countries. For example, low scoring U.S. Millennials (at the 10^{th} percentile) ranked last. Top scoring U.S. Millennials (those at the 90^{th} percentile) scored lower than any other country except for Spain. The achievement gap between the U.S. bottom 10^{th} and the top 90^{th} percentile scores was the greatest of any other country tested – 139 points as compared with an OECD average gap of 122 points – highlighting wide disparities across Millennials in the U.S. Not only does this highlight discrepancies among states, economists argue that ever-widening skill gaps in the U.S. lead to decreased economic growth and propagate wage gaps (Autor, Katz, & Kearney, 2008).

Christine Lagarde, managing director of the International Monetary Fund, warns of the consequences of growing economic and educational disparity on our democratic social fabric. She stated:

> The 85 richest people in the world, who could fit into a single London double-decker, control as much wealth as the poorest half of the global population – that is 3.5 billion people. Fundamentally, excessive inequality makes capitalism less inclusive. It hinders people from participating fully and developing their potential. Disparity also brings division. The principles of solidarity and reciprocity that binds societies together are more likely to erode in excessively unequal societies. History also teaches us that democracy begins to fray at the edges once political battles separate the haves against the have-nots" (Legarde, 2014).

The ETS report concludes that, "Moreover, if there is inequality in the investment and quality of educational resources for different racial/ethnic and socioeconomic groups within the U.S., then inequalities in skills, economic opportunity, income and wealth will continue to grow over time" (Autor et. al., 2008). Our nation's well-being depends on educating every child to high levels of knowledge and performance if we are to keep our democracy's social fabric from fraying at the edges. An equity comparison between U.S. states' educational programs may reveal some insights, raise questions, and serve as the basis for policy discussions.

Importance of 10th Amendment

There is great irony in the fact that education is not recognized as a fundamental right (San Antonio Independent School District v. Rodriguez, 1973) under the Federal Constitution, but the Supreme Court has affirmed that "education is perhaps the most important function of state and local governments” (Lemon v. Kurtzman, 1971; Tinker v. Des Moines Independent Community School District, 1969). John Adams, Benjamin Rush, and George Washington understood the need for education. Adams observed that “nothing is more effective in countering political oppression than the general diffusion of knowledge; Rush called for states to be tied together by one system of education and Washington stated during his farewell address that American people need to promote as an object of primary importance, institutions for the general diffusion of knowledge (Alexander & Alexander, 2012). Still, On December 15, 1791 representatives from the U.S. reached a compromise “state’s rights” amendment so the U.S. Constitution could be ratified. As stated, this compromise paved the way for some unforeseen consequences that continue to influence schools. This compromise on “states’ rights” allowed powers to ratify the U.S. Constitution which continues to drive policy about American children’s education in a world that is different from that of its signers. The 10th Amendment ultimately determined that each state should control the structure of its educational system. Since the U.S. Constitution does not directly address education, by default, states control their education systems which means education remains primarily a state and local responsibility (Owings, Kaplan, Myran, Doyle, 2017). The duty to educate is a well-established American principle, but its legal basis rests in the 10th Amendment.

Who has the responsibilities to make decisions among nation, state, and local authorities is a much debated topic in education policy. According to OECD’s Education at a Glance (2018) most country decisions on instruction are predominantly made at the school level; decisions on resources are made at the local level; and decisions made regarding planning and structures, personnel management are made at the state level. Decisions about finances, resources, organization of instruction, programs of study, selection of study taught, and instruction time are often made at various levels. Planning and structures, which include design of programs of study, selection of programs of study taught in a particular school; choice of subjects taught in a particular school; definition of course content, are many heavily influenced variables by each state. In fact, 33% of decisions made regarding planning and structures come from the state level. The United States exceeds the OECD average of 13% making the case that research is needed to understand the significance of the policy that stakeholders are responsible for creating and implementing (OECD, 2017). Developing and strengthening education policies can make education more inclusive as well as provide options for students after they graduate high school.

Fifty separate states plus the District of Columbia and territories departments of education, each of which sets policies on the age when children are required to begin and end formal schooling, course lengths, compulsory attendance, school funding formulas, and optional subjects to be taught, lesson frequency and length, number of days in the school year, and class sizes. Moreover, union and right to work states – where unions negotiate, or state legislatures set salaries with local school board adoptions – also vary from state to state. And, while each state controls its fundamental system of education, education is administered at the local level. Schools are primarily the responsibility of the state and all have pursued a variety of policies the affect quality in schools. States function autonomously, implying considerable differences in regulations and operations exist across states.

Contextual Framework

Given the strong evidence that NAEP scores and graduation rates are higher among certain states, it is worthwhile to question which policies (state per pupil expenditure, compulsory attendance, graduation rates, and instructional hours) are misguided or based on false assumptions.

State policies are powerful instruments that are necessary for organizational structure. Since schools affect the lives of their students, it is essential to examine policies that state and local school organizations implement. When an educational crisis is perceived, policymaking will occur (Silver, 1990). State educational policy is an important component when surveying the future of public-school education. However well-intended state education policy may be in achieving increased student learning, the link between the policy and increased student learning requires further examination. Since schools affect the lives of their students, it is essential to examine policies that state and local school organizations implement. Using an equity perspective, this research compares state educational systems within the U.S., such as curricula, school finance resources, and student outcomes. Using Michael Fullan's change theory, which states that it takes 5 to 7 years for change to be systemic, we will investigate the effects of time lags on student outcomes.

Organization of the Study

This chapter began with an introduction of the study as an investigation of the extent to which state policies, including state per pupil expenditure, compulsory attendance, graduation credits, and instructional hours predict NAEP scores and graduation rates. Chapter one also includes background information, purpose statement, problem statement, definition of key terms, and the importance of this study. The research questions are discussed as well as a brief overview of the study. Finally, in chapter one, delimitations and assumptions are included to explain, in a detailed manner, with clear parameters of the study. Chapter two includes a review of the current literature which examines the effects of each variable and the impact the variable has on education. In chapter three, the methods used to conduct the study is explained along with the research design, sample sizes, procedures, and data collection procedures. Also included are detailed steps of data analysis and hypothesis statements. Limitations and delimitations are detailed in the final portion of chapter three. Chapter four includes an overview of the findings, as well as tables, figures, and descriptive information. Chapter five summarizes the findings and provides implications for practice and recommendations for future research.

Purpose Statement

The purpose of the study is to evaluate the results of school policies on NAEP scores that aim to establish conditions for school reform efforts regarding the factors the researcher is examining at the state level. This is measured using a quantitative data analysis. There is a lack of consistency between state policies that results in reliability issues in using select policies to measure state effectiveness.

Problem Statement

This study measures the impact that varying state expenditures, curricula, funding, compulsory attendance laws, and graduation credits have on both NAEP scores and graduation rates. It further addresses the problem that many states have differing policies, with a comparison of graduation rates and NAEP Scores.

Importance of the Study

The intent of studying graduation rates and NAEP assessment data in the U.S. was beneficial to the researcher due to the personal, professional, and practical implications. Academic failure and success have been at the center of educational policies for many years (Nieto, 2010). The results from this study may provide direction for states, and district level leaders as to which state policy reform efforts are needed for an increase in graduation rates and NAEP scores. The results will also benefit states that are currently considering changes in compulsory education laws, curricula, or amount of instruction time. Additionally, given the fact that few studies explore multiple variables and their relationship to NAEP scores and graduation rates, this study is timely and important for the future of education and state policy reform efforts. The results of this study could provide information to Federal, state, and local level policy makers with information about which variables including, compulsory attendance, required course credits, instructional hours, predict NAEP scores and graduation rates. With such knowledge, school officials could implement or modify current policies that are found to be a significant indicator of NAEP achievement.

Research Questions

Research questions should guide the direction of the study, give it focus, and serve as the "directional beam for the study" (Lunenburg & Irby, 2008). This study sought to identify the variables predictive of NAEP scores and graduation rates. The following questions were considered throughout this study:

1. What is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing?
    a. What are the effects of increasing or decreasing slope on graduation rates?
    b. Is there a relationship following a 3, 5, or 10-year time lag on graduation rates?
2. What is the relationship between the 2008 and 2012 NAEP cohorts in 4th and 8th grade English Language Arts scores, math scores, and 2016 graduation rates?
3. What is the relationship between 4th grade reading and math NAEP scores and state fiscal effort?
4. What is the relationship between 8th grade reading and math NAEP scores and state fiscal effort?

5. What is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?

The approach of this study was quantitative. Data regarding NAEP scores, state expenditures, graduation rates, graduation credits, compulsory attendance, and instructional hours, were retrieved from the NCES.gov website. Data from the 2015-2016 school year was used. Data retrieved reflected student math and reading NAEP scores in 4th, 8th, and 12th grade. Each state reporting data to the NCES.gov website was utilized in this study. Each research question was investigated using a correlation and stepwise regression for predicting NAEP scores and graduation rates.

Delimitations

This study was delimited in several ways: math and reading NAEP assessments were limited to a single measure over a single year in 4th, 8th, and 12th grades; however, I look at several years of instruction leading up to the single test. Time of instruction is calculated without factoring in how much time was designated to math and reading. There are programs that exist outside of the compulsory attendance ages that are set forth by the state. There are a limited number of schools that are selected in each state. Students with disabilities are permitted to opt out of testing and, in some cases, are not tested at all.

Assumptions

I am assuming that compulsory attendance that state requires are the ages that students attend. Curriculum and instruction are based on minimums, some divisions can exceed that expectation. There is a great deal of variance in state standards, and furthermore, these standards are not aligned to NAEP test. The data came from the NCES website and are deemed accurate and reliable.

Definition of Key Terms

In the field of education, teachers, researchers, legislators, and the general public may refer to similar term or concepts by using different names and acronyms. The following section includes clarification of terminology central to this study:

Adjusted cohort graduation rate (ACGR) - State education agencies calculate the ACGR by identifying the "cohort" of first-time 9th-graders in a particular school year. The cohort is then adjusted by adding any students who transfer into the cohort after 9th grade and subtracting any students who transfer out, emigrate to another country, or die. The ACGR is the percentage of students in this adjusted cohort who graduate within 4 years with a regular high school diploma. (NCES)

Compulsory attendance - Compulsory school attendance refers to the minimum and maximum age required by each state in which a student must be enrolled in and attending public school, or some equivalent education program defined by the law. (ecs.org/clearinghouse)

Equity - refers to the principle of fairness, equity encompasses a wide variety of educational models, programs, and strategies that may be considered fair. (http://edglossary.org/equity/)

Graduation Credits (Carnegie Units) - Credit hours or units that represent a mathematical summarization of all work completed and are not the same as the actual classroom contact or instructional hours. A unit would represent a single subject taught for one classroom period for five days a week. (ed.gov)

Graduation Rates - The four-year adjusted cohort graduation rate strictly adheres to section 1111(b) (2) (C) (vi) of the ESEA, which defines graduation rate as the "percentage of students who graduate from secondary school with a regular diploma in the standard number of years."

Instructional Hours - Hours that students are provided the opportunity to engage in educational activity planned by and under the direction of school district staff, as directed by the administration and board of directors of the district.

NAEP - The largest continuing and nationally representative assessment that measures what U.S. students know and can do in various subjects across the nation, states, and in some urban districts. Also known as The Nation's Report Card, NAEP has provided important information about how students are performing academically since 1969. NAEP is given to a representative sample of students across the country. National results are available for all subjects assessed by NAEP. State and selected urban district results are available for mathematics, reading, and (in some assessment years) science and writing. (https://nces.ed.gov/nationsreportcard/about/)

10th Amendment – The section of the Bill of Rights that states that any power that is not given to the federal government is given to the people or the states.

CHAPTER II

Literature Review

Using an equity perspective, this literature review analyzes student achievement results across states to determine which public education policies are most critical to ensuring student outcomes. Inequalities among states affect student outcomes. Curricula, funding, and policies such as compulsory attendance, graduation credit requirements, and instructional hours may partially explain why states differ in terms of their NAEP scores. There are large differences across the U.S. in instructional time, graduation credits, and compulsory attendance, which lead to dissimilarities in student assessments, and graduation rates. While research in recent years provides convincing evidence about the effect of several inputs in the education production function, there are limited connections on the effect of classroom instructional time (Lavy, 2009), a positive relationship between educational achievements and when a student begins school (Fletcher & Kim, 2016). U.S. graduation rates are a key indicator of school success (Murnane, 2013; Warren, & Halpern-Manners, 2009) and have slowly increased from 79% in 2010 to 83% in 2016 (Snyder & Dillow, 2017, Table 219.46). Little research exists which describes the relation between graduation requirements and graduation rates.

There is substantial variance in the way states fund education, mandate ages for compulsory education, provide instructional hours in core academic subjects, and determine the number of credits needed to graduate. These differences at the state level have led to some states with graduation rates above 90%, such as Iowa and New Jersey, and others stuck around 70%, such as Washington D.C. and Nevada (Snyder & Dillow, 2017, Table 219.46). The adjusted cohort graduation rate for public high school students was lowest in the following states: District of Columbia at 69%, New Mexico at 71%, and Nevada at 74% in 2015. This is a stark contrast to the top graduation rates for the following states: Iowa at 91%, New Jersey, and West Virginia at 90%. In addition, there are 6 states that are below 76%, and 18 states that are at 87% or above.

The U.S. Constitution, according to the 10^{th} amendment, delegates the governance of public-school education to each state. Even when policies are crafted at the federal level, states are tasked with understanding the change and providing their own interpretation (Duncan, & Murnane, 2014). The federal government defers to states' decisions about curricula, compulsory attendance, teacher salaries, per pupil expenditures, and graduation requirements. Fifty different education models can deliver a powerful research benefit in the long run if investigators are able to recognize the effective and ineffective models. Recognizing what works can assist as a blueprint to other states in refining and adapting successful policies. Gauging the effects of different levels and uses of resources and changing state policies could provide critical information for improving schools and overall student performance.

States have control over schools' access to instruction by mandating the number of days and hours of a school day, setting the amount of credits a student must obtain before graduation, and the age when students begin school. Exploring the relationship these inputs have on student assessments, specifically the NAEP test, this study describes the correlations between the states that have shown gains while others remain stagnant or fall behind. Policy reforms are constant and affect the way schools operate. These efforts are driven by evidence that the age of schooling differs, amount of instruction students receive is highly variable, and that substantial variance exists in course requirements for secondary education from state to state (Borg, 2001; Corey, Phelps, Ball, Demonte, & Harrison, 2012). States must recognize that the amount of time students spend on instruction and what they are learning (Clune & White, 1992; Kubitschek, Hallninan, Arnett, & Galipeau, 2005; Lavy, 2015) has an impact on student achievement (Rivkin, & Schiman, 2015).

State-by-State Comparison of Education Variables

Over 50 million students enrolled in public K-12 schools (Snyder & Dillow, 2017, Table 203.20) are taught by nearly 3 million adults each day (Snyder & Dillow, 2017, Table 208.40). State governments face a constant challenge to create equitable schools through various policies. State policy makers have control over preschool access, compulsory attendance, required lengths of the day and year, courses and credits needed for high school graduation, and how much money is spent each year. Each of those variables affects student achievement outcomes. I chose those variables related to student outcomes because the data were readily available; the variables are not intended to be all inclusive. Policies and programs set at the state level influence school capacity and student achievement (Newmann, King, & Youngs, 2000).

State per pupil revenue and expenditure. Public school systems are being held more accountable for the money spent on education. According to the most recent Digest of Education Statistics, (2017) the United States spent over $575 billion on public, K-12 schools (Snyder & Dillow, 2017, Table 236.25), including an average of $11,445 per student for public schools (Snyder & Dillow, 2017, Table 236.65). On average, the U.S. public school funding is comprised of three basic sources: federal (8.5 %), state (46.3 %), and local (45 %) sources (Snyder & Dillow, 2017, Table 235.10). Funding continues to shift away from federal sources, and more to states. In 2009, federal revenues were at $85,087,024 (about 12.7% of the budget) and decreased to $56,398,350 by 2014-2015. This decrease in federal funds shifted more responsibility to the state and local levels. State funds comprised 43.4% of total revenue in 2009 and now account for 46.6% of the total budget. That same time frame showed local funds increased from 43.8% to 45%. State policies attempt to provide minimum compliance guidelines, but this minimum standard often leaves localities with the financial burden. Localities are tasked with funding schools when the states do not provide enough to ensure that school divisions are equitably funded. Wealthier localities are at an advantage to provide funding for schools, leaving low-capacity localities at a disadvantage to attract high quality teachers, and decrease achievement gaps (Owings, & Kaplan, 2020).

As previously stated, there is large variance among how federal, state, and local finances are distributed. For example, the range in federal revenue sources runs from a high of 14.8% in Mississippi, to a low of 4.2% in New Jersey. State revenue sources range from a high of 90.1% in Vermont to a low of 30.4% in South Dakota. Local revenue sources vary from Illinois's 58.8% to Vermont's 3.9% (Snyder & Dillow, 2017, Table 235.20). As Table 1 depicts, there is a huge discrepancy between the amounts of money each state spends per pupil. When comparing each state, it is evident that inconsistencies in funding exits. When exploring the total amount of per pupil expenditures, including federal, state, and local contributions, 18 states spend between $7,000 and $9,999; 22 States spend between $10,000 and $14,999, 9 states spend between $15,000 and $19,999; and 2 states spend over $20,000 per student. There is a difference of $15,225 between Utah and New York, the lowest, and highest spending per pupil in the U.S.

Table 1

Breakdown of Spending on Education Per Pupil by State, 2017

State	PPE (Rank)	State	PPE (Rank)
Alabama	9,258 (10)	Montana	11,374 (26)
Alaska	17,510 (46)	Nebraska	12,379 (34)
Arizona	7,772 (3)	Nevada	8,753 (7)
Arkansas	9,900 (17)	New Hampshire	15,535 (42)
California	11,420 (27)	New Jersey	19,041 (48)
Colorado	9,619 (13)	New Mexico	9,959 (18)
Connecticut	19,615 (49)	New York	22,231 (51)
Delaware	14,397 (39)	North Carolina	8,717 (6)
DC	21,135 (50)	North Dakota	13,358 (35)

Florida	9,176 (9)	Ohio	11,933 (32)
Georgia	9,835 (16)	Oklahoma	8,091 (4)
Hawaii	13,748 (36)	Oregon	10,823 (22)
Idaho	7,178 (2)	Pennsylvania	15,165 (41)
Illinois	14,327 (38)	Rhode Island	16,082 (43)
Indiana	9,691 (14)	South Carolina	10,045 (19)
Iowa	11,148 (24)	South Dakota	9,335 (11)
Kansas	10,216 (20)	Tennessee	8,876 (8)
Kentucky	9,831 (15)	Texas	9,352 (12)
Louisiana	11,169 (25)	Utah	7,006 (1)
Maine	14,202 (37)	Vermont	19,023 (47)
Maryland	14,523 (40)	Virginia	11,435 (29)
Massachusetts	16,986 (45)	Washington	11,484 (30)
Michigan	11,051 (23)	West Virginia	11,424 (28)
Minnesota	12,364 (33)	Wisconsin	11,664 (31)
Mississippi	8,692 (5)	Wyoming	16,431 (44)
Missouri	10,385 (21)		

Source: Adapted from Digest of Education Statistics, 2017, Table 236.65.

Challenging the constitutionality of inequalities in financing in California public schools, Serrano v. Priest (1971) stated that

> "Recognizing as we must that the right to an education in our public schools is a fundamental interest which cannot be conditioned on wealth, we can discern no compelling state purpose necessitating the present method of financing. We have concluded, therefore, that such a system cannot withstand constitutional challenge and must fall before the equal protection clause" (Serrano v. Priest 1971).

Serrano v. Priest was a defining moment when the California Supreme Court stated that all school districts must spend equal amounts per pupil for all students (Vasquez, Ward, Weisman, & Horsford, 2014). California recognized the importance of an equitable finance plan for their students. However, just adding money to a school's budget does not systematically lead to higher student achievement in schools.

The impact of the school resources on student outcomes has been a debated topic since the Coleman Report (1966), and parents, and citizens are still concerned about the effectiveness of their tax dollars (Lafortune, Rothstein, & Whitmore, 2016; Duncan, & Murnane, 2014). State policymakers are charged with developing school finance formulas to ensure student outcomes continue to improve. School finance reforms have affected every student, parent, school, and teacher, making it imperative to understand how school spending can lead to an optimal investment in society. State expenditures are directly tied to other variables in this study: compulsory attendance, instructional hours, and graduation rates. When states make minor changes such as increasing compulsory attendance ages, there may be a change in fiscal effort. For example, if Pennsylvania was to lengthen their compulsory attendance time from 8 to 17 to something similar to Virginia, 5 to 18, that will require more staffing, resulting in more spending. The same notion can be applied to more instructional time, and more credits for students to attain to graduate. When more resources are needed, the financial budget of the division can increase, or cuts would need to be made because of changes; school finance drives policy and practice in education (Reyes, & Rodrigues, 2004). Research affirms that total dollars and how they are spent have a positive impact on student achievement (Greenwald, Hedges, & Laine, 1996; Hanushek, 2016; Hedges, Laine, & McLoughlin, 1994; Jackson, Johnson, & Persico, 2015). More well directed resources can also mean smaller class sizes, smaller teacher-to-student ratios, and additional academic supports and enrichment that can make meaningful contributions to student achievement outcomes.

According to Hanushek (2016),

> "How money is spent is much more important than how much is spent. Just providing more funds to a typical school district without any change in

> incentives and operating rules is unlikely to lead to systematic improvements in student outcomes."

Recently, research affirms that total dollars and how they are spent have a positive impact on student achievement (Hanushek, 2016; Johnson, Johnson, & Persico, 2015).

Card and Payne (2002) identified changes in states, after court-mandated school finance reforms, that reduced Scholastic Assessment Test (SAT) score gaps between low- and high-income students. The research is important because the SAT is administered nationally and is an important national metric for student performance. However, it needs to be mentioned that not all students participate in the SAT. After spending equalizations from court-mandated reforms, 12 states over the 1980s closed the gap in average SAT scores between children with highly educated parents and poorly educated parents by about 8 points. Hoxby (1996) believes that rising spending has not brought higher average student performance and students from disadvantaged backgrounds have not benefited from the increase on their schooling. Despite Hoxby's belief that we spend too much on education, she did state that drop-out rates are lower when school finance reforms shift funds from the high to low poverty schools (2001). Downes and Figlio (1997) would disagree, and suggest their evidence represents that court-mandated school finance reforms have led, on average, to increased student performance. This conundrum has led researchers and policy makers to question if more money will produce better student achievement.

State fiscal effort. Fiscal effort measures how much a locality, state, or nation spends of its resources in relation to capacity or their ability to pay (Owings, & Kaplan, 2020). Fiscal effort is substantial because a richer state may have a higher per pupil expenditure than a less wealthy state, however, the less wealthy state may really be spending more of its revenue towards education.

Money is positively related to student performance (Greenwald, Hedges, & Laine, 1996) and even more important than a state's fiscal commitment to schools is how the money is spent (Hanushek, 1996; Owings & Kaplan, 2020). Hanushek (1996) argued that school resource variations are not closely related to variations in student outcomes and, by implication, aggressive spending is unlikely to be a good investment for schools. Updating previous research, Hanushek (1996) reviewed close to 400 studies of student achievement to "demonstrate that there is not a strong or consistent relationship between student performance and school resources." While resources alone may not be enough to guarantee achievement, "adequate resources are surely needed" (Hanushek, 2007). Hanushek (2016) later found that "how money is spent is much more important than how much is spent". Just providing more funds to a typical school district without change in incentives and operating rules is unlikely to lead to systematic improvements in student outcomes. Research indicates that instructional practices, such as a rigorous curriculum, effective instructional strategies, proper classroom management techniques (Chetty, Friedman, & Mascall, 2011), and effective school leaders (Leithwood, & Mascall, 2008) result in increased student achievement.

Jackson, Johnson, and Persico's (2015) research revealed that a 10% increase in pupil spending each year for all 12 years of public education has many benefits. The benefits to increased spending lead to 0.31 more completed years in education, about 7 % higher wages, and a 3.2 %-point reduction in the annual incidence of adult poverty. The research showed that among low income students, increasing spending by 10% over a student's educational career increases the likelihood of graduating high school between 5.6% and 19.3%. The impact was much smaller for more affluent students. Increasing school funding alone does not guarantee the positive impacts stated from the research of Jackson et al. (2015), it is how the money is spent that is critical (Ellison, 2015; Hanushek, 2016)

Hours of required instruction. Former U.S. President Barrack Obama stated during his speech to the US Hispanic Chamber of Commerce (2009) that American children should go to school longer, either staying late or attending longer into the summer or both. Instructional time is one of many factors that impact student achievement (Hattie, 2009) and most researchers have identified a positive, but weak, non-statistically significant relationship between quantity of schooling and achievement (Walberg, 1988). Kidron and Lindsay's (2014) meta-analysis examined more than 7,000 studies and identified 30 that used research designs capable of yielding strong evidence about the outcomes of increased learning time. Although the effects were small, increased learning time programs improved literacy and math achievement. Additionally, the findings also showed that increased learning time can benefit students at risk of academic failure, and among programs that identified specific subgroups and used explicit instruction to teach, there was a positive effect on student outcomes. Evidence from a sample of over 50 countries consistently show that additional instructional time has a positive and significant effect on test scores (Lavy, 2015). Instructional time is so dependent on its relationship to other variables, such as teacher quality and curriculum, it is difficult to measure as a stand-alone variable (Baker, Fabrega, Galindo, & Mishook, 2004).

In the U.S., each state sets the number of required instructional time in terms of hours, days, and/or subjects. To ensure that all students receive at least a minimum amount of instruction, policy makers have defined the length of the school year, the hours in a school day, and the amounts of daily instruction devoted to core subject areas. Most states require between

175 and 180 days of school (see Table 2) and/or between 900 and 1,000 hours of instructional time per year, depending on the grade level (Snyder & Dillow, 2017, Table 234.20).

Table 2

Minimum Amount of Instructional Time per Year in Days, by State

State	**Days**	**State**	**Days**
Alabama	180	Montana	ND
Alaska	180	Nebraska	ND
Arizona	180	Nevada	180
Arkansas	178	New Hampshire	180
California	180	New Jersey	180
Colorado	160	New Mexico	180
Connecticut	180	New York	180
Delaware	ND	North Carolina	185
DC	180	North Dakota	175
Florida	180	Ohio	182
Georgia	180	Oklahoma	180
Hawaii	180	Oregon	ND
Idaho	ND	Pennsylvania	180
Illinois	180	Rhode Island	180
Indiana	180	South Carolina	180
Iowa	180	South Dakota	ND
Kansas	186	Tennessee	180
Kentucky	170	Texas	180
Louisiana	177	Utah	180
Maine	175	Vermont	175
Maryland	180	Virginia	180
Massachusetts	180	Washington	180
Michigan	175	West Virginia	180
Minnesota	165	Wisconsin	180
Mississippi	180	Wyoming	175
Missouri	174		

Note: *ND = No data

Source. Adapted from Digest of Education Statistics, 2017, Table 234.20

The states vary from a low minimum amount of 160 days in Colorado, compared to a high of 186 days required by several states, including Pennsylvania, Tennessee, California, and several others. For the 2015 school year, average U.S. school year consisted of 36 weeks, 180 days, encompassing 1,097 hours in elementary education, 1,068 hours in lower secondary schools, and 1,051 hours in upper secondary schools. The number of hours per year ranged from 356 to 951 in kindergarten, from 720 to 1,116 in elementary grades, and 720 to 1,137 in secondary education. Table 3 depicts the minimum amount of instructional time per year in hours. This variance begs a question. These time differences may explain some of the variance across states in student achievement and graduation rates. The following evidence can be very important for state policy makers because instructional time is an input that can be increased relatively easily and there is much scope for such an increase in many states (Lavy, 2009).

Table 3

Minimum Amount of Instructional Time per Year in Hours, 2017

State	**Hours/Grade Level**	**State**	**Hours/Grade level**
Alabama	1080	Montana	360/720\3\ (K); 720\3\ (1-3); 1,080\3,17\ (4-12)
Alaska	740 (K-3); 900 (4-12)	Nebraska	400 (K); 1,032 (1-8); 1,080 (9-12)
Arizona	356 (K); 712 (1-3); 890 (4-6); 1,000 (7-8); 720 (9-12)	Nevada	ND
Arkansas	ND	New Hampshire	450 (K); 945 (Elementary); 990 (Middle); 990\17\ (High)
California	600 (K); 840 (1-3); 900 (4-8); 1,080 (9-12)	New Jersey	ND
Colorado	435/870\2\ (K); 968\2\ (1-5); 1,056\2\ (6-12)	New Mexico	450/990 (K); 990 (1-6); 1,080 (7-12)
Connecticut	450/900 (K); 900 (1-12)	New York	ND
Delaware	1,060 (K-11); 1,032 (12)	North Carolina	1025
DC	ND	North Dakota	ND
Florida	720 (K-3); 900 (4-12)	Ohio	455/910 (K); 910 (1-6); 1,001 (7-12)
Georgia	ND	Oklahoma	1080
Hawaii	1080	Oregon	450/900 (K); 900 (1-8); 990 (9-11); 966 (12)
Idaho	1080	Pennsylvania	450 (K); 900 (1-8); 990 (9-12)
Illinois	ND	Rhode Island	1080
Indiana	ND	South Carolina	ND

Iowa	1080	South Dakota	437.5 (K); 875 (1-5); 962.5\17\ (6-12)
Kansas	465 (K); 1,116 (1-11); 1,086 (12)	Tennessee	ND
Kentucky	1062	Texas	1260
Louisiana	1062	Utah	450 (K); 810 (1); 990 (2-12)
Maine	ND	Vermont	ND
Maryland	1,080; 1,170 (9-12)	Virginia	540 (K); 990 (1-12)
Massachusetts	425 (K); 900 (1-5); 990 (6-12)	Washington	1,000 (K-8); 1,080 (9-12)
Michigan	1,098	West Virginia	ND
Minnesota	425/850 (K); 935 (1-6); 1,020 (7-12)	Wisconsin	437 (K); 1,050 (1-6); 1,137 (7-12)
Mississippi	425 (K); 900 (1-5); 990 (6-12)	Wyoming	450 (K); 900 (El); 1,050 (Middle); 1,100 (Secondary)
Missouri	522 (K); 1,044 (1-12)		

Source. Adapted from Digest of Education Statistics, 2019, Table 234.20

Corey, Phelps, and Ball (2012) state that students attending schools two standard deviations higher than a comparable school on the distribution of school time could expect to receive 85 additional hours of instruction in ELA and 53 hours in mathematics. Additionally, the authors found "positive effects of staying in school longer." Increases in time spent on different elementary school subjects usually leads to significantly greater achievement (Hill, Rowan, & Ball, 2005). Increasing instructional time can dramatically increase the amount of instruction students receive. Historically, the amount of instructional time has a significant positive effect on learning (Rizzuto & Wachtel, 1980; Card & Krueger, 1992; Betts, 1998). Lavy (2009) suggested that instructional time has a positive and significant effect on academic achievement; furthermore, that on average one hour of instruction per week in math, science or reading raises the test score in the subjects by 0.15 of a standard deviation of the within student distribution.

Phelps et al. (2011) understand the importance of instructional time, and while state policy and school improvement efforts focus on curriculum reform, a wide gap still exists between regulations and plans that specify things such as the actual amount of instruction students receive. Recent research supports the idea that additional instruction time raises student achievement (Rivkin, & Schiman, 2015). Rivkin, & Schiman, (2015) used the PISA test (2009) because of "the richness of information on instruction time and the availability of measure about classrooms." Students were asked the number of math, science, and English classes attended per week, and the length in minutes. This allowed the researchers to examine the effects of instructional time which concluded that achievement increases with instruction and time. It should be noted that the increases varied by both the amount of time and the classroom environment. Fuller (1987) identified that length of instruction stands out as a consistent predictor of student achievement. Indicators range from the number of days in the school year to how many hours that science is studied during the school week; in summary, the length of instruction was significantly related to student achievement in 12 out of 14 analyses.

Preschool education. During the early elementary years, children learn basic social and academic skills (Chang & Romero, 2008) that are critical to their academic success. Furthermore, advances in neuroscience and research have helped demonstrate the benefits of quality early education for young children (Yoshikawa et al., 2013). By supporting development when children are very young, early childhood programs can yield large benefits. The *Economics of Early Childhood Investments* released by the Council of Economic Advisers (2015) shows that a strong focus on early learning provides benefits to society of roughly $8.60 for every $1 spent.

Currently, 53.8% of U.S. children ages 3 and 4, attend preschool (Snyder & Dillow, 2017, Table 103.10), and low-income children are least likely to be enrolled in preschool programs (Balfanz & Byrnes, 2012; Connolly & Olson, 2012; Magnuson & Duncan, 2016). In comparison, four OECD countries have 99% of children ages 3 and 4 enrolled in preschool education. U.S. preschool enrollment is at 5% for 3-year-olds and increases to 33% for 4-year-olds. Digging deeper, states range from 0% to 66% for 3-year-olds, and 0% to 88% for 4-year-olds. 22 states have no programs for 3-year-olds, and 7 states have no programs for 4-year-olds (Friedman-Krauss, Barnett, Garver, Hodges, Weisenfeld, & DiCrecchio, 2018).

Research has clearly established that early childhood education has a positive impact on students' later academic achievement (Connolly & Olson, 2012; Chang & Romero, 2008); social benefits (Barnett & Frede, 2010); and pays off later in life with decreases in poverty, obesity, depression, and other health ailments (Ludwig & Miller, 2007). Claessens, Engel, and Curran (2014) found a consistent and positive effect of exposure to advanced content for all children in both reading and mathematics. Early childhood education is even more important for students who come from low socioeconomic status, and minority students (Barnett, 2008, Bassok, 2010, Duncan, & Murnane, 2014).

Balfanz and Byrnes (2012) stated that

> "Because students reared in poverty benefit the most from being in school, one of the most effective strategies for providing pathways out of poverty is to do what it takes to get these students in school every day…this will drive up achievement, high school graduation, and college attainment rates."

When children from poverty start kindergarten, they perform worse on academic assessments (Cascio, & Schanzenbach, 2014), and according to Duncan and Magnuson (2011) teachers report that children from poverty have a more difficult time paying attention and exhibit more behavioral problems. In a randomized trial, children in full day preschool improved almost twice as much on vocabulary and math tests as children in half day programs. The added hours of preschool education were substantially effective. Children in the full day program had improved 11 to 12 standard points on vocabulary and math skills, as compared to improvements of 6 to 7 standards points in vocabulary and math skills (Robin, Frede, & Barnett, 2006). It is important to note that the research showed gains in both groups of students attending preschool. Similarly, on average, cognitive effects of full day Head Start centers are 0.14 standard deviations larger than centers that do not offer a full day service (Walters, 2015). There is a major need to increase access to education at a lower age, especially when children from low socioeconomic families enter kindergarten as much as one standard deviation behind high socioeconomic peers in reading and math (Lee & Burkam, 2002).

Improving access to early childhood education must be a priority for policy makers. Recent research suggests that the effects of attending preschool varies by race (Bassok, 2010), and socioeconomic status (Herman-Smith, 2012). The majority of students who attend preschool from minority populations or low-income families arrive at school well behind their peers. Researchers have long revealed that minority students, and students from low socioeconomic statues have lower achievement and graduation rates (Duncan, and Murnane, 2014). To further complicate this issue, research also shows that quality and access vary across states, and even from one classroom to the next. Bassok (2010) conducted a study and used nationally representative data to examine the impact of preschool participation. The study concluded that, on average, students benefit substantially from preschool participation, and that black children benefit significantly from their involvement with a preschool program. Children that participated in a preschool program, when compared to children that did not, performed about a quarter of a standard deviation higher on a literary assessment.

Early childhood programs are seen as a way to boost academic achievement and improve students' long-term outcomes. Duncan, Ludwig, and Magnuson (2007) stated that "rigorous body of research demonstrates the very intensive early childhood programs can produce lasting improvements in the life chances of poor children." Duncan and Sojourner (2013) studied how early interventions, beginning at birth or age one can reduce or close the achievement gap in education. The study had a total of 985 infants randomly assigned to a comprehensive early childhood group or a control group and showed that when the program ended, "income-based gaps would be essentially eliminated with either a universal or income-based targeted program."

Compulsory attendance. Compulsory attendance is the term used to define the obligation that parents must have their students attend school depending on the guidelines set forth by the state where they live. The first law ensuring compulsory attendance in schools was enacted in Massachusetts in 1852 (Hall, 2005). The U.S. has used compulsory school attendance laws with the expectation or encouragement that students will remain in high school and graduate (Mackey & Duncan, 2013). In January 2012, President Obama called for all U.S. states to extend compulsory schooling to age 18. That recommendation would raise the compulsory school age for 32 states. Compulsory attendance ages in school force parents to send their students to school at a beginning age and through to an exiting age. Logic holds true that students must be in school to learn. An educated populace is necessary to survive and leads to productive and contributing members of society (Leigh, 1998; Owings & Kaplan, 2020). Education is the cornerstone of our nation's success or failure; after all, our present youth will determine our future. Compulsory attendance policies, set forth by states, widely differ regarding the starting and ending ages of students in education. Having an educated population is critical to our democracy. Attendance in school is critical to educating students, and even has ties to educational funding. Federal and state funding is provided to school divisions and schools based on average daily memberships.

Compulsory attendance is uneven, as seven states require 9 years of education, and five states require 13 years of schooling. Table 4 indicates the states' differing expectations for required school attendance.

Table 4

Compulsory Attendance Ages and Years in US, by State

Ages 5-16	**Ages 5-17**	**Ages 5-18**	**Ages 6-16**	**Ages 6-17**	**Ages 6-18**	**Ages 6-16**	**Ages 7-16**	**Ages 7-18**	**Ages 8-17**	**Ages 8-18**	**Ages 7-17**
DE	SC	AL	AR	AL	CA	TX	AK	IN	PA	WA	ME
RI		CT	IA	CO	KY		ID	KS			MA
		DC	FL	IL	MI		MN	LA			MO
		HI	GA	MI	NE		NC	NA			
		MD	MS	WV	NH		ND				
		NY			OH		WY				
		NJ			OR						
		OK			SD						
		VA			TN						
					UT						
					WI						

Source. Adapted from Digest of Education Statistics, 2017, Table 234.10

Start times for children are also uneven, as some states make students begin at the age of 5, while others delay the start until the age of 8, and require attendance until the age of 16; all states have compulsory attendance through the age of 16, seventeen states mandate age 17 or 18 or high school graduation. Seventeen states, including Washington D.C. require students to be in school until they are 18, and there are currently fourteen states in the process of having recently passed legislation to raise compulsory attendance to 18 years old, and another seven are raising the age from 16 to 17 (Snyder & Dillow, 2017, Table 234.10). Between 2010 and 2013, three states reduced compulsory attendance by one year, and two states reduced compulsory attendance by two years.

There seems to be evidence to build a case for or against changing compulsory schooling ages. The main arguments of those in favor for changing compulsory attendance ages are that it will reduce dropout rates (Mackey & Duncan, 2013) which will lead to lower spending on social programs, public safety, and other state lead programs (Bedard & Dhuey, 2012; Li, 2006). Counterarguments are made that changing school ages will result in more cost, and students remaining in school against their will and thus becoming a distraction to others (Mackey & Duncan, 2013).

State policy has trended towards increasing the minimum age children will begin their formal education, as more and more states have been passing or introducing legislation to raise the compulsory attendance laws (Bridgeland, Dilulio, Jr., & Streeter, 2009). Bedard and Dhuey (2012) present evidence that shows the significance of this policy change due to the increase of human capital accumulation; increasing the amount of time in school increases hourly earnings by approximately 0.6%. Expanding the years of education that students are required to complete has financial implications on schools. The Maryland Department of Education (MDOE, 2007) estimated that over $200 million would be needed for additional teachers, and classrooms if they raised the compulsory attendance from 16 to 18. Other states, such as North Carolina, and New York (Landis & Reschly, 2010) have stated the same concern, that increasing compulsory attendance, even with small effects, does not outweigh the financial burden this would cause on states, and localities.

Marburger (2006) suggested that an enforced mandatory attendance policy significantly reduces absenteeism and improves exam performance. Historically, this supports Angrist and Krueger (1991) since their findings indicated that higher compulsory education laws kept some students from dropping out of high school and that students do in fact stay in high school based on the legal age of departure in their respective states. They estimated that approximately “25% of potential dropouts remain in school because of compulsory schooling laws.” The authors also concluded that individuals who attended school longer because of compulsory school attendance laws earned more money later in life (Angrist & Krueger, 1991). Alternatively, Landis and Reschly's (2011) results indicated that the compulsory attendance age had no meaningful relationship with high school graduation. Burhauser (2002) studied Texas and Kansas compulsory schooling ages to determine if New York should raise the age from 16 to 18. Burhauser, and Thomas (2002) concluded that such an increase has been shown to be completely unsuccessful in increasing completion rates and only slightly decreased dropout rates. The U.S. has a dropout issue that needs to be addressed, as almost one-third of all public-school students fail to graduate on time with their class (McFarland, Stark & Cui, 2016). In the 2006 report, *The Silent Epidemic*, the researchers made "concrete" recommendations at the state and federal levels to address the high number of students dropping out. Of the recommendations, there was a call for a re-examination of compulsory age requirements (Bridgeland, Dilulio & Morison, 2006).

When compulsory attendance laws were enacted between the years of 1870-1910, students did not need to graduate to participate in the workforce. However, as times have changed, nearly two-thirds of high growth, high wage jobs require a college degree, but only one-third of Americans have the necessary credentials. New Hampshire Governor John Lynch stated during his inaugural address (January 4, 2017), that

> "Today a high school diploma is the minimum price of admission for most jobs. Yet twenty percent of our young people are dropping out of high school. These young people will not have the opportunities they deserve. Half a high school education in no longer enough. That is why we must increase our compulsory attendance laws from 16-18."

Combined instructional time. Before discussing the importance of graduation rates, it is important to explore the difference in the amount of instructional time a student will receive before they become part of their gradation cohort. As stated earlier, there are considerable differences in state policy, specifically compulsory attendance, days of instruction, and hours of instruction. Nine states require students to start school at age 5, 25 require students to start at the age of 6, with the remaining students starting at the age of 7 or even 8. On closer examination, there are students entering school in Delaware, Maryland, Arkansas, South Carolina, Connecticut, D.C., New Mexico, Oklahoma, and Virginia who receive 3 more years of schooling before students enter school in Pennsylvania, and Washington. Students start school at the age of 5 compared to 8 respectively. The variance in required years of school due to compulsory attendance laws range from the amount of instruction students receive in terms of years, number of instructional hours, and days of instruction widens the gap of time students spend in school. The longest amount of years in school due to compulsory attendance laws is 13, compared to the least amount of years at 9. While most of the schools fall within 175-180 days of instruction, some outliers exist. Minnesota's minimum amount of instructional days per year is set at 165, compared to North Carolina's minimum amount at 185 days. Minnesota and North Carolina are both states that require 9 years of compulsory attendance, with a starting age of 7, but differ in terms of instructional days. A typical 6th grade student in Minnesota starts middle school with a total of 660 days (4 years with 165 days of instruction) compared to a typical 6th grade student in North Carolina starting middle school with a total of 740 days of schooling (4 years with 185 day of instruction). There is a difference of 80 days of instructional time per year between the two states. Comparing states like Connecticut that require 13 years, and 180 days of school to Minnesota further demonstrates the differences in instructional days. Students in Connecticut begin school at the age of 5, and by the time they reach middle school at the age of 11, they have received far more instructional time. In fact, the numbers are staggering: 1,080 days of instruction in Connecticut, compared to 660 days in Minnesota - a difference of 420 days.

Instructional hours also demonstrate huge differences in state policies that impact the amount of time a student spends in school. From the time a student enters school at the age of 5 in Connecticut, they are required to receive at least 900 hours of instructional time until the age of 18, or they graduate high school. Minnesota starts with 850 for students that voluntarily attend kindergarten, increase to 935 hours for students that attend from first grade through sixth grade, and increase once again to 1,020 for the remaining years of their schooling. A student in Connecticut will receive 900 hours of instruction, for 180 days, from the age of 5 through 18. Looking at this in terms of elementary education (K-5), would mean a student would receive 972,000 of instruction before they enter 6th grade compared to a student in Minnesota starting school at the age of 7, receiving 617,000 hours of instruction, equaling a difference gap of 354,900 hours. Oklahoma compulsory attendance law starts at the age of 5, requires 180 days of instructional time and 1,080 hours of instruction per year equals 1,166,400. Compared to Minnesota, that is difference of 549,400 hours of instruction.

Graduation rates. U.S. graduation rates are a key indicator of school success (Messacar & Oreopoulos, 2013) and have remained relatively stable between 1970 and 2000, fluctuating between 88.3% and 88.9%. Table 5 breaks down the graduation rates by state. Graduation rates give an indication of the extent to which education systems are succeeding in preparing students to meet the minimum requirements. While the 10th amendment provided states with substantial latitude to determine the manner in which their graduation rates were calculated, the U.S. Department of Education now mandates that states institute a uniform, cohort-based graduation metric, the Adjusted Cohort Graduation Rate (ACGR). The National Governor's Association adopted a four-year adjusted cohort graduation rate. This signified a commitment among the U.S. states to create a unified measure for reporting graduation rates (National Governors Association, 2005). The first recommendation would be that each state adopt and implement a standard four-year adjusted cohort graduation rate (Graduation rate = [on-time graduates in year x] ÷ [(first-time entering ninth graders in year x – 4) + (transfers in) – (transfers out)]. The ACGR rate for the 2015-2016 class is formulated as follows:

$$\frac{\text{Number of cohort members who earned a regular high school diploma by the end of SY 2015–16}}{\text{Number of first-time 9th-graders in fall 2012 (starting cohort) plus students who transferred in, minus students who transferred out, emigrated, or died during school years 2012–13, 2013–14, 2014–15, and 2015–16}}$$

Table 5

Public High School 4-Year Adjusted Cohort Graduation Rate

State	**ACGR**	**State**	**ACGR**
Alabama	87.1	Montana	85.6
Alaska	76.1	Nebraska	89.3
Arizona	79.5	Nevada	73.6
Arkansas	87	New Hampshire	88.2
California	83	New Jersey	90.1
Colorado	78.9	New Mexico	71
Connecticut	87.4	New York	80.4
Delaware	85.5	North Carolina	85.9
DC	69.2	North Dakota	87.5
Florida	80.7	Ohio	83.5
Georgia	79.4	Oklahoma	81.6
Hawaii	82.7	Oregon	74.8
Idaho	79.7	Pennsylvania	86.1
Illinois	85.5	Rhode Island	82.8
Indiana	86.8	South Carolina	82.6
Iowa	91.3	South Dakota	83.9

Kansas	85.7	Tennessee	88.5
Kentucky	88.6	Texas	89.1
Louisiana	78.6	Utah	85.2
Maine	87	Vermont	87.7
Maryland	87.6	Virginia	86.7
Massachusetts	87.5	Washington	79.7
Michigan	79.7	West Virginia	89.8
Minnesota	82.2	Wisconsin	88.2
Mississippi	82.3	Wyoming	80
Missouri	89		

Source. Adapted from Digest of Education Statistics, 2017 Table 219.46

During the late 1960s, U.S. high school graduation rates were ranked number one among the OECD countries. However, among the nineteen OECD countries, the U.S. now ranks thirteenth in terms of school graduation rates (OECD, 2017). Despite an increase in the number of students graduating from high school, the U.S. is still well below the OECD average of 87% (OECD, 2017).

A recent study by Moussa (2017) explored the relationship between compulsory attendance on high school graduation and grade attainment. The research found that compulsory attendance impacts graduation. An additional year of compulsory attendance leads to an increase of 9% to 12% in the probability of continuing to grade 11, and 12, and significantly raises the likelihood of graduating from high school by 9% to 14% (Moussa, 2017). Given the importance of high school graduation and importance of attaining skills to become productive contributors of society (Hanushek & Woessmann, 2008), it is vital to explore the relationships that impact graduation rates. Increasing high school graduation rates will require a set of "complimentary investments and structural changes" (Murnane, 2013) at the federal, state, and local levels. Students who fail to graduate and drop out of school culminate a long-term process of disengagement from school which has profound social and economic consequences for students, families, and society (Bromberg & Theokas, 2016). Students who drop out of high school are more likely to be unemployed, earn less than those who graduate, be on public assistance, and end up in prison (Owings & Kaplan, 2020). According to a report on high school graduates in 2000, 56% of high school dropouts were unemployed, compared to 16% of high school graduates (Stanard, 2003). Census Bureau estimates have placed the median weekly income of a high school dropout in 2015 at $493, compared to $678 for a high school graduate; that is a $9,620 gap between the groups for each year. Studies show that a high school diploma alone is not proficient enough to prepare them for well-paying jobs in today's job market. Additional work at community college skills, or trade skills will be necessary.

Required graduation credits. Studies largely support the importance of this policy because the level of academic rigor is a primary influence on student achievement (Bryk, Lee, & Smith, 1990; Clune & White, 1992). While Clune and White (1992) explored changes in graduation requirements and showed that previous research based on this notion suggest that increased requirements would have their primary impact in the few states that set requirements above the average of preexisting academic course taking. Schools continue to reform and experiment with their own strategies, all aimed at preparing the youth for graduation. Higher graduation requirements are associated with increased course taking (Clune & White, 1992, Federman, 2007) and student achievement appears largely tied to courses (Chaney, Burgdorf, & Atash, 1997; Long, Conger, & Iatarola, 2012). States have varying requirements for graduation, but have increased course requirements, instituted high school exit exams, and adopted new standards (Bromberg & Theokas, 2016).

The U.S. Department of Education publication of *America's High School Graduates* (2011) found that graduates with stronger academic records earn higher NAEP scores. Additionally, graduates who completed an Advanced Placement (AP) of International

Baccalaureate (IB) mathematics or science course in ninth grade or a rigorous curriculum had average NAEP scores at the *Proficient* level in the respective courses, as compared to graduates that completed a midlevel or standard curriculum had average NAEP scores at the *Basic* level (U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics, 2017). This is a significant finding because approximately 20,100 of the graduates included in the transcript study also participated in the twelfth grade NAEP mathematics or science assessment. This allows for the comparison of course-taking patterns and achievement levels based on the NAEP assessment.

Substantial variance exists in course requirements for secondary education from state to state. Carnegie credits required to graduate vary from a low of thirteen to a high of twenty-six. To obtain a diploma in California, students are required to take and pass half of the number of classes required in Texas. Looking into credits closer, even more variance exists: for example, in English/LA, the number of required classes varies from 3 to 4.5. In science and math, the number of required classes varies from 2 to 4. And in Social Studies, the number of required classes varies from .5 to 4. According to the Digest of Education Statistics (2016), more than half of the states, twenty-seven, do not require students to pass an exit exam as a graduation requirement. Table 6 depicts course requirements by each state.

Table 6

Total Required Credits for Standard Diploma

State	Credits	State	Credits
Alabama	24.0	Montana	---
Alaska	21.0	Nebraska	22.5
Arizona	22.0	Nevada	20.0
Arkansas	22.0	New Hampshire	24.0
California	13.0	New Jersey	24.0
Colorado	---	New Mexico	22.0
Connecticut	20.0	New York	21.0
Delaware	22.0	North Carolina	22.0
DC	24.0	North Dakota	20.0
Florida	24.0	Ohio	23.0
Georgia	23.0	Oklahoma	24.0
Hawaii	24.0	Oregon	---
Idaho	23.0	Pennsylvania	20.0
Illinois	16.0	Rhode Island	24.0
Indiana	20.0	South Carolina	22.0
Iowa	14.0	South Dakota	22.0
Kansas	21.0	Tennessee	26.0
Kentucky	22.0	Texas	24.0
Louisiana	24.0	Utah	20.0
Maine	16.0	Vermont	22.0
Maryland	21.0	Virginia	20.0
Massachusetts	---	Washington	24.0
Michigan	16.0	West Virginia	13.0
Minnesota	21.5	Wisconsin	13.0
Mississippi	24.0	Wyoming	20.0
Missouri	24.0		

Source. Adapted from Digest of Education Statistics, 2019, Table 234.30 (web only)

According to the National Center of Education Statistics (2017), average credits earned by high school graduates increased from 26.8 to 27.2, in the time period of 2005 to 2009 respectively. Additionally, since 1990, the average credits earned increased by more than three credits, from 23.6 to 27.2. Each Carnegie credit represents 120 hours of classroom instruction meaning that students that graduated in 2009 received more than 400 hours more instructional time during their high school career than a graduate in 1990 while the number of days and the number of instructional hours have stayed relatively stable.

Federman (2009) examined the influence of state graduation rates on course taking patterns and associated states that require more stringent requirements, such as two years of math and science compared to states that require three years of math and science. The states with stringent course requirements demonstrated higher graduation rates. Federman (2009) used state graduation requirements because of their importance and because they are a useful source for identifying exogenous variations more so than other school or district level requirements which are more likely to correlate with student characteristics. Federman (2009) found that higher graduation requirements increase course taking.

Outcomes

Due to the substantial methodological challenges, comparing state educational systems data has been limited but remains attractive to debate among many different stakeholders. The need for such an assessment that allows for long term longitudinal data was warranted. The NAEP test, used since the late 1960s, are assessments administered uniformly using the same sets of test booklets across the U.S., making the results a common metric for states. The assessment stays basically the same from year to year, permitting a clear picture of student academic progress over time. For this reason, the NAEP database of information is very large and complex and requires considerable intellectual investment. Many states and policy makers have referenced NAEP data to push reform by producing extensive reports and results. Historically, NAEP is an extraordinary national resource, in many respects the best indicator of the achievement of American students (Koretz, 1991; Zenisky, Hambleton, & Sireci, 2009). Although states vary greatly on which particular tests are used to measure accountability, the tests generally serve to measure what students know, improve the quality of instruction, and help students achieve at high standards (Zucker, 2003).

Education policymakers continue to analyze state and national trends and express great concern about student performance. Reform efforts are often tied to the rise or fall of test scores to justify educational reform efforts. Increases in scores on accountability-oriented tests are not enough evidence that education has really improved (Felner et al., 2008; Koretz, 2000; Linn, 2006a). Whether a state accountability system focuses on improvement in achievement or student growth, there is “always a question of what level of achievement, what degree of improvement, or what amount of growth is considered acceptable or exemplary” (Linn, 2006a). Assumptions from NAEP scores have led to a large number of reports, articles, and headlines. The definition of key terms, such as proficient, is left up to states. The variance in terms can cause a student to fail one state’s test, while passing on another state’s test, and yet perform differently on the NAEP. Comparing two accountability systems can send mixed messages. For example, a school may fail to make gains on the NAEP assessment but may be identified as improving on the state scale. These types of messages can be “confusing to the public” (Linn, 2006a). It is obvious that a school cannot be failing to improve and simultaneously improving. Schools are complex systems and have many variables that cause a change in test scores besides school quality and instructional effectiveness, which is not always readily understood by the public (Koretz, 2000; Linn, 2000). Consider, for example, two states based on NAEP results from 2013. School A shows a higher number of proficient students while state B fails to make gains. It could be stated that state A is more effective than state B. On the other hand, it may be that students in state A were higher achieving, then students in state B (Linn, 2006a). Other factors such as previous knowledge and number of subgroups can attribute to the inferences made regarding the two states (Koretz, 2000; Linn, 2006a). To say that state A is more effective than state B requires an inference that the state and their instructional programs have caused the observed differences (Linn, 2006a). Schools under the burden of excessive, high stakes testing, often find themselves being unfairly labeled as failing, leaving many to question the school and staff effectiveness. Most often, these inferences are made through an accountability system that often fails to reveal whether or not a school is successful. Messick (1989) reinforces this notion by stating "what is validated is not the test or observation device as such but the inferences derived from the test scores or other indicators – inferences about score meaning or interpretation and about the implications for action that interpretation entails."

NAEP results provide important information and appear to be an appropriate comparison tool for states to use in evaluating the performance of their own assessment (Innes, 2012); however, drawing conclusions from simply comparing tests can be oversimplified, frequently exaggerated, and misleading (Bussert-Webb & Zhang, 2016). Innes (2012) found that NAEP math and reading proficiency rates were astonishingly close to the reported percentages to those same students scoring at or above the Kentucky end of year assessment. Ho (2007) would draw caution from comparing state end of year assessments to NAEP scores because these results showed that state trends are significantly more positive than NAEP scores and the two are not necessarily aligned. These reports have taken advantage of the release of 2013 state NAEP results for comparing states include those by the Washington Post (2015), Huffington Post (2016), Education Week (2015), the Civil Rights Project at UCLA (2016), Educational Trust, (2015), and the National Education Association (2015). Since the start of NAEP testing, there is a wide sampling of papers that compare state and NAEP outcomes by Linn (2008), Koretz (1995), Swanson and Stevenson (2002), and Nicols, Glass, and Berliner (2012).

NAEP results. Comparing student achievement across states is a challenging task, especially with a large number of variables that come into play due to the fact that states set their own curricula, assessment standards, and compulsory attendance laws. Student outcomes are extremely important and perhaps education's most important outcome. The NAEP provides a common assessment for measuring students across the United States.

NAEP reports the results for populations of students including fourth, eighth and twelfth grade students. Student performance is reported as average scores on separate 0 to 500 scales in mathematics and reading, and as the percentages of students performing at or above three achievement levels. The achievement levels for NAEP are defined in three categories: basic, proficient and advanced. Basic level refers to partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade. Proficient represents solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real world situations, and analytical skills appropriate to the subject matter. Advanced refers to superior performance (NAEP, 2003). NAEP has two major goals: to compare student achievement in states and other jurisdictions and to track changes in achievement of fourth, eighth, and twelfth graders over time in mathematics, reading, writing, science, and other content domains. To meet these dual goals, NAEP selects nationally representative samples of students who participate in either the main NAEP assessments or the long-term trend NAEP assessments.

The number of schools in 2017 that participated in the 4th grade reading was 7,920 which tested approximately 190,400 students. The number of schools that participated in the 4th grade math NAEP assessments was 7,930, with approximately 186,500 students testing. The number of schools that participated in the 8th grade reading was 6,510 which tested approximately 171,800 students. The number of schools that participated in the 8th grade math NAEP assessments was 6,520 with approximately 170,100 students testing. Table 7 depicts NAEP reading scores by state for 4th and 8th grade students.

Table 7

Average NAEP Reading Scale Score, by State

State	4th grade	8th grade	State	4th grade	8th grade
Alabama	216	258	Montana	222	267
Alaska	207	258	Nebraska	224	269
Arizona	215	263	Nevada	215	260
Arkansas	216	260	New Hampshire	229	275
California	215	263	New Jersey	233	275
Colorado	225	270	New Mexico	208	256
Connecticut	228	273	New York	222	264
Delaware	221	263	North Carolina	224	263
DC	213	247	North Dakota	222	265
Florida	228	267	Ohio	225	268
Georgia	220	266	Oklahoma	217	261
Hawaii	216	261	Oregon	218	266
Idaho	223	270	Pennsylvania	225	270
Illinois	220	267	Rhode Island	223	266
Indiana	226	272	South Carolina	213	260
Iowa	222	268	South Dakota	222	267
Kansas	223	267	Tennessee	219	262
Kentucky	224	265	Texas	215	260
Louisiana	212	257	Utah	225	269
Maine	221	269	Vermont	226	273
Maryland	225	267	Virginia	228	268
Massachusetts	236	278	Washington	223	272
Michigan	218	265	West Virginia	217	259
Minnesota	225	269	Wisconsin	220	269
Mississippi	215	256	Wyoming	227	269
Missouri	223	266			

Source. Adapted from Digest of Education Statistics, 2017 Table 221.40, and 221.60

Table 8 shows NAEP math scores by state for 4th and 8th grade students.

Table 8

Average NAEP Math Scale Score, by State

State	4th grade	8th grade	State	4th grade	8th grade
Alabama	232	268	Montana	241	286
Alaska	230	277	Nebraska	246	288
Arizona	234	282	Nevada	232	275
Arkansas	234	274	New Hampshire	245	293
California	232	277	New Jersey	248	292
Colorado	241	286	New Mexico	230	269
Connecticut	239	284	New York	236	282
Delaware	236	278	North Carolina	241	282
DC	231	266	North Dakota	244	288
Florida	246	279	Ohio	241	288
Georgia	236	281	Oklahoma	237	275
Hawaii	238	277	Oregon	233	282
Idaho	240	284	Pennsylvania	242	286
Illinois	238	282	Rhode Island	238	277
Indiana	247	288	South Carolina	234	275
Iowa	243	286	South Dakota	242	286
Kansas	241	285	Tennessee	237	279
Kentucky	239	278	Texas	241	282
Louisiana	229	267	Utah	242	287
Maine	240	284	Vermont	241	288
Maryland	241	281	Virginia	248	290
Massachusetts	249	297	Washington	242	289
Michigan	236	280	West Virginia	236	273
Minnesota	249	294	Wisconsin	240	288
Mississippi	235	271	Wyoming	248	289
Missouri	240	281			

Source. Adapted from Digest of Education Statistics, 2017 Table 222.50, and 222.60

NAEP's impact on education. The Nation's Report card has been utilizing data to demonstrate performance and growth in many subjects. Students performing at or above the proficient level on NAEP assessments demonstrate solid academic performance and competency over challenging subject matter. The percentages of students at or above proficient increased from 2011 to 2013 in mathematics at grade 4, and in reading at grades 4 and 8, and were higher than in the early 1990s in both subjects and grades. Additionally, NAEP scores have been able to track the progress of U.S. students; fourth and eighth grade students are showing improvement on the NAEP mathematics and reading assessments. Mathematics scores were higher in 2013 than in all previous assessment years at grades 4 and 8. Reading scores were higher in 2013 in comparison to all previous assessments at grade 8, and all but the 2011 assessment at grade 4.

The ability to analyze state standardized testing data (NAEP Scores) provides a tool for educators to use in their effort to combat students' deficiency in learning. Administrators, teachers, and policymakers benefit from high stakes tests to refocus reform efforts and to know what is significant for students and if they are meeting state benchmarks (Amrein & Berliner, 2002). No longer can administrators or teachers make decisions based on intuition, gut instinct, or fads (Slavin, 2002). NCLB made it imperative that decisions are based on accurate and meaningful data that represent student learning and achievement (Viteritti, 2012). The law presumes that, by examining annual achievement data, educators can determine what causes unacceptable outcomes and can correct the unproductive parts of the system (Heibert et al., 2005).

Fitchett and Haefner (2013) used NAEP social studies scores to facilitate "pedagogical aims, engage teachers in critical discourse, and investigate the contexts of teaching and learning." The researchers use NAEP data as "a valuable tool for examine social studies theory and practice in relation to student learning outcomes." The significance of this research is not in the results, but the fact that the authors used NAEP scores as an ally to promote dynamic social studies instruction. The authors previously attempted to provide evidence of the impact of pedagogical practices through "case studies, teacher vignettes, providing salient examples of ambitious teaching, and challenging traditional practice through dialogue and self-reflection."

They contend that NAEP scores offer educators a valuable tool for exploring instructional strategies, student demographics, and school contexts associated with student learning outcomes.

Lee and Reeves (2012) examined the impact of high-stakes school accountability, capacity, and resources under NCLB on reading and math achievement outcomes. As a common variable, the researchers used NAEP reading and math scores to systemically relate to state implementation of NCLB test-driven accountability policies. The research showed mixed results in terms of accountability policy reforms. A similar study done by Dee and Jacob (2009) reported significant positive effects of NCLB in math, not reading, based on NAEP scores. NAEP continues to be the standard of interstate comparisons.

Judson (2012) used NAEP scores to show that states using science in their accountability programs in the fourth grade had significantly higher science achievement than other states. Swanson and Stevenson's (2002) research utilized NAEP assessments in math to "chart a path of reform across the state, school, and classroom levels." Data were used from NAEP math scores in 1992 and 1996; the hierarchical analytical design enabled the researchers to examine the interactions between distant and local influences for educational change, like state policy and site-based norms of practice. Some of the findings suggest that policies associated with standards-based reform have been at least partially successful in promoting instructional techniques espoused by movement advocates. They continue to explain that use of standards-based instruction within individual math classrooms is more prevalent in states that vigorously pursue standards-based reforms. Using NAEP scores in their model, the data suggest a potentially important connection between state policy and local receptivity.

Using data from a survey of state policies, state case studies and surveys, and the NAEP assessment, Darling-Hammond's (2000) research suggests that policy investments in the quality of teachers may be related to improvements in student performance. Teacher quality is a function that is constructed at the state level and, like many other outputs, vastly differs from state to state. Further analysis proposes that policies adopted by states, such as licensing practices, hiring, and professional development, may make an important difference in the qualifications and capacities that teachers bring to their work. NAEP data have documented how specific kinds of teacher learning opportunities correlate with their students' reading achievement (Darling-Hammond, 2000).

The results of Carnoy and Loeb (2002), indicate a positive and significant relationship between the strengths of states' accountability systems and math achievement at the8th grade level across racial and ethnic groups. 4th grade scores are not as strongly associated with accountability as compared to 8th grade gains. Using NAEP math scores as the outcome variable, the researchers were also able to identify that black students that achieved at least basic level and 4th grade Hispanic students that achieved at least basic level made more than a third of a standard deviation increase, and approximately a quarter of a standard deviation increase respectively, in accountability.

CHAPTER III

Methodology

Purpose Statement

The purpose of this study is to examine ways that policies can empower states to raise student achievement through a series of correlation analyses, multiple regression and observations of patterns among scatter plots. The variables examined include compulsory attendance, instructional hours, and graduation credits, and their correlation with graduation rates, per pupil expenditure, and National Assessment for Educational Progress (NAEP) test scores (see Table 9). The goal of this research is to identify the factor(s) that most directly affect state policies that affect student achievement. This is measured by using quantitative data analysis.

Table 9

Independent and Dependent Variables

Independent Variables	**Dependent Variables**
Compulsory Attendance	NAEP Scores
Fiscal Effort	Graduation Rates
Graduation Credits	
Instructional Hours	
Per Pupil Expenditure	

Research Questions

Research questions should guide the direction of the study, give it focus, and serve as the “directional beam for the study” (Lunenburg & Irby, 2008). This study sought to identify the variables predictive of NAEP scores and graduation rates. The following questions were considered throughout this study:

1. What is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing?

a. What are the effects of increasing or decreasing slope on graduation rates?

b. Is there a relationship following a 3, 5, or 10-year time lag on graduation rates?

2. What is the relationship between the 2008 and 2012 NAEP cohorts in 4th and 8th grade English Language Arts scores, math scores, and 2016 graduation rates?
3. What is the relationship between 4th grade reading and math NAEP scores and state fiscal effort?
4. What is the relationship between 8th grade reading and math NAEP scores and state fiscal effort?
5. What is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?

Statement of the Problem

This research will contribute to the scarcity of peer-reviewed, empirical research related to the issue. The intent of this study is to look at the policies that states control and to examine the extent that each play on graduation rates and NAEP test scores. While some research exists for the variables, the scope is limited. Research has recently provided convincing evidence about the effects of inputs on education. Fiscal effort, compulsory attendance, graduation credits, and instructional hours have been linked to gains in student achievement and increased graduation rates; however, there is limited research done looking at the relationship between the variables. There are large differences across the country regarding state policies. For instance, the minimum number of hours per year, set by the state ranged from 356 to 951 in kindergarten, from 720 to 1,116 in elementary grades, and 720 to 1,137 in secondary education. Table 3 depicts the minimum amount of instructional time per year in hours. This variance begs a question. Compulsory attendance is uneven, as seven states require 9 years of education, and five states require 13 years of schooling. 9 states require children to start school when they are five, compared to 25 states that require children enroll by the age of six; 15 that require a starting age of seven; and 2 that require children enroll at the age of eight.

Research Design

This chapter on methods will detail the procedures employed to conduct the research. A correlation study was used to identify trends and the relationships between the variables stated for each research question. A quantitative, post-hoc design was used to gather data on the independent and dependent variables. The data was through SPSS using a multiple regression/stepwise analysis to explore the relationship among the variables. The variables are NAEP Scores obtained when students are in fourth, eighth, and twelfth grades in both reading and math scores, graduation rates, graduation credits, compulsory attendance ages, and instructional hours for core subjects. The population will consist of achievement data and graduation rates from all fifty states as well as Washington D.C.

This study employs a quantitative approach to provide a picture of the impact that state policies have on NAEP scores. The research questions require the collection and analysis of data to further explore the topics. The quantitative design used descriptive statistics to implement models that include correlation relationships, and regressions. Comparisons were based on the average scale scores for public school students within a single assessment year, and graduation rates from each state during the same time period: 2016-2016 school year. The large-scale dataset from the NCES.gov website was well suited because it is nationally representative and contains information from a variety of sources. According to the website, the mission of the NCES is to collect, analyze, report, and disseminate education information and statistics. It provides statistical services for educators and education officials at the federal, state, and local levels.

Sample

The NAEP assessment is administered to a representative sample of students rather than the entire population of students. The sample selection process utilizes a probability sample design in which each school and each student has a known probability of being selected (the probabilities are proportionate to the estimated number of students in the grade assessed). Samples are selected according to a multistage design, with students drawn from within sampled public and private schools nationwide. A sample of schools and students is selected to represent each participating state. In an average state, 2,500 students in approximately 100 public schools are assessed per grade, for each subject assessed. Using a complex, weighting sampling frame, NAEP offers the most comprehensive and nationally inclusive sample of student data. The selection process for schools uses stratified random sampling within categories of schools with similar characteristics. Some schools or groups of schools (districts) may be selected for each assessment cycle if they are unique in the state. For instance, if a particular district is in the only major metropolitan area of a state or has the majority of a minority population in the state, it may be selected for assessment more often. Additionally, even if a state decides not to participate at the state level, schools in that state identified for the national sample will still be asked to participate. NAEP does not disseminate individual student data and results to the public.

The population of the study included all 50 United States, and the District of Columbia (N = 51). The data were primarily compiled from two large databases, the National Center for Education Statistics, and the Owings, Kaplan, Pirim website (http://schoolfunding.info/trends-in-state-support-for-education-1986-2016/). Data were analyzed over a 10-year period to explore relationships between fiscal effort, and graduation rates.

The number of schools in 2017 that participated in the 4th grade reading was 7,920 which tested approximately 190,400 students. The number of schools that participated in the 4th grade math NAEP assessments was 7,930, with approximately 186,500 students testing. The number of schools that participated in the 8th grade reading was 6,510 which tested approximately 171,800 students. The number of schools that participated in the 8th grade math NAEP assessments was 6,520 with approximately 170,100 students testing. Table 7 depicts NAEP reading scores by state for 4th and 8th grade students.

Data Collection

The NCES website was used for the collection of quantitative data that included NAEP scores, graduation rates, instructional days, graduation credits, and financial data. NAEP is a federally administered test used in the U.S. public school system that has garnered increasing interest because it offers the only state to state comparison data (Innes, 2012). The NAEP test is a nationally representative assessment of what U.S. students know and can do in many academic areas, specifically math and reading for this study. Long-term trend NAEP tests are administered on a cyclical basis to students in fourth, eighth, and twelfth grades.

The NCES Data Explorer is a free online database that allows researchers to create simple to complex tables aimed at investigating multiple data sources that contribute to achievement. In the analysis of this research, I describe how we use the data set to engage meaningful, data-driven discussions concerning state policies. I described how NAEP scores and graduation rates will elicit discourse on many decisions controlled by states.

Analysis of Data

Each of the research questions used different data to explore the relationship between the variables, see Table 10.

Table 10

Research Questions, Methods of Data Collection, and Data Analysis

Research Questions	Method of Data Collection	Data Analysis
1. What is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing? a. What are the effects of increasing or decreasing slope on graduation rates? b. Is there a relationship following a 3, 5, or 10-year time lag on graduation rates?	NCES Schoolfunding.info	Scatterplot Multiple regression
2. What is the relationship between the 2008 and 2012 NAEP cohorts in 4th and 8th grade English Language Arts scores, math scores, and 2016 graduation rates?	NCES Schoolfunding.info	Correlation Analysis Multiple Regression
3. What is the relationship between 4th grade reading and math NAEP scores and state fiscal effort?	NCES Schoolfunding.info	Multiple Regression
4. What is the relationship between 8th grade reading and math NAEP scores and state fiscal effort?	NCES Schoolfunding.info	Multiple Regression
5. What is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?	NCES Schoolfunding.info	Correlation Analysis

Research question one explored the relationship between state fiscal effort and graduation rates over a 10-year period. Using a linear regression and scatter plot matrices, state fiscal effort and graduation rates were examined over a 10-year period. The lag comparison was used to account for time of a state's fiscal effort to impact student outcomes. Fiscal effort and graduation rates do not concurrently happen; therefore, a lag was used to represent the effects of fiscal effort on graduation rates. Results do not change immediately, and many experts agree that organizational change takes five to seven years to show the impact (Fullan, 2010). This is especially important when considering fiscal effort.

Research question two explored the relationship of a cohort starting with a student entering fourth grade for the 2007 – 2008 school year and graduating in 2016. The cohort data including English and math NAEP scores from 2008, and 2012. A correlation analysis was run with the NAEP scores from 2008, 2012, and graduation rates from 2016.

Research question three explored the relationship between 4^{th} grade reading, math NAEP scores and hours of required instruction. The NAEP scores were run through a correlation with the hours of instruction that a student will receive by the time they take the NAEP assessment. In order to gauge how many hours of instruction a student would receive by the time they enter the 4^{th} grade; I multiplied the number of hours required by the state and by the age when compulsory schooling begins. For example, in the state of Virginia, a student must begin school at the age of 5, meaning they will have five years of schooling when they are in fourth grade. The state of Virginia also requires 990 hours of instruction each year a student in obligated to attend school. By this method, a student enrolled in Virginia public schools would receive, at minimum, 4,950 hours of instruction when they take the NAEP assessment.

Research question four explored the relationship between 8^{th} grade reading, math NAEP scores and hours of required instruction. Like research question two, NAEP scores were run through a correlation with the hours of instruction that a student will receive by the time they take the NAEP assessment. I multiplied the number of hours required by the state and the age when compulsory schooling begins. For example, in the state of Virginia, a student must begin school at the age of 5, meaning they will have 9 years of schooling when they are in eighth grade. The state of Virginia also requires 990 hours of instruction each year a student is obligated to attend school. By this method, a student enrolled in Virginia public schools would receive, at minimum, 8910 hours of instruction when they take the NAEP assessment in 8^{th} grade.

The final research question sought out the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates. The NAEP scores were first run through a correlation and then a stepwise regression with compulsory attendance ages. For the compulsory attendance data, I explored the number of years a student would be in school prior to taking the NAEP assessment, not the actual ages set forth by the state. Virginia compulsory attendance laws state students must be enrolled in school from the age of five and remain in school until eighteen. Thus, students in 8th grade will have nine years of compulsory attendance when they take the NAEP assessment.

All data and the results of this study were analyzed using the software program, Statistical Package for Social Science (SPSS v.26). Comparisons were tested for statistical significance at the $p < .05$ level.

Limitations

The use of a single output, such as NAEP scores, is likely to be insufficient, as one test cannot explain the myriad of complexities within a school system. The results of the test could be viewed as a minimum standard. There are many issues that surface when comparing state-to-state through NAEP scores. Researchers should always be careful about conclusions reached by studies that fail to mention the exclusion rates, lack of accommodations, and student demographics.

Chapter IV

RESULTS

The results of the research in Chapter 4 are presented in a narrative format and include tables to support the findings. Chapter 4 is divided into sections for each research question. SPSS v26 was used for descriptive and inferential analysis related to the research questions. All inferential analyses were tested at the 95% level of significance. Correlational and regression analyses were performed to address all the research questions. Correlation research allows the researcher to measure the relationship among variables and therefore only suggest a relationship exists between the measured variables. Correlation research does not prove that one variable cause another to change (Creswell, 2008). Thus, it does not tell the researcher the why and how behind the relationship, but it can indicate that a relationship exists. Multiple regression permits the researcher to use multiple variables for analysis.

The purpose of this study was to examine ways that policies can empower states to raise student achievement. Specifically, the relationship that state fiscal effort, compulsory attendance laws, graduation credits, and instructional time has on National Assessment of Educational Progress (NAEP) scores and graduation rates. Additionally, I wanted to determine if a relationship exists between a state's fiscal effort and graduation rates over a ten-year span. The following are the research questions that guided this study:

1. What is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing?
    a. What are the effects of increasing or decreasing slope on graduation rates?
    b. Is there a relationship following a 3, 5, or 10-year time lag on graduation rates?

2. What is the relationship between the 2008 and 2012 NAEP cohorts in 4th and 8th grade English Language Arts scores, math scores, and 2016 graduation rates?
3. What is the relationship between 4th grade reading and math NAEP scores and state fiscal effort?
4. What is the relationship between 8th grade reading and math NAEP scores and state fiscal effort?
5. What is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?

Population and Descriptive Findings

The population of this study consisted of students from all fifty states, and the District of Columbia (*N*=51). All records were compiled from two large databases, the National Center for Education Statistics, and the Owings, Kaplan, Pirim website (2019). All information and data sets were collected between 2006 and 2016. Not all states provided information for each variable. The NAEP reading and math assessment is given every two years to students in grades 4 and 8. Descriptive and demographic information were not collected for each state for this study. This study evaluated the influence that varying state expenditures, curricula, funding, compulsory attendance laws, and graduation credits have on both NAEP scores and graduation rates.

Assumptions

Each data set was inspected to ensure that it fulfilled the assumptions of the analyses: lack of missing data, absence of outliers, normality, linearity, and homoscedasticity. All NAEP scores for grades 4 and 8 in both reading and math, compulsory attendance ages, and fiscal efforts rates for all 51 states were available. Some records pertaining to instructional time, instructional days, graduation credits, and graduation rates were missing. Missing records were excluded only for the analysis in which they did not contain full data. There were no missing data for research questions one through four.

Inferential Analysis

The results of the analyses are presented according to each research question.

Research Question 1

The first research question was, what is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing?

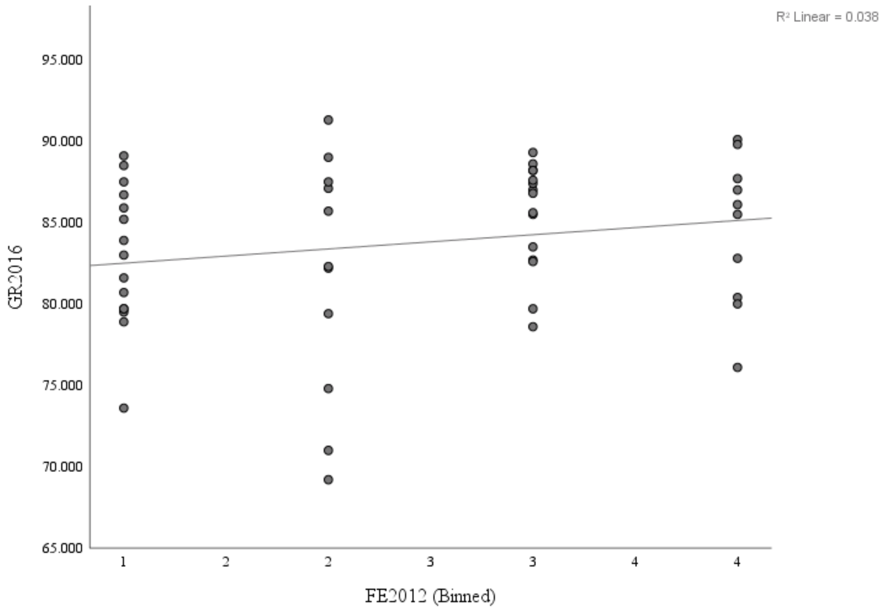
a. What are the effects of increasing or decreasing slope on graduation rates?

b. Is there a relationship following a 3, 5, or 10-year time lag on graduation rates?

The variables were placed into quartiles using the visual binning feature in SPSS. This process allowed for the creation of new variables into four distinct categories. Once the mean and standard deviation (*SD*) were determined by SPSS v.26 descriptive statistics, the *SD* was used to create the new values. The mean for fiscal effort over the 10-year span was .26, with a *SD* of .052. The next set of values were created to place each state's graduation rates and fiscal effort into quartiles. The quartiles for fiscal effort are 1: .13 to .21, 2: .22 to .30, 3: .31 to .39, and 4: .40 to .49. Figure 1 represents the higher the fiscal effort, the higher the graduation rates, when states spend a greater percentage of wealth there are higher graduation rates. For quartiles 3, and 4 (the states with the highest fiscal effort) each state has graduation rates above 80%, except for 3 states. The states that fall into quartiles 1, and 2 (the states with the lowest fiscal effort) have inconsistent graduation rates that range from below 60% to above 90%.

Figure1

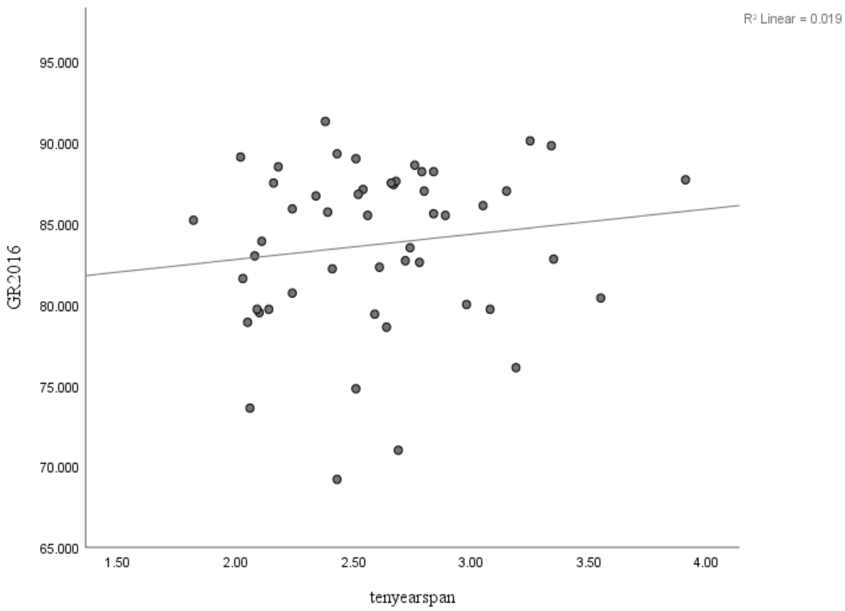
Scatter Plot of Graduation Rates (2016) and Fiscal Effort (2012) by Quartiles



When a greater percentage of the state's available wealth is spent, there are only higher graduation rates. There is not causation, but a small association does exist. There is not a statistically significant relationship; however, there appears to be an association. Across several observations, there is a consistent observation of a small non-significant, but non-trivial positive relationship among fiscal effort and graduation rates. The variables were combined through SPSS v26 to create a new variable to represent 10-years of fiscal efforts. The 10-year fiscal effort for each state and Washington D.C. was placed into a scatter plot that was examined. See Figure 2 for details. The slope represents the predicted increase in *Y* for each unit increase in *X*. For this example, as graduation rates increase, fiscal effort increases. There is practical significance and a small positive association across the scatter plots.

Figure 2

Scatter Plot of Graduation Rates (2016) and combined Fiscal Effort (2006 – 2015)



Trends of fiscal effort over the 10-year period show a bimodal distribution, while graduation rates increase over the same time frame. When the scatter plots were observed by looking at fiscal effort over a 3-year time frame, 2013-2015 *(r^2 = .007)*, as time progressed, the value increased for the 5-year time frame, 2011 – 2015, r^2 was .010 and the 10-year time frame reported an r^2 of .019.

Research Question 2

The second research question guiding this study was, what is the relationship between the 2008 and 2012 NAEP cohorts in 4th and 8th grade English Language Arts scores, math scores, and 2016 graduation rates?

A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015 – 2016 school year to ELA, and math NAEP scores from the 2007 – 2008, and 2011 – 2012 school years. Descriptive information for the following variables are graduation rates from 2015-2016 school year from all fifty states and Washington DC (M = 83.72, SD = 5.01) and 4th grade NAEP scores, 2007 – 2008, in ELA (M = 220.37, SD = 7.074), math (M = 239.18, SD = 6.752) and 8th grade NAEP scores, 2011-2012 in ELA (M = 264.67, SD = 6.523), math (M = 283.49, SD = 283.49, 7.703). A Pearson's r data analysis revealed a positive correlation for 4th grade ELA, r = .590 (p <.01), 4th grade math r = .558 (p <.01), and 8th grade ELA, r = .502 (p <.01), 8th grade math r = .431 (p <.01). States with higher NAEP scores had higher graduation rates.

4th grade ELA, math NAEP scores to graduation rates. A multiple regression was run with 4th grade ELA and math as the independent variables and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on ELA and math scores. The overall regression model was significant, $F(2, 48) = 12.88$, ($p < .001$), r^2 = .349. Taken as a set, the predictors, ELA and math NAEP scores account for 34.9% of the variance in graduation rates. The predictor variables (p = .101, and p = .806) are correlated, and do offer a significance of variance.

4th grade ELA NAEP scores to graduation rates. A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015-2016 school year to ELA and math NAEP scores individually from the 2007-2008 school year. The regression was run with 4th grade ELA as the independent variables and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on ELA scores. The overall regression model was significant, $F(1, 49) = 26.21$, ($p < .001$), r^2 = .348. Taken as a set, the predictor, ELA NAEP scores account for 34.8% of the variance in graduation rates. The predictor variable (p < .001) is correlated and offers a significance of variance.

4th grade math NAEP scores to graduation rates. A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015-2016 school year to math NAEP scores individually from the 2007-2008 school year. The regression was run with 4th grade math as the independent variables and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on math scores. The overall regression model was significant, $F(1, 49) = 22.15$, ($p < .001$), $r^2 = .311$. Taken as a set, the predictor, math NAEP scores account for 31.1% of the variance in graduation rates. The predictor variable ($p < .001$) is correlated and offers a significance of variance.

8th grade ELA, math NAEP scores to graduation rates. A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015 – 2016 school year to ELA, and math NAEP scores from the 2011-2012 school year. The first regression was run with 8th grade ELA and math as the independent variables and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on ELA and math scores. The overall regression model was significant, $F(2, 48) = 8.18$, ($p = .001$), $r^2 = .254$. Taken as a set, the predictors ELA and math NAEP scores account for 25.4% of the variance in graduation rates. The predictor variables ($p = .041$, and $p = .698$) are correlated, and do offer a significance of variance.

8th grade ELA NAEP scores to graduation rates. A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015-2016 school year to ELA NAEP scores individually from the 2007-2008 school year. The regression was run with 8th grade ELA as the independent variable and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on math scores. The overall regression model was significant, $F(1, 49) = 16.50$, ($p < .001$), $r^2 = .252$. Taken as a set, the predictor, ELA NAEP scores account for 25.2% of the variance in graduation rates. The predictor variable ($p < .001$) is correlated and offers a significance of variance.

8th grade math NAEP scores to graduation rates. A multiple regression was conducted to evaluate the relationship between graduation rates during the 2015-2016 school year to math NAEP scores individually from the 2007-2008 school year. The regression was run with 8th grade math as the independent variables and graduation rates as the dependent variable. The multiple regression was calculated to predict graduation rates based on math scores. The overall regression model was significant, $F(1, 49) = 11.16$, ($p < .001$), $r^2 = .185$. Taken as a set, the predictor math NAEP scores account for 18.5% of the variance in graduation rates. The predictor variable ($p < .001$) is correlated and offers a significance of variance.

Research Question 3

The third research question guiding this study was, what is the relationship between 4th grade reading and math NAEP scores and state fiscal effort? The regression was run with fiscal effort over a three-year span as the independent variables and 4th grade ELA NAEP scores as the dependent variable. The multiple regression was calculated to predict NAEP scores based on fiscal effort. The overall regression model was not significant, $F(3, 47) = 1.394$, ($p = .256$), $r^2 = .082$. Taken as a set, the predictors fiscal effort accounts for 25.6% of the variance in ELA NAEP scores. The predictor variables over a 3-year span (fiscal effort, 2015, $p = .227$, fiscal effort, 2014, $p = .051$, fiscal effort, 2013, $p = .705$) do not offer a significance of variance.

The regression was run with fiscal effort over a 3-year span as the independent variables and 4th grade math NAEP scores as the dependent variable. The multiple regression was calculated to predict math NAEP scores based on fiscal effort. The overall regression model was not significant, $F(3, 47) = 1.43$, ($p = .246$), $r^2 = .084$. Taken as a set, the predictors fiscal effort accounts for 8.4% of the variance in NAEP score. The predictor variables over a 3-year span ($p = .246$) do not offer a significance of variance.

Research Question 4

The fourth question guiding this study was, what is the relationship between 8th grade reading and math NAEP scores and state fiscal effort? The regression was run with fiscal effort over a 3-year span as the independent variables and 8th grade ELA NAEP scores as the dependent variable. The multiple regression was calculated to predict NAEP based on fiscal effort scores. The overall regression model was not significant, $F(3, 47) = 2.912$, ($p = .044$), $r^2 = .157$. Taken as a set, the predictors fiscal effort accounts for 15.7% of the variance in ELA NAEP scores. The predictor variables over a 3-year span (fiscal effort, 2015, $p = .019$, fiscal effort, 2014, $p = .007$, fiscal effort, 2013, $p = .793$) do not offer a significance of variance.

The regression was run with fiscal effort over a three-year span as the independent variables and 8th grade math NAEP scores as the dependent variable. The multiple regression was calculated to predict math NAEP scores based on fiscal effort. The overall regression model was not significant, $F(3, 47) = 2.17$,($p = .104$), $r^2 = .122$. Taken as a set, the predictors fiscal effort accounts for 12.2% of the variance in NAEP score. The predictor variables over a 3-year span ($p = .104$) do not offer a significance of variance.

Research Question 5

The fifth and final research question guiding this study was, what is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?

A correlation analysis was conducted with NAEP scores, hours of instruction, and ages for a student based on when a student entered 4th and 8th grade and credits required for graduation. There is a slight negative correlation among all the variables. To further explain the data, other state policies were examined to further explain the lack of correlations. I explored the 4th grade NAEP scores, number of instructional hours based on the state expectations and compulsory attendance ages, instructional days, and per pupil expenditure (see Table 11). The amount of instructional time, instructional days, and compulsory attendance all had a negative correlation with NAEP scores. Results indicated that the amount of instructional time a student receives by 4th grade is not a statistically significant relationship with graduation rates $r(49) = .221$; however, there appears to be an association. There is an observation of a small non-significant, but non-trivial positive relationship among instructional time when a student enters 4th grade and graduation rates. The correlation of per pupil expenditure and 4th grade ELA NAEP scores are significant, $r(49) = .315$, *p* , .05.

Table 11

Correlation Analyses of ELA, Math NAEP Scores (4th Grade), Instructional Days, Instructional Hours, Per Pupil Expenditure, and Graduation Rates.

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. 4th grade ELA	-	-	-.101	-.114	-.097	.522**	.315*
2. 4th grade math	-	-	-.179	-.166	-.138	.534**	.141
3. Years in 4th	-.101	-.179	-	-	-	.032	-
4. Instructional Days	-.114	-.166	-	-	-	.060	-
5. Hours by 4th grade	-.097	-.138	-	-	-	.221	-
6. GR2016	.522**	.534**	.032	.060	.221	-	.121
7. PPE	.315*	.141	-	-	-	.121	-

The next correlation analyses were 8th grade NAEP scores, number of instructional hours based on the state expectations and compulsory attendance ages, instructional days, and per pupil expenditure. Among the correlation analyses, none offer a significance of variance (see Table 12, and Table 13). There is a negative correlation among instructional time, instructional days, and hours by 8^{th} grade to 8^{th} grade ELA, and math NAEP scores. Results indicated that the amount of instructional time a student receives by 8th grade does not have a statistically significant relationship with graduation rates r(49) = .274; however, there appears to be an association. There is an observation of a small non-significant, but non-trivial positive relationship among instructional time when student enters 8th grade and graduation rates.

Table 12

Correlation Analyses of ELA, Math NAEP Scores (8^{th} Grade), Instructional Days, Instructional Hours, Per Pupil Expenditure, and Graduation Rates.

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. 8th grade ELA	-	-	-.262	-.165	-.258	.484**	.270
2. 8th grade math	-	-	-.304*	-.165	-.303	.432**	.235
3. Years in 8th	-.262	-.304*	-	-	-	.032	.082
4. Instructional Days	-.165	-.165	-	-	-	.060	-
5. Hours by 8th grade	-.258	-.303	-	-	-	.274	-
6. GR2016	.484**	.432**	.032	.060	.274	-	.121
7. PPE	.270	.235	-	-	-	.121	-

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

Table 13

Correlation Analyses of Course Credits, Years in 4^{th} and 8^{th} Grade, and Hours in 4^{th} and 8^{th} Grade.

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Course Credits	-	-	-	.195	.195	.195	.104	.094
2. ELA Credits	-	-	.-	.163	.163	.163	.091	.108
3. Math Credits	-	-	-	.358*	.358*	.358*	.276	.302
4. Years in 4th	.195	.163	.358*	-	-	-	-	-
5. Years in 8th	.195	.163	.358*	-	-	-	-	-
6. Years in 12th	.195	.163	.358*	-	-	-	-	-
7. Hours by 4th grade	.104	.091	.276	-	-	-	-	-
8. Hours by 8th grade	.094	.108	.302	-	-	-	-	-

Summary

Scatter plots were created and observed to address research question one. Across several observations of fiscal effort (2006-2015) to graduation rates on scatter plots, there is a consistent observation of a small non-significant, but non-trivial positive relationships among fiscal effort and graduation rates. For each year comparison of fiscal effort and graduation rates for 2016, there was a positive slope.

A series of correlation analyses were conducted to address research question two. Once a relationship was depicted, a multiple regression was run to evaluate the relationship among a cohort of data. The analyses revealed the states with higher NAEP scores had higher graduation rates. This was consistent for 4th and 8th grade reading scores on graduation rates.

Questions three and four were explored through a multiple regression to see the relationship between fiscal effort and NAEP scores. None of the regressions offered any significance of variance.

A series of correlation analyses were run to explore research question five. There is an observation of a small non-significant, but non-trivial positive relationship among instructional time when student enters 4th grade, and 8th grade and graduation rates. There is a slight negative correlation among instructional time, instructional days to ELA, and Math NAEP scores.

This investigation revealed findings that can be used for further research and practice. The purpose of the research was to examine ways that policies can empower states to raise student achievement and graduation rates. Specifically, the relationship that state fiscal effort, compulsory attendance laws, graduation credits, and instructional time has on NAEP scores and graduation rates. The findings indicate that NAEP scores predict graduation rates. While fiscal effort to graduation rates did not reveal a statistical significance, there is still practical significance. The practical significance shows that an increase in fiscal effort will increase graduation rates, albeit a small one.

Chapter V

Summary of Findings

In this chapter I will summarize the findings, provide implications for practice, make recommendations for future research, and draw conclusions about this study. This study was an examination of the relationships between National Assessment of Educational Progress (NAEP) scores, graduation rates, hours of instruction, compulsory attendance ages, and fiscal effort of all 50 states and Washington DC. Additionally, I wanted to determine if a relationship exists between a state's fiscal effort and graduation rates over a ten-year span. A variety of statistical tests were used including descriptive, inferential, correlational, and regression analyses. All statistical tests included data from 50 states and Washington DC. Three themes emerged from this study: 1) while there is not a statistical significance to the relationship between fiscal effort and NAEP scores, and graduation rates, there is practical significance, 2) NAEP tests have a statistically significant relationship with graduation rates, and 3) while the literature supports more instructional time will lead to increases in student achievement, the research did not find a significant relationship between instructional time and the outcome variables.

The following are the research questions that guided this study:

1. What is the relationship between state fiscal effort and state graduation rates over a 10-year period? Are slopes decreasing, flat, or increasing?
    a. What are the effects of increasing or decreasing slope on graduation rates?
    b. Is there a relationship following a 3-, 5-, or 10-year time lag on graduation rates?

Results for Research Question 1 revealed an increasing slope on each scatter plot that was performed for 3-years, 5-years, and 10-years of fiscal effort to graduation rates. Each year of fiscal effort from 2006 to 2015 to graduation were graphed in a scatter plot and each revealed a positive slope. There is a consistent observation of a small non-significant, but non-trivial positive relationship among fiscal effort and graduation rates.

2. What is the relationship between the 2008 and 2012 NAEP cohorts in 4^{th} and 8^{th} grade English Language Arts scores, math scores, and 2016 graduation rates?

Results for Research Question 2 showed no significant relationship among a cohort of data starting during the 2007 – 2008 school year when looking at fiscal effort and graduation rates. The analyses did reveal a strong, statistically significant relationship between NAEP scores and graduation rates.

3. What is the relationship between 4th grade reading and math NAEP scores and state fiscal effort?

The results for Research Question 3 did not show a significant relationship between fiscal effort and NAEP scores. Fiscal effort for the three years prior to the NAEP administered in 2016 test were explored.

4. What is the relationship between 8th grade reading and math NAEP scores and state fiscal effort?

The results for Research Question 4 did not show a significant finding of fiscal effort and 8^{th} grade NAEP scores. Fiscal effort for the three years prior to the NAEP administered in 2016 test were explored.

5. What is the relationship between state NAEP scores, hours of required instruction, compulsory attendance ages, credits required for graduation, per pupil expenditure, and graduation rates?

The correlation analysis did not reveal any significance of variance; however, there is practical significance among instructional time when a student is in 4^{th} grade, and 8^{th} grade on graduation rates. There is a slight negative correlation among instructional time, instructional days to ELA, and math NAEP scores.

Practical vs Statistical Significance

Explanations are not easily derived from a single and initial examination of the variables in this study (Riddle et al., 2017). Several conclusions and associations can be drawn from the research in terms of practical significance and statistical significance. According to Roger Kirk (1996) statistical significance is concerned with whether a research result is due to chance or sampling variability; practical significance is concerned with whether the result is useful in the real world. Statistical significance testing in education research has been facing legitimate criticism in recent years largely because the outcome of statistical significance relies too heavily on sample size; on the other hand, practical significance is often ignored at the expense of statistical significance (Fan, 2001). In general, correlations above .30 provide ample evidence to conclude that there is sufficient commonality to explain the relationship between factors (Tabachnick & Fidell, 2001) and if the correlations are surprisingly low, it might be the result of low variance (Beavers, Lounbury, Richards, Huck, & Skolits, 2013). Good research practice demands that attention be given to practical and statistical significance to arrive at sound conclusions.

Discussion

This study was an examination of the relationships between NAEP scores, graduation rates, hours of instruction, compulsory attendance ages, and fiscal effort of all 50 states and Washington DC. Currently, there is a need for further research on the associations between fiscal effort, compulsory attendance, hours of instruction, graduation rates, and NAEP scores. Chapter 5 summarizes the findings, implications for practice, recommendations for future research, and a conclusion. These findings can benefit researchers, school division leaders and policy makers at the state and local levels.

The U.S. education system, unlike many other nations, is unique because most educational programs in many countries are run by a national education ministry. The U.S. doesn't have one education system, it has 50 state systems, and Washington D.C. Through the 10th amendment, the Federal government has been able to implement specific policies that affect state decision-making. Departments of education in fifty separate states, plus the District of Columbia and territories set policies on the age when children are required to begin and end formal schooling, course lengths, compulsory attendance, school funding formulas, optional subjects to be taught, lesson frequency and length, number of days in the school year, and class sizes. I make the case that since the 10th Amendment to the Constitution makes U.S. education a state function, 50 states and Washing D.C. can have substantial variance in their instructional standards and outcomes.

Public education was never stated as a particular power in the Constitution and, traditionally, educational powers and duties were assigned to state and local governments. At the secondary level, these variations can partly explain the lagging achievement of U.S. states as compared to other countries. Such gaps have current and far-reaching consequences, as schools try to train the workforce for the economic and political future of our nation tomorrow.

The distinctions within those states did not permit comparisons to be made until the NAEP test was established. Researchers were not able to compare states with each other by a single metric making NAEP data critical to exploring for better understanding of state policies. State policies are powerful instruments required for structuring the organization. Since schools influence their students' lives, it is important to look at policies adopted by state and local school organizations. Considering the clear evidence that NAEP scores and graduation rates in some states are higher than others, it is worth questioning which policies are beneficial for policy makers.

NAEP scores fluctuate for various reasons among each state. For example, 4th grade English NAEP scores range from a low of 207 (Alaska), to a high of 236 (Massachusetts). The range for 4th grade math NAEP scores range from 229 (Louisiana) to a high of 249 (Massachusetts). The range for 8th grade English NAEP scores ranged from a low of 247 (Washington D.C.) to a high of 278 (Massachusetts). The range for 8th grade math NAEP scores 266 (Washington D.C.), to a high of 297 (Massachusetts). Washington D.C. which happens to be the lowest among 8th grade English and math NAEP scores, also has the lowest graduation rates at 69.2% compared to a high of 91.3 in Iowa. These differences raise the questions which policies, state per pupil expenditure, compulsory attendance, graduation rates, and instructional hours need to be studied. Exploring the relationship these inputs have on student assessments, specifically the NAEP test, this study describes the relationships between the states that have shown gains in graduations rates while others remain stagnant or fall behind. NAEP's goal was to report on each state's academic performance and include comparative data, because there was no clear means of assessing state education policies. NAEP helps researchers and policymakers strengthen the U.S. education system by providing a wealth of data for each state it serves. Some states have established their own state standards, such as Virginia, while others have followed Common Core Standards.

Recognizing what works will help to improve and adapt productive initiatives as a blueprint to other nations and states. Examining the effects of the variables, uses of resources, and changing state policies could provide critical information for improving schools and overall student performance. State governments face a constant challenge to create equitable schools through various policies. State policy makers have control over preschool access, compulsory attendance, required lengths of the day and year, courses and credits needed for high school graduation, and how much money is spent each year. Each of those variables affects student achievement outcomes. I chose those variables related to student outcomes because the data were readily available; the variables are not intended to be all inclusive. Policies and programs set at the state level influence school capacity and school student achievement (Newmann, King, & Youngs, 2000).

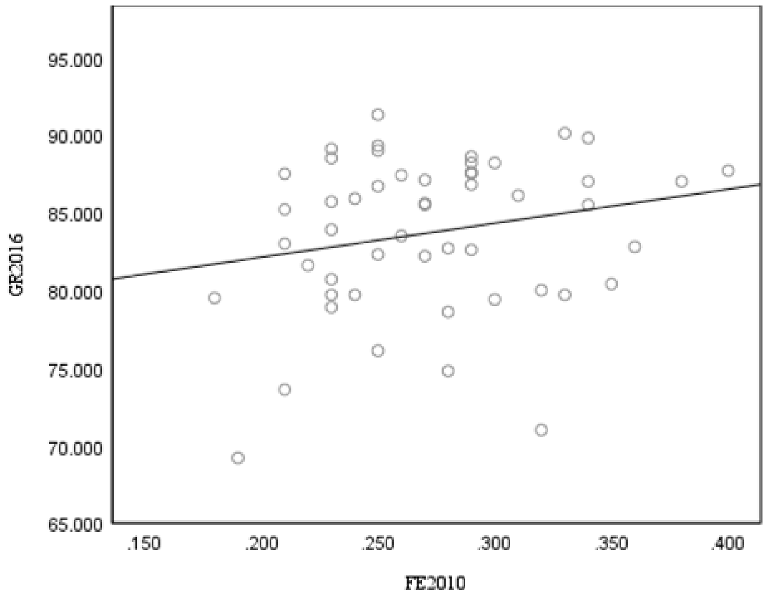
Money is positively related to student performance (Greenwald, Hedges, & Laine, 1996) and even more important than a state's fiscal commitment to schools is how the money is spent (Hanushek, 2016; Owings & Kaplan, 2020). Public school systems are being held responsible for the money spent on education. As previously noted, there is large variance among how federal, state, and local finances are distributed. For example, the range in federal revenue sources runs from a high of 14.8% in Mississippi, to a low of 4.2% in New Jersey. State revenue sources range from a high of 90.1% in Vermont to a low of 30.4% in South Dakota. Local revenue sources vary from Illinois's 58.8% to Vermont's 3.9% (Snyder & Dillow, 2017, Table 235.20). There is a huge discrepancy between the amounts of money each state spends per pupil. When comparing each state, it is evident that inconsistencies in funding exists. When exploring the total amount of per pupil expenditures, including federal, state, and local contributions, 18 States spend between $7,000 and $9,999, 22 States spend between $10,000 and $14,999, 9 states spend between $15,000, and $19,999, and 2 states spend over $20,000 per student. There is a difference of $15,225 between Utah and New York, the lowest and highest spending per pupil in the U.S. Some of the variance in spending can be due to cost of living in each state.

The importance between school funding and student achievement was initially researched by the Coleman Report (1966), and later followed up by Hanushek (1981). Both reports determined that funding was not linked to student achievement. Greenwald, Hedges, and Lane (1996) discovered that this was not the case, there are associations between spending and achievement, something Hanushek later supported.

The use of fiscal effort, instead of per-pupil expenditure provides an equalizing factor among states because it allows for eliminating differences in capacity and provides a fair comparison (Owings & Kaplan, 2020). Effort determines how much of a state's capacity is spent on education while per-pupil expenditure reveals the wealth of the state. Fiscal effort is even more substantial than per pupil expenditure because it provides a bigger picture of a state's commitment to education. A wealthier state will have higher spending per student than a less wealthy state, but the less wealthy state may also spend more of its income on education. Change theory suggests that it takes five to seven years for a change to take place with any variable. (Fullan, 2000). Using Michael Fullan's change theory, which states that it takes 5 to 7 years for change to be systemic, I investigated the effects of time lags on student outcomes. In the current study I explored fiscal effort over a 10-year span which is a critical component of this research to align with change theory. Applying change theory to the fiscal effort and graduation rates, I explored fiscal effort at the 5-year point to graduation rates. When I observed the scatter plot for fiscal effort in 2010 to graduation rates, 2016, you have the largest r^2 (.047) among the different scatter plots (Figure 3).

Figure 3

Scatter plot of Graduation Rates, 2016, to Fiscal Effort, 2010.



Recommendations for Practice

Education policymakers continue to analyze state and national trends and express great concern about student performance. Reform efforts are often tied to the rise or fall of test scores to justify educational reform efforts. The data used in this study are publicly available from the NCES website. This vast database includes easily accessible data that allow researchers to disaggregate and compare data at the country, state, and division levels. This vast data base includes easily accessible data that allows researchers to disaggregate and compare data at the country, state, and division levels. School leaders should identify the states with high graduation rates and NAEP scores and examine the variables to determine the effective programs, policies, and practices. School leaders can also identify the impact that fiscal effort has on student achievement. Research has shown that an increase in fiscal effort will decrease juvenile incarceration rates. Incarceration rates impacts graduation rates, therefore targeting fiscal effort to increase graduation rates will have a positive impact on society (Ellison, 2015). States must invest heavily in education if they want future economic prosperity for their citizens. Research affirms that total dollars and how they are spent have a positive impact on student achievement (Hanushek, 2016; Johnson, Johnson, & Persico, 2015). Students who drop out of high school are more likely to be unemployed, tend to earn less than those who graduate, be on public assistance, or end up in prison (Owings & Kaplan, 2020). According to a report on high school graduates in 2000, 56% of high school dropouts were unemployed, compared to 16% of high school graduates (Stanard, 2003).

School leaders should identify the states with high graduation rates and NAEP scores and examine the variables to determine the effective programs, policies, and practices. Of particular interest should be the states with low fiscal effort, and high graduation rates, and/ or NAEP scores. State policies attempt to provide minimum compliance guidelines, but this minimum standard often leaves localities with the financial burden. Localities are tasked with funding schools when the states do not provide enough to ensure that school divisions are equitably funded. Wealthier localities are at an advantage to provide funding for schools, leaving low-capacity localities at a disadvantage to attract high quality teachers, and decrease achievement gaps (Owings, & Kaplan, 2020).

The lack of significance among fiscal effort and graduation rates and NAEP scores is aligned with the Coleman Report (1996), and Hanushek's (1996) original findings that there was not a relationship between spending and academic achievement. Recent research agrees that more money will not equate to an increase in student achievement; of more importance is how the money is spent (Hanushek, 2016; Owings & Kaplan, 2020). The differences of these findings highlight the complex structures that occur within the context of educational researchers seeking to identify the relationship between educational expenditure and student achievement. Fiscal effort is an important measure for policy makers at the state and local level to monitor and decide how to allocate funds based on their capacity. As previously discussed, there is a limited amount of research related to fiscal effort and student outcome variables. This conundrum has led researchers and policy makers to question if more money will produce better student achievement. I recommend that future research focus on fiscal effort on the variables used in this study at the division, or student level. Increasing school funding alone does not guarantee the positive impacts stated from the research of Jackson et al. (2015), it is how the money is spent that is critical (Ellison, 2015; Hanushek, 2016)

This research did confirm the importance of NAEP tests as there was a strong relationship between NAEP scores and graduation rates. There is overwhelming evidence that NAEP scores are linked to positive student outcomes (Carnoy & Loeb, 2002; Judson, 2012; Fitchett & Haefner, 2013). There is also research that cautions the use of NAEP scores as a way to compare state educational systems (Ho, 2007).

While the literature supports more instructional time will lead to increases in student achievement, this research did not find a significant relationship between instructional time and the outcome variables. Phelps et al. (2011) understand the importance of instructional time, and while state policy and school improvement efforts focus on curriculum reform, a wide gap still exists between regulations and plans that specify things such as the actual amount of instruction students receive. Kidron and Lindsay’s (2014) meta-analysis examined more than 7,000 studies and concluded that increasing learning time programs had a small effect on literacy and math achievement. While this research did not yield the results expected, research has concluded that the amount of instructional time has a significant positive effect on learning (Rizzuto & Wachtel, 1980; Card & Krueger, 1992; & Betts, 1998).

Instructional time is so dependent on its relationship to other variables, such as teacher quality and curriculum, it is difficult to measure as a stand-alone variable (Baker, Fabrega, Galindo, & Mishook, 2004). There seems to be evidence to build a case for or against changing compulsory schooling ages. The main arguments of those in favor for changing compulsory attendance ages are that it will reduce dropout rates (Mackey & Duncan, 2013) which will lead to lower spending on social programs, public safety, and other state lead programs (Bedard & Dhuey, 2012; Li, 2006). Counterarguments are made that changing school ages will result in more cost, and students remaining in school against their will and thus becoming a distraction to others (Mackey & Duncan, 2013). Research has clearly established that early childhood education has a positive impact on students' later academic achievement (Connolly & Olson, 2012; Chang & Romero, 2008); social benefits (Barnett & Frede, 2010); and pays off later in life with decreases in poverty, obesity, depression, and other health ailments (Ludwig & Miller, 2007). However, Reschly's (2011) results indicated that the compulsory attendance age had no meaningful relationship with high school graduation. Further research into the other variables that surround instructional times is needed.

Recommendations for Policy

Throughout the literature review and research, it is evident that across the 50 states and Washington D.C. each have varying policies and student outcomes. In order to explain some of the variance among the states, and discuss the lack of statistical significance I explored states that were considerably above the graduation rate average and took a deeper dive into the polices that set each state apart from each other. For example, Nevada is the bottom third among states for all

NAEP tests and fiscal effort from 2006 through 2015 so it is not surprising that they rank in the bottom third among graduation rates at 74%. New Jersey's commitment to school equity came in a series of decisions based on a comprehensive school reform program that started over the past 30 years because of *Abbott v. Burke* (1997), and an earlier case *Robinson v. Cahill* (1970). Abbott v. Burke (1985) led to universal preschool in the state's poorest areas and extra funds to be tied to these schools to bring funding even with the wealthier divisions. New Jersey is in the top third for all NAEP tests, and fiscal effort from 2006 through 2015 and has the second highest graduation rate at 90.1. The focus on preschool education, coupled with an equitable finance funding formula have led New Jersey to increased graduation rates, and obtain high NAEP scores. These differences raise the questions which policy: state per pupil expenditure, compulsory attendance, graduation rates, and instructional hours need to be studied. Overall averages for NAEP scores, graduation rates, and fiscal effort from 2013 to 2015 are in Table 14.

Table 14

Average Score for 4th and 8th Grade English, Math NAEP Scores, Graduation Rates, and Fiscal Effort from 2013 to 2015.

Variable	***Average***
4th grade English	221
4th grade math	239
8th grade English	265
8th grade math	282
Graduation rates	84
Fiscal effort 2013	.259
Fiscal effort 2014	.244
Fiscal effort 2015	.251

Several states ranked above the graduation rate average (83.72) and were above the average fiscal effort for 3 consecutive years and ranked above the average NAEP scores. As stated earlier, New Jersey is among the highest graduation rates, well above the average for 4th grade English, math (233, 248), 8th grade English, math (275, 292), and consistently above average for fiscal effort throughout the 10-year span. It is not surprising that New Jersey has a rigorous curriculum were students must complete 24 credit hours that include 4 credits in English, and 3 credits each in math, science, and social studies. In direct contrast to New Jersey is Washington D.C., which ranks in the bottom third among NAEP scores, fiscal effort from year to year is inconsistent and have the lowest graduation rates. Washington D.C. compulsory attendance laws are among the longest at 13 years; children must be enrolled in school at the age of 5 through 18. Ironically, Washington D.C. requires three more years of required school than New Jersey and require the same amount of course credits for a student to graduate, so why does one state have graduation rates above 90% and the other below 70%? One major difference between the states which can be attributed to the 20-percentage point gap in graduation rates is their fiscal effort. I studied 10 years of fiscal effort from 2006 -2015 and New Jersey was above the average for all ten years. On the other side, Washington D.C. was below the average for 8 out of the 10 years. Fiscal effort 2015 was the first time Washington D.C. was at .30 for fiscal effort. It would be worth exploring what their graduation rates would be in the future if the policy makers continue to invest financially in their students.

Nevada is another state well below the average scores for NAEP scores, graduation rates, and fiscal effort. Nevada compulsory attendance laws require students to attend school from ages 7 through 18. The starting age of 7 is the second oldest among all the states. Nevada requires less credits than New Jersey, students need 22 credits, including 4 in English, 3 in math, and 2 each in science, and social studies. A student in Nevada would receive substantially less instructional hours over that year and have a less rigorous curriculum than New Jersey. The main observation is again tied to fiscal effort. Despite the differences in compulsory attendance, and less rigorous curriculum, the biggest difference is that Nevada has been well below the average for each year in fiscal effort.

Iowa is ranked number 1 with the highest graduation rate of 91.3. The graduation rates could be the result of a lack of rigor, as they require students to earn 14 credits to graduate. Iowa also ranks below the average for fiscal effort for each year which could account for the lack of statistical variance among fiscal effort and graduation rates. Iowa requires 1080 instructional hours for each grade which is among the highest of all the states but among the lowest for graduation rates. It would be beneficial to explore Iowa graduation rates and credits required to graduate to understand if the lack of rigor could explain the high graduation rates. State educational policy is an important component when surveying the future of public-school education. However well-intended state education policy may be in achieving increased student learning, the link between the policy and increased student learning requires further examination.

Recommendations for Future Research

I recommend that future research focus its efforts on the variables used in this study at the division, or student level. While compulsory attendance laws, and instructional hours were explored, it would be beneficial to tie preschool education into the equation for combined instructional hours. This research created a formula to look at instructional hours for a student in kindergarten through 12th grade, it would be beneficial to incorporate preschool education programs into the equation. Improving access to early childhood education must be a priority for policy makers. Poverty levels, as defined by state free and reduced-price lunch levels, between states, should be tied into fiscal effort when examining the highest and lowest performing states on the NAEP test.

We know that instructional time is so dependent on its relationship to other variables, such as teacher quality and curriculum, it is difficult to measure as a stand-alone variable (Baker, Fabrega, Galindo, & Mishook, 2004). Future research around the other variables and how that relates to NAEP scores and graduation rate would be valuable to leaders in education. Identifying the states and localities with high graduation rates and NAEP scores and examining the variables to determine the effective programs, policies, and practices within that state and locality would be of interest.

Substantial variance exists in course requirements for secondary education from state to state. Carnegie credits required to graduate vary from a low of thirteen to a high of twenty-six. To obtain a diploma in California, students are required to take and pass half of the number of classes required in Texas. Looking into credits closer, even more variance exists: for example, in English/LA, the number of required classes varies from 3 to 4.5. In science and math, the number of required classes varies from 2 to 4. And in Social Studies, the number of required classes varies from .5 to 4.While the variance in what each state requires for a student to graduate is worth exploring, it would be of greater benefit to look into how rigorous the credits are for graduating. Looking into the rigor tied to the content is critical to understanding the differences in graduation rates.

Conclusion

Education policymakers continue to analyze state and national trends and express great concern about student performance. The broad variance in educational standards, expectations, policies, funding, and student outcomes across our 50 states and Washington D.C. pose many educational, political, cultural, and social questions. Educational leaders believe that their school can always better (National Policy Board for Educational Administration, 2015) and the education which the young people of today receive will form the future of our country; therefore, it is critical that leaders make informed decisions that impact student achievement. Research into these differences may provide leaders with answers to these questions. The results from this study may provide direction for state and district level leaders as to which state policy reform efforts are needed to improve student outcomes. Few studies explore multiple variables and their relationship to NAEP scores and graduation rates. This study is timely and important for the future of education and state policy reform efforts.

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