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The Relationship Between Georgia Public School Educational Funding Sources and Academic Achievement

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

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MS, Georgia State University, 1995

BA, Georgia State University, 1983

Dissertation Submitted in Partial Fulfillment

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Doctor of Philosophy

Management

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Abstract

In the United States, state educational finance systems are required to ensure that every student obtains an adequate and equitable education. The purpose of this quantitative study was to evaluate the financial management aspect of public funding and the consequences of Georgia's reliance on local property tax revenue for financing its public school districts and attaining student academic achievement outcomes. The research questions examined whether there was a difference in student academic achievement levels of economically disadvantaged (ED) students based on the total 8th grade student population, annual property valuations, and median home sale prices during the 2006–2014 school terms. Systems theory management, resource allocation, and property taxation provided the theoretical framework for the study. Data were obtained from public, online databases in Georgia. Purposive sampling identified the ED students who took the Grade 8 Writing Assessment (EGWA), the test used to measure the ED students' academic performance levels (n = 27,136). Results from Pearson correlation analyses indicated an inverse relationship between the number of ED students who passed the EGWA and the median sale prices of homes, and school districts with high property tax revenue were more likely to have higher test scores than school districts located in areas with low property tax revenue. Multiple regression analyses showed that the academic performance of 8th grade ED students who passed the EGWA was predicted by the total number of 8th grade students who passed the test. The implication for positive social change is that it is not the amount of public funding that affects student academic achievement, but how the funds are spent that can change academic achievement.

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Dedication

This dissertation is dedicated to my son, Chase-Anthony Ray, for your unwavering love, encouragement, support, and faith in my ability to complete this journey. I love you and thank you for believing in me.

During challenging times in my life, I have relied on these words: “I know the plans I have for you, said the Lord, plans to prosper you and not to harm you, plans to give you hope and a future” (Jeremiah 29:11). As I come to the end of my dissertation journey, I simply want to declare, Thank you, Lord God Almighty-El Shaddai-Jehovah Jireh, for your daily mercies, sufficient grace, and favor, in Jesus’ name. Amen.

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This journey would not have been possible without the encouragement and kind support of many people. I would like to thank each committee member for the time you invested reading through my research study and making invaluable recommendations. To my committee chair, Dr. Teresa Lao; thank you for your guidance and support; committee member, Dr. Bob Nolley, served as my methods evaluator, and to the University Research Reviewer, Dr. Jean Gordon. I would also like to thank Walden University's professional support staff: Michael Miller, my dissertation editor, Libby Munson, for your support and encouragement, and Dr. Zin Htway, your knowledge of statistical analyses is incredible, thank you.

My PhD journey would not have been possible without the extraordinary love and support from my friends and family: Shirlene Mitchell and the Fulton County Tax Assessors retirees, my business partner, Theresa McGruder, Cliff and Linda Walker, my Sands Deirdre Knox, Soror Darlene 'Penny' Jones, Tara Parker, and my sister, Faye Ray. To Marilyn Wise Britt, you have stood with me and provided editorial skills that lessened the stress of this journey, but most of all, you are a friend, indeed. And to Melvin 'Sean' Hoston, thank you for motivating me and always being there to tell me to not quit and "just do the work".

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Chapter 1: Introduction to the Study

In the United States, public education is the responsibility of individual states. In most state constitutions, public education guidelines and regulations specify that the states are obligated to provide an adequate education (Arocho, 2014; Hyman, 2011; Sciarra & Hunter, 2015). The concept of adequacy pertains to the various approaches and methodologies used to measure the cost of educating a typical or average student (Picus, 2001). The role of state educational (school) finance systems consists of state and local financial resources that use rules, processes, and policies to meet district educational goals and objectives (Baker & Corcoran, 2012). Coupled with each state's financial obligations, it is crucial that student academic outcomes are such that the link between funding and student performance is paramount in the states' constitutional requirements (Augenblick, Myers, & Anderson, 1997; Iatorola & Stiefel, 2003).

Although states' educational finance systems have been evolving for many decades to produce improvements in resource allocation, the levels of positive student achievement gaps have almost remained unchanged (Bartz, 2016). To understand the financial implications of Georgia's public education funding policies, an evaluation of Georgia's financing and budgeting systems was required to assess the state's equity and adequacy frameworks for educating the state's student population. The objective was to examine the financial management aspect of Georgia's reliance on local property tax revenue for funding its public school districts. To address this issue, I reviewed the resource allocation practices at the student, school, and district levels which included school district costs, school-level budgeting, activity-based funding, and the generation of local tax revenue levels.

The goal of this research was to compare the student academic achievement levels of economically disadvantaged (ED) students who attend high property wealth school districts to ED students who attend schools in low property wealth school districts. School districts are significant because they are local and receive at least a portion of their funding from local property tax revenue (Aroche, 2014; Chingos, Whitehurst, & Gallaher, 2013). Therefore, I examined the State of Georgia's educational finance system to determine whether there was a correlation between student academic achievement and property tax revenue in low and high property wealth school districts.

The potential positive social change implications of the study may assist policy makers to understand how educational funding based on local taxation can affect the socioeconomic position of all students in every school district. That is, it the responsibility of education policy makers to ensure that all students become knowledgeable and productive citizens in society. Thus, the focus of this research, the relationship between financing public school education and student academic achievement outcomes, may contribute to the literature concerning education resource allocation.

Background of the Study

Public education in the United States has been a major contributor in the lives of students to become knowledgeable, pragmatic, and productive citizens. In Georgia, this objective began in the eighteenth century, spearheaded by towns, with the first state-supported school opening in August 1783. However, in 1868, Georgia's new constitution established a general education paid for by poll and liquor taxes (Mewborn, 2016).

Consequently, for more than a century, Georgia policy makers have been presented with the same challenge of how to improve and fund the education of its students.

According to the state constitution, Georgia has an obligation to provide an adequate public education for the citizens (Ga. Const. art. I, § II, para. III). Georgia finances public education by revenues from federal, state, and local sources. In 1985, the state enacted a school educational finance system, the Quality Basic Education (QBE) Act, based on a foundation grant program, developed for the operation and financing of its public schools (QBE Act, 2011). Although the federal government provides a portion of Georgia's education funding, state and local governments are responsible for the bulk of school funding (Davis & Ruthotto, 2015). However, each state has devised additional financing strategies for localities that are unable to meet the standard allocation (Verstegen, 2011).

Thus, according to Georgia's constitution, the purpose of the QBE Act is to provide "an equitable public education finance structure which ensures that every student has an opportunity to a quality basic education, regardless of where the student lives, and ensures that all Georgians pay their fair share of this finance structure" (QBE Act, 2011). The basis of the QBE Act was to ensure that statewide funding did not solely reflect local revenue but to focus on the educational needs of Georgia's students.

In the United States, since the inception of public schools, the local property tax has been the primary source of revenue to fund local school districts (Kenyon, 2007; Picus & Odden, 2011; Youngman, 2016;). Under Georgia's school finance system, QBE, local districts are required to raise five mills of tax revenue. The local fair share

contribution, 40%, affects the equalized tax base or digest (Davis & Ruthotto, 2015) and every local school district is required to contribute (Rubenstein & Sjoquist, 2003). Consequently, because of differences in property wealth and property tax revenue collections, the ability to raise funds differs among school districts, which may affect student academic performance (Kurban, Gallagher, & Persky, 2012; Lin & Quayes, 2006). Unfortunately, the amount of local revenue is directly related to the level of property wealth/value, location, and the actual tax revenue collected by each jurisdiction (Sjoquist, 2008). Therefore, where a student resides can be just as important as the resources allocated to each local school district.

The connection between where individuals choose to reside, the type of public goods expected to be received, and the cost and allocation of public goods was first hypothesized more than 50 years ago by Tiebout (1956) in the seminal article, "A Pure Theory of Expenditures." The author pointed out that individuals decide where to live based on household tastes and preferences for quality public services, including public schools. Mensah, Schoderbek, and Sahay (2013) found that where families lived had a direct relationship with their willingness to pay higher property taxes as long as it was reflected by better schools and high test scores. Likewise, Seo and Simons (2008) identified the positive relationship between housing prices and school quality, especially pertaining to academic student measures such as standardized test scores. As a result, in most cases, students' family income determines where the student lives and the school where the student is enrolled.

However, because of unfair opportunity for many students in the United States to obtain a quality education within their residential areas, the federal government stepped in to address this issue. In 1974, U.S. Congress declared it to be the policy of the United States that all children enrolled in public schools are entitled to equal educational opportunity without regard to race, color, sex or national origin, and the neighborhood is the appropriate basis for determining public school education (Equal Educational Opportunities Act, 1974). Since then, students have been allowed to go to school in their local areas or attend schools that may have been off limits to them before 1974.

My objective in this study was to analyze the gap in the literature of comparing the correlation between student academic achievement and property tax revenue in low and high property wealth districts. Li, Fortner, and Lei (2015) analyzed test score results and found them to be an acceptable gauge to understanding student academic achievement (Neymotin, 2010). My research will contribute to the gap in the literature concerning the effects of public school resource allocation practices and student academic performance of a subgroup of students.

Problem Statement

A major focus of school finance literature is the relationship between student academic achievement and school funding (Aroche, 2014; Baker, 2014; Bartz, 2016; Sorenson, 2016;). In 2015, Georgia enrolled 1.76 million students; 60% received free or reduced lunch (Georgia Department of Education, 2016). Within this subgroup, the eighth graders' scores on the reading test were 65% at the basic proficiency level and 20% at the above proficiency level. However, compared with students who did not

receive free or reduced lunch, they scored 87% on basic and 46% above the proficiency levels on the reading test (National Assessment of Educational Progress, 2015). The general problem that I addressed in this study is Georgia relies too much on local property tax revenue for funding public school districts and attaining student academic achievement outcomes (Chingos et al., 2013; Li et al., 2015; Niven, Holt, & Thompson, 2014; Sorenson, 2016). The specific problem that I addressed in this study was whether a difference exists in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend high property wealth middle schools.

Purpose of the Study

The purpose of this quantitative study was to determine whether a difference exists in student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend high property wealthy middle schools in Georgia. Georgia has 180 local school systems; 159 are county systems, and 21 are independent or city systems. In 2015, Georgia educated 1.76 million students (Georgia Department of Education, 2016). The target population was ED students enrolled in 11 local school districts. I used a correlational method to address the relationships between the independent variables: total number of eighth-grade students who took the Georgia Grade 8 Writing Assessment (EGWA), the total middle school property valuation, the total ED per-pupil property valuation, and the average sale price and the total number of ED eighth-grade students who passed the EGWA is the dependent variable measure used for student academic achievement.

Research Question(s) and Hypotheses

The purpose of this study was to determine whether a difference exists in student academic performance outcomes based on the location of the middle schools and school districts. The central question that guided this research was: Do Georgia's education policy makers use the student achievement data in its decision-making process when allocating resources?

According to Mandinach (2012), data-driven decision making is the process used by administrators and educators to guide their educational decisions. Informed data-driven decision making is important because previous research reveals that accurate data can lead to an increase in student academic outcomes (Della Sala & Knoeppel, 2015; Schildkamp & Kuiper, 2010). The research questions and corresponding hypotheses address the following:

1. Is there a difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts?

   $H_0$1: There is no statistically significant difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts.

   $H_1$1: There is a statistically significant difference in the student academic achievement outcomes of ED students who attend middle schools located in

low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts.

2. To what extent, are school districts with high property tax revenue more likely to have higher test scores than school districts located in areas with low property tax revenue districts?

$H_0$2: There is no statistically significant difference between the test scores of school districts with low property tax revenue compared with the test scores of school districts located in areas with high property tax revenue.

$H_1$2: There is a statistically significant difference between the test scores of school districts with low property tax revenue compared with the test scores of school districts located in areas with high property tax revenue.

Theoretical Foundation

In this research study, I selected three theoretical frameworks to provide an in depth understanding of the public education system in the United States: educational resource allocation, property taxation, and systems theory. The frameworks provide a synergistic view of public education in the United States and its evolution into one of the most important entities in society. The following is an overview of these theories and their relevance to this study. Public finance is an area of economics that pertains to how U.S. government manage its revenues, expenditures, and policies concerning the overall economy.

The government budgetary process has three key components: allocation of resources, distribution of income, and economic stabilization. All of them are required to

meet the government's fiscal responsibility of providing goods, services, and programs to its citizens (Kasdin, 2017). I focused on public education finance and the decision-making processes used in the allocation of resources (how to fund schools). Specifically, the theoretical framework addressed equity and adequacy in state public school finance systems.

In the United States, public schools are primarily under the jurisdiction of the state and local governments (Hyman, 2011); however, they receive some funding from the federal government. Since the nineteenth century, policy makers have attempted to determine how to successfully allocate education resources to ensure that every student can receive an equal, adequate, and efficacious academic experience (Baker & Levin, 2015). Equity, in school finance, pertains to fairness among all students. In their seminal work, Berne and Stiefel (1984) identified two forms of equity used to measure the distribution of educational funding. They defined horizontal equity as, equals being treated equally, and vertical equity pertains to funding individuals based on their differences (i.e., the unequal treatment of students that are unlike or not the same as the general student population).

The goal of equity is to guarantee each child had an opportunity to a fair education. For example, in order for children from low-income families to assimilate into the general school population often required additional services and programs (Ananthakrishnan, 2012; Baker & Corcoran, 2012). Hence, the challenge in distributing school funding is determining when to apply the appropriate amount of resources based on the equity framework.

Another central component of public finance is taxation, which is the primary source of revenue for all levels of government (Hyman, 2011). Taxes and borrowing come from public funds at all levels of government spending (Hyman, 2011). The way the federal, state, and local governments pay for spending affects the economy and the taxpayers who monitor governments' cost of programs and services.

The method local governments employ to finance their school operations is determined by state-imposed constraints and legislation. As creations of the state, local government entities are required to operate within the confines of its budget structure to comply with its laws and statutes. Thus, states determine local revenue reliance, defined as "the proportion of total revenues that a local government generates from one particular revenue source or several sources" (Pagano & McFarland, 2013, p. 10). For most jurisdictions, the primary sources of income are derived from taxes (property and non-property), other own-source revenue (user fees and service charges), and state and federal intergovernmental transfers (National League of Cities, n.d.). The property tax administration system in many states, assist local jurisdictions in obtaining property tax revenues, produce public education, and comply with local municipal budgets (Sjoquist, 2008).

Systems theory originated in the 1950s by the biologist Bertalanffy (1950/2008). Bertalanffy presented the idea that systems are composed of multiple entities and are managed by laws about their environment (Duryan, Nikolik, van Merode, & Curfs, 2012). In addition, the theory considers how the parts of a system respond to nonlinear interrelationships and behaviors (Thien & Razak, 2012). Systems theory is not like

reductionism which views a system as a sum of its parts (Andreadis, 2009; Bates, 2013). Instead, its focus is on the totality of the various components relative to the whole system. That is, the premise is to observe the interactions and connections based on behavioral patterns created within the system.

From a systems theory perspective, the structure of the public education school system has many of the attributes of a system. Like any other complex entity, an education system consists of interdependent and interrelated components whose objective is to achieve its goals on behalf of the whole system to educate students (Guevara, 2014). For instance, when the federal government issue mandates and reforms to the states these are passed down to local governments and implemented.

As in the case of the No Child Left Behind Act (NCLB, 2002), traditionally, public schools are controlled by local government units; however, viewed as an open system in the United States, federal education policy monitors the operation of public school districts (Neely, 2015). The continuation of education systems means that inputs such as school resources transform into outputs via the throughput process, which leads to desired outputs such as student academic performance outcomes.

Nature of the Study

Quantitative methodology was appropriate for this research study because it helped me test hypotheses through empirical investigation (Gelo, Braakmann, & Benetka, 2008). When quantitative methods are selected, the acquired information explains and determines if a relationship exists between variables. Conversely, qualitative approaches attempt to understand the reason or purpose for the actions of the subject matter

(Trafimow, 2014). Quantitative methods convert the information collected into numerical values to perform statistical analysis (Trafimow, 2014). Qualitative research methods use information that is nonnumerical and presented in a written or oral format (Cook & Cook, 2008). Although I analyzed the relationship between variables, the type of data in this study was not feasible for qualitative research methodology.

I selected a descriptive, correlational research design because it could determine the extent of the relationship between the variables by using statistical data for analyses (Gelo et al., 2008). Turner, Balmer, and Coverdale (2013) stated that descriptive research should answer the how and what questions concerning variables instead of why a phenomenon occurs. A correlational research design attempts to determine whether the relationships are positive or negative, the strength of the relationship, but not the cause and effect among two or more variables (Teddlie & Yu, 2007). Cook and Cook (2008) found that when the goal is to investigate and compare the differences between specific subgroups and the relationship between the variables, a correlational analysis is the best approach. In this study, I focused on the data, the distribution, and relationships of the variables. Thus, a descriptive, correlational design was appropriate.

Definitions

The following terms and their definitions will clarify the meaning of these concepts.

Academic achievement: This refers to a student's proficiency in mandatory subjects such as mathematics, reading, language arts, and science (NCLB, 2001). The

method of evaluating academic achievement is determined by the relationship of raw scores, without accounting for student background (Lubienski & Weitzel, 2008).

Adequacy: Pertains to the allocation and distribution of resources for funding public education K-12 (Ikpa, 2016).

Assessment value: In Georgia, property is required to be assessed at 40% of fair market value; it is the taxable amount used to calculate the property tax bill (Georgia Department of Revenue, n.d.).

Economically disadvantaged student: A student who is eligible for the free or reduced-price meal program (Georgia Department Revenue, n.d.).

Equity: The fair distribution of educational resources (including uniformity of facilities and environment, equal resource inputs, and equal access to educational opportunities) for all students (Pan, Rudo, Schneider, & Smith-Hanson, 2003).

Expenditures: The amount of education money spent by districts and/or states for school needs (including functions such as instruction, support services, and food services and objects such as salaries, benefits, and materials) (Pan et al., 2003).

Millage/tax rate: The ad valorem tax rate levied per thousand dollars of the taxable assessed value of property (Alm, Buschman, & Sjoquist, 2012).

Resource allocation: The process in which fiscal and nonfiscal resources are divided between competing needs and expended for educational purposes (Pan et al., 2003).

Sales ratio study report: The report compares the fair market value of properties that sold to the property value established by the local county assessment offices. The

study determines the extent to which one county generally assesses property at higher or lower values compared with another (Davis & Ruthotto, 2015).

Tax base: The total of all assessed values within a jurisdiction to which the property tax rate is applied. State law or local ordinances define what constitutes the tax base and determine what objects if any are exempted from taxation (International Association of Assessing Officials, 2013).

Assumptions

Assumptions in a research study serve as the basis for what the researcher considers to be an accurate representation of what is to be analyzed (Leedy & Ormrod, 2005). I made the following assumptions at the outset of this study:

1. To examine the education cost function, which focuses on the statistical relationships between resource allocation and student performance, requires available outcome oriented information and decision-making processes from entities such as school districts (Baker & Levin, 2015).
2. The 2006–2014 student outcome data will be available at the state and district levels. Accessibility to specific student, schools, and school districts data is essential to having enough information to conduct a research study on student academic achievement outcomes (Sorenson, 2016).
3. Access to the county tax digests and the subject school districts will provide identical information concerning property values and property tax rates which are necessary for the analysis of property wealth based on location (Davis & Ruthotto, 2015; Verstegen, 2015).

4. The school districts in the study have a high reliance on local property taxes. For the majority of American school districts, property tax revenue provides a significant amount of revenue for public education (Kenyon, 2007; Picus & Odden, 2011; Youngman, 2016).
5. Each student can receive an adequate education regardless of where they live within each school district. In Georgia, according to the state Constitution Section, I Paragraph I, the state has an obligation to provide an adequate public education for the citizens. Because of differences in property wealth and property tax revenue collections, the ability to raise funds will differ among school districts, which should affect student academic performance (Kurban et al., 2012; Lin & Quayes, 2006).

These assumptions were essential in determining whether the Georgia state school finance system, QBE was capable of achieving identified educational outcomes in a fair manner for all students regardless of the location of their residence.

Scope

The scope of the study refers to what I attempted to achieve based on specific components in the research study (Leedy & Ormrod, 2005). I focused on public education in Georgia. I examined 11 school districts located in eight counties (Clayton, Cobb, Dekalb, Douglas, Fayette, Fulton, Gwinnett, & Henry) and three independent school systems (Atlanta, Decatur, & Marietta) located in Metropolitan Atlanta. I selected these counties because they are similar in demographics and property value characteristics. The target population was eighth-grade ED students who attended public

middle schools in these districts. Thus, it was not necessary to conduct sampling procedures because every eighth-grade ED student was included to ensure that enough subgroup participants were available to cover the study time frame, 2006–2014.

I selected this time frame because it coincided with two events that affected this study; the 2006–2009 housing crisis and the No Child Left Behind Act's 2014 deadline for student proficiency levels in core subjects. Therefore, student academic achievement outcome data was required to analyze the cost function, (a key aspect in determining an adequate education) (Baker & Levin, 2015). I reviewed each school district's property digest/tax base to evaluate housing prices, property values, and property tax revenue. I focused on residential properties to assess high and low property values.

Delimitations

The delimitations in this study revealed why specific variables were selected. Although the target population was eighth-grade ED students who attended public middle schools in these districts, there was no need for sampling procedures because the study included all students in this subgroup. I included only residential properties located in these school districts' boundaries, even though all property types (commercial, residential, industrial, etc.) are necessary to determine the comprehensive level of property wealth and to focus on where students live regardless of their socioeconomic status.

Although I compared student academic achievement outcomes between high and low property wealth school districts, I did not include household and family income rates. Instead, my focus was on the location of the school districts based on state and district

data as the units of analysis. This form of analysis required a review of data changes in time, and it provided access to multiple levels of information from the state education finance systems.

Limitations

According to Leedy and Ormrod (2005), limitations are the components in a study that represent potential problems or weaknesses that may be significant to the research. The following limitations affected this research:

1. I reviewed only 11 school districts from eight counties from the total 180 school districts within the state. In addition, I did not include charter schools.
2. Other variables could affect student performance. However, the focus was on the independent variables, total eighth-grade students who took the EGWA, total middle school property valuation, ED per-pupil property valuation, and the average median sale price.
3. The study's time frame, 2006–2014 was limited because it represented two key events that occurred and may have affected the correlation analysis.
4. Bias may have occurred due to the familiarity of residential and commercial characteristics of the selected counties in the study. In the City of Atlanta, these property types are in adjacent counties and their school districts. Thus, the research did not apply to rural areas with high poverty or coastal areas composed of expensive properties.

Overall, I reviewed a small segment of the student population in a specific area within the state. The school districts' proximity to the same metropolitan area confirmed

or denied the focus of the research concerning the correlation between student academic performance and their attendance in a school located in a high or low property wealth area.

Significance of the Study

In this study, I addressed whether a difference exists in ED students' academic achievement outcomes due to the property tax revenue funding levels relative to where the middle schools and school districts are located (Riha, Slate, & Martinez-Garcia, 2013). The implication was whether state education finance systems ensure that its public school students are receiving an adequate education and if there was a correlation between student academic achievement and their residence in low property versus high property areas (Baker & Corcoran, 2012). As a result of the enactment of the NCLB (2002), states were required to validate their students' academic achievement outcomes. Subsequently, states turned their attention to evaluating their resource allocation schemes and determining whether they were paying for the right mix of financial measures (Baker, Taylor, & Vedlitz, 2004).

If a student lives in an area that consists of inexpensive property values, then the assumption is the quality of education may be inferior to a student who resides in a high property wealth area. However, this was questionable since many students reside in areas where there are expensive commercial structures but economically, the residents represented the lower socioeconomic level. Seo and Simon (2008) found a significant relationship between school performance and housing prices. Nevertheless, my research

was based on previous research concerning state obligations to provide the efficacious mix of resource allocation inputs and student academic performance outcomes.

Significance to Theory

In this study, I provided quantifiable evidence to determine the level of success of students' academic achievement based on high and low property value areas. That is, based on Georgia's current funding system, the two-tiered Foundation grant program, I wanted to know whether the school districts were providing an equitable and adequate education. Specifically, I examined the state's school finance system, the QBE Act, to determine whether it was achieving its goal to provide educational adequacy and equal opportunities at the same level of education for all students.

Education cost function (ECF) analyses served as the basis for addressing the statistical relationship between student performance, per-pupil revenue, and student academic outcomes (Baker & Levin, 2015). The ECF is capable of revealing the different student academic achievement outcomes among similar school districts that receive the same amount of funding. The analysis also applied to school districts that produce similar outcomes but have different levels of education funding (Baker & Levin, 2015).

Conversely, the resource cost model (RCM) uses state data systems' inputs to assess school district level fiscal measures such as per-pupil spending, revenue sources, and district characteristics such as total enrollment and pupil/teacher ratios. The RCM is an input-oriented method that measures how resources are organized, allocated, and their impact on student performance (Baker & Corcoran, 2012). Therefore, I relied on established costing-out methodologies to ensure that the education finance system was

valid and reliable in reporting whether it was using the correct data to produce accurate information.

Significance to Practice

The central contribution of this study was to inform state education decision makers concerning the effectiveness of how they allocated funding and other resources in achieving their standards and assessment goals. Decision makers may be able to identify the best mix of resources that can improve the academic experience of all students including federally defined subgroups. Consequently, hard data served as the basis for evaluating school financing as opposed to wishful thinking.

Significance to Social Change

The implication of this research study to social change pertained to Georgia's obligation to ensure that its students receive an equitable and adequate education. Specifically, it is the responsibility of the state to prepare its low-income, middle school students by providing a robust curriculum to meet state-based standards and graduate from high school. For many decades, researchers have indicated that student subgroups have been unable to perform at the same academic levels when compared with the basic student population because of their socioeconomic status (Bartz, 2016). Much of the difference has been due to the location of their residences and school districts.

The objective of this study was to assist education policy makers understand their obligation to enhance student academic performance. Part of their responsibility requires that every student has access to robust coursework. Ensuring that individual students have equal access to relevant course content is the only way that every student will have

an opportunity to meet state-based proficiency standards. Thus, the inability to receive an education comparable with every other student's in the district can reduce knowledge and the skills to be a productive citizen in society. Positive social change can be demonstrated when students are equipped to attain their desired goals. Therefore, having an equal education opportunity is a prerequisite for pursuing higher education or obtaining rewarding employment.

Summary and Transition

The purpose of this quantitative study was to examine the relationship between Georgia's reliance on local property tax revenue for funding public school districts and student performance. A correlational method was used to assess whether a relationship existed between the dependent variable, student academic achievement, measured by the ED students who passed the EGWA and the independent variables, the total number of eighth-grade students who took the EGWA, total middle school property valuation, ED per-pupil property valuation, and the median sale price. Hanna and Morris (2014) found whenever school districts allocated similar funding to students with the same characteristics, they were still left with different student achievement levels. Therefore, it was essential that school districts ensure that their quantifiable allocation inputs for programs and services focus on improving student academic achievement (Baker & Levin, 2015). These claims were supported by the ongoing debate in the literature concerning the link between district funding and increasing student test scores (Sorenson, 2016). Therefore, my goal for this study was to contribute to the gap in the literature

concerning low-income students' academic performance regardless of the location of the school they attend, and whether the school is in a high or low property wealth district.

In this chapter, I have introduced the state education finance systems' ability to provide an adequate education for all public school students. The effect of local property tax collection revenue on local school district budgets addressed the combination of financial resources on students' academic performance. I presented an overview of costing-out methodologies using the RCM to evaluate input measures and the ECF statistical approach to verify student academic performance outcomes that estimate resource costs. The study will continue with Chapter 2, which includes a review of relevant literature that discusses key factors that contribute to state efforts in funding an adequate education.

Chapter 2: Literature Review

In the United States, public education, a massive and complex system, is the responsibility of individual states. Although states' educational finance systems have been evolving for many decades to produce improvements in resource allocation, the gap between high-income students and low-income students' academic performance levels have remained unchanged (Baker & Corcoran, 2012). I attempted to determine whether part of the problem lies in where the school is located (i.e., if the students attend schools in low property wealth or high property wealth district schools). The purpose of this quantitative study was to determine whether the state of Georgia relies too much on local property tax revenue for funding public school districts and student academic achievement performance.

In the theoretical background section of this chapter, I examined and synthesized multiple scholarly studies related to resource allocation and student academic achievement. The literature review begins with a link to the problem statement and the premise that Georgia relies too much on property tax funding to affect student academic achievement performance. Education-based resource allocation, systems thinking, and property taxation theories were the theoretical frameworks for this study. These theories provide a synergistic approach to explaining the complex issues that pertain to student academic achievement in the public school system.

I used a thematic approach to investigate historical and current data to describe student academic performance. I explored each of the research variables and the interrelationship between educational funding and academic achievement. My goal in this

literature review was to demonstrate where this research fits into the existing body of knowledge and to provide practitioners with a better understanding of student academic achievement performance and some of the causes for the present state of the public school system. The chapter will end with a summary and conclusion of the literature review, as well as a transition to Chapter 3.

Literature Search Strategy

To understand what student achievement is about, the review included scholarly peer-reviewed journals, reports, standards, regulations, encyclopedias, and symposium proceedings related to educational resource allocation and student academic achievement was reviewed. To perform a comprehensive search for literature relevant to systems thinking, resource allocation, and student achievement, to ensure that all relevant topics were included in the review, I searchced the following terms: *resource allocation and student achievement, school funding, finance and education, equity and education, adequacy and education, high performance testing, test scores and accountability, financial resources, public school student performance, systems theory and education, decision making, property taxation, poverty and education, public education and low income students, and housing and schools.*

Leading authors who are relevant to the theoretical framework focused on resource allocation theory and student academic performance. Databases related to the fields of management, education, systems theory, and public finance gave additional insight on student academic performance. I performed a review of scholarly literature through the Walden University Library and public libraries using Boolean search

strategies in the following databases: Thoreau Multi-Database Search, Education Source, Business Source Complete, Science Direct, SAGE Premiere, ProQuest, ABI Inform Complete, SocINDEX, PsycARTICLES, PsycINFO, Academic Search Complete, Educational Resources Information Center (ERIC), United States Department of Education, and others.

The scope of the literature review was limited to scholarly journals, periodicals, reports, and dissertations published between 2010 and 2016. Conversely, I used certain older sources to support some aspects of the study. Although I selected numerous articles on the topic of educational resources and student performance within the time period of the study, no one source included all of the variables proposed in this study. I used seminal literature from the original authors to gain a better understanding of the theoretical frameworks of this study. The next section is the theoretical framework, in which I provide the basis for understanding the relationship between education funding and student academic performance.

Theoretical Foundation

Theories for resource allocation, systems theory management, and property taxation framed this study on student academic achievement. The first theory, local property taxation, is a primary source of revenue for local governments and public funding. The study evaluated the financial management aspect of public funding and the consequences of Georgia's reliance on local property tax revenue for financing its public school districts. This evaluation is related to the second theory, resource allocation, which focused on public education finance concepts, equity, and adequacy. The final theory is

systems thinking, a management approach to decision making for complex organizations. I will discuss these three theories in-depth to provide a well-rounded analysis of the topic, student academic achievement. Therefore, I will begin the literature review with a review of public finance, followed by resource allocation, In the next section, I will discuss systems thinking, and in the last section of the chapter, I will address student academic achievement.

Literature Review

Public Finance

Local property taxation. The property tax is a critical component in local government finances because of its proven stability and predictability for in the course of 75 years (Sjoquist, 2008). The stability of the property tax is the tax base; the foundation of local annual budget preparation and forecasting future public obligations (Davis & Ruthotto, 2015). The predictability of the tax can heighten expectation of receiving adequate amounts of revenue. The property tax is unaffected by fluctuations in the economy because it is an inelastic source of revenue. Elastic revenue sources such as sales and income taxes, user fees and miscellaneous charges rise, and fall based on economic conditions, which reduces fiscal stability and predictability necessary to provide core public provisions (Dye & Reschovsky, 2008; Ross & Yan, 2012). As a result, the confidence and reliability of receiving enough revenue permit local officials to focus on other administrative issues and not only on finances within their jurisdictions.

Characteristics of the property tax. Over the decades, the property tax has become the primary source of revenue for local governments (U.S. Census Bureau,

2015). Local governments and taxing authorities rely upon several advantages inherent in the property tax: the tax base is immobile, it is a stable and a predictable source of revenue, it taxes every property owner, and it is difficult to avoid. Youngman (2016) found these attributes to be the basis for continuous growth potential as a constant source of income not found in other local own-source revenues (Giertz, 2006). The ability to provide the ongoing delivery of core public provisions and maintain financial autonomy leads to successful decision making and annual program planning (Cornia & Walters, 2006; Mitchell & Thurmaier, 2011). While there are many positive features of the property tax, these same attributes can also be the basis of its negative perception among taxpayers.

Property taxes and local budgets. Local government financial managers must be vigilant about the effect of housing prices on assessed values regarding local budgets. To analyze the response of local jurisdictions to changes in their tax bases, researchers have studied the relationship between the housing markets and property tax collections. Lutz (2008) used national and local level data to estimate the elasticity of the cost of housing and property taxes. The results produced a 0.4 elasticity, which indicated that government officials would be inclined to compensate for the 60% increase in revenue from increased property values by reducing the millage rate.

Additionally, the research findings revealed it takes approximately three years before increases in house prices affect property tax revenues. Lutz indicated that the 3-year lag was a result of the gap between matching the assessed values with market values or revaluations (a review of the values on the tax role or tax base). Lutz's findings

revealed how the lag time between value changes would cease to be a problem if there was a consensus among states concerning when and how often revaluations should occur. Standardized property revaluations could affect not only the timing of changes in property values and property taxes but improve local jurisdictions' capability to stay abreast of annual changes in the real estate housing market.

My analyses of state and local government data revealed how jurisdictions addressed the effect of the housing markets on their budgets. Alm et al., (2012) focused on how communities handled the housing boom and its effect on property tax revenues. Their findings demonstrated that the decline in property values did not negatively affect the budgetary process. The authors' findings also supported Lutz's 2008 hypothesis that local government officials often adjusted the millage rate opposite from the change in the direction of housing values. That is, depending on the type of change in property values (increased or decreased) the millage rate was adjusted to ensure there was not a change in property taxes. In addition, Alm et al. evaluated the relationship of house values to tax revenue using Georgia school districts to substantiate their conclusion; whenever assessed values increased, then the millage rate (effective tax rate) was equally reduced.

The role of housing prices and property tax revenue. Additional analysis of the link between the cost of housing and property taxes led to other conclusions. In another study, Lutz, Molloy, and Shan (2010) arrived at a different conclusion concerning the link between house prices and property taxes. Their evaluation consisted of five types of local revenue streams to determine whether there was a correlation between the downturn in the housing market and the amount of state and local revenue generated. The objective

was to assess the influence the housing bust may have had on state and local government finances. The findings revealed that a decline in housing prices did not result in a reduction in property tax revenue, like Lutz's (2008) conclusion. That is, the time lags between reconciling assessed property values to market values and tax officials' willingness to raise tax rates did not result in reduced property tax revenue. Lutz et al. (2010) concluded that without a change in property values, taxes could remain unchanged from the previous year. Instead, the authors found that after property values are adjusted based on sales activity, the new values contain information that may have occurred two to three years earlier and considered a loss in revenue in prior year local budgets.

Likewise, I examined the role of revaluations to understand the relationship between property tax revenue and local housing markets. Vlaicu and Whalley (2011) demonstrated the positive benefits of annual revaluations contrary to the conclusions obtained by Lutz (2008) and Lutz et al. (2010) concerning the impact of lags between revaluations. Vlaicu and Whalley measured property tax revenue per capita using city, year, and average house prices over a two-year period using a two-way fixed effects model. Specifically, they considered localities where frequent reassessments occurred throughout the housing boom. First, they found that the frequency of revaluations led to greater accuracy between residential assessed values and the housing market. Second, they concluded that based on when the local government conducted reassessments could result in a positive correlation between house prices and property tax revenue.

Based on the evidence, Vlaicu and Whalley were unable to find a link between housing prices and their effect on local government budgets (total revenue and

expenditures). Instead, they realized that changes in assessments were not relevant because governments adjust tax rates to balance their budgets. Therefore, it is not the amount of revenue raised from the property tax that controls the changes in the assessed values, because the tax rates are adjusted by policy makers to cover gaps in most government budgets. The role of local government to offset the amount of taxes to maintain their budgets is known as a residual view of property taxation policy (Netzer, 1964). Vlaicu and Whalley's findings indicated that other sources of revenue were decreased in response to increased tax revenue whenever there were changes in property values. The explanation of this occurrence was, public officials usually adjust or rollback the millage rates and the rates of other taxes to handle the extra revenue and have a balanced budget (Alm et al., 2012).

Ihlanfeldt (2011) examined the changes in house values' effect on local government budgets throughout the State of Florida. Specifically, the author examined how officials handled changes in their local tax bases due to changes in property values. Ihlanfeldt found that because the main concern of officials was the actual tax base and not the effect of property values, it required the officials to understand the link between changes in property values and the budgetary process. This was significant, because as fiscal officials responded to fluctuations in government finances and legislated balanced budget requirements, they typically resort to three standard solutions (a) adjust the millage rate to ensure property tax revenues cover expenditures, (b) manage other revenue sources through policies adjusted to balance the change in tax revenue, and (c) balance all revenue sources to total expenditures as needed. However, to aid localities to

improve their financial capabilities, Ilanfeldt recommended policy makers use additional techniques to assist elected, and public officials obtain greater fiscal capacity.

The History of Public Education Finance in the United States

Funding Public Education

In the United States, the states and local governments are responsible for financing public elementary and secondary education (Hyman, 2011). Nevertheless, in many states, the primary responsibility lies with the local government units: cities, counties, and school districts (Verstegen, 2011). Although state constitutions made them responsible for educating their citizens (Youngman, 2016), once public education became prevalent throughout the states by the 1800's (Mewborn, 2016), the states shifted the sole responsibility of educating children to their local jurisdictions which included using local sources to finance them (Hyman, 2011).

Schools became decentralized entities in New England when they devised a system to separate schools by district within the individual towns to use local taxes to fund the schools. These decentralized schools became school districts, municipal units with taxing authority (Hyman, 2011). To date, this system is the basis for state school funding systems. However, the states' role in funding education changed in the 1950s because of litigation, education finance systems, and the implementation of federal government education reforms (Aroche, 2014).

Public education finance theories. Education-based public finance policies began in the 1920s. At that time, local governments were still responsible for funding public schools and the states provided minimal support (Verstegen, 2011). The first

theorist to address public education finance and the problems of local funding was Ellwood Cubberley. Cubberley questioned the sufficiency of local revenue as the appropriate source to fund local public school systems in his 1906 Ph.D. dissertation (Verstegen, 2011). Cubberley argued that the states were concerned about the local school districts ability to increase and distribute funding. Cubberley recognized that localities had different funding levels and were unable to accomplish state funding requirements to the same degree. In addition, due to local funding capacities, the states would have to supplement poorer jurisdictions to ensure that every student received the same, equal education.

In 1923, George D. Strayer and Robert M. Haig built upon Cubberley's theory regarding disparities in state finance systems, which led to the development of the Foundation Program concept (Verstegen, 2011). To date, the foundation program plan is used by over 40 states as the mechanism to fund school districts (Verstegen, 2016). The objectives of the foundation program required states to:

- Come up with a dollar amount that represented a basic, minimum level of education, the foundation.
- Ensure that every local jurisdiction in the state contribute a uniform tax amount to the program.
- Establish a uniform set rate (even though wealthier tax districts would raise more revenue that poorer districts) and the differences in local contributions were made up by the states.

- Recognize the amount of taxes needed to fund the program under the plan included the amount of revenue it required for affluent districts to fund the program, even though the wealthy districts would not receive additional funds from the state.
- Local districts were permitted to raise revenue above the foundation amount through local tax levies.

The disparities produced by this formula is what contributed to the differences in the quality of public schools located in high property wealth districts compared with schools located in communities with low property wealth (Aroche, 2014; Baker & Levin, 2015; LaPlante, 2012). Due to the contributions of these public education finance theorists, many systems and processes have entered the scope of funding schools. Unfortunately, the problems and inequities associated with educating students over a century ago are still unresolved in 2017.

The Federal Role in Public Education

The U. S. Department of Education (DE) was created in 1867 as the Office of Education. The department's task was to gather data to help states enhance the teaching profession and improve school systems through effective practices (U. S. Department of Education, 2016). In 1890, the Second Morrill Act made the department the administrator of land-grants colleges and universities. In the 1940s, as soldiers returned from World War II support for public education led to the Servicemen's Readjustment Act of 1944, the "GI Bill." The bill was a federal program developed to provide postsecondary

education assistance to returning soldiers; eight million veterans attended college (U.S. Department of Veterans Affairs, 2016).

In the 1960s and 1970s, the federal government turned its attention to civil rights and anti-poverty legislation. In 1965, the Elementary and Secondary Education Act (ESEA) was enacted to equalize the public education system (U.S. Department of Education, 2016). A major feature of ESEA was Title I, formed to address problems of the poor and disadvantaged children in rural and urban communities. To date, the DE is responsible for the administration of programs and policies. In addition, the department provides grants and program funding, monitors discriminatory practices, and continues to collect data for analysis and research.

The DE is the channel that the federal government uses to administer its policies to the states. An example of this role is the education reform policy, NCLB. Federal education mandates are managed and implemented by the states. There are three procedures for distributing federal education revenue to the states (a) the allocation of the funds uses a statutory formula to determine eligibility; (b) the funds are distributed as a competitive tool for specific projects, programs, and (c) as a needs-based assessment for families and students (U.S. Department of Education, 2016). Therefore, the federal government's role in providing support for public education is financial and based on reform policies in an effort to improve the overall education experience.

State Role in Funding Public Education

State educational accounting. In most states, according to their constitutions, they have an obligation to provide an adequate education for their citizens (Aroche,

2014). In addition, states are responsible for identifying processes to fund education which for most states includes revenue from local property tax collections (Davis & Ruthotto, 2015). Early educational accounting and accountability practices consisted of basic bookkeeping methods that consisted of maintaining general operations. However, there was no process in place to use the information to assist states in the decision-making process (National Center for Education Statistics, 2014; Odden, Archibald, Fermanich, & Gross, 2003).

In the 1950s, to help states remedy this situation, the DE developed a fiscal accounting handbook to categorize expenditures by each function: instructions, administration, supplemental support, operations and maintenance, transportation, and food services (U. S. Department of Education, 2016). What the handbook did for state school systems was provide a national set of standards and guidelines. The standardization of reporting uniform and comprehensive state financial data became the state education finance system (National Center for Education Statistics, 2014). It was beneficial to school systems for accountability, decision making, and reporting capabilities for oversight of public funds.

Conversely, by the 1990s, because each state had different regulations and policies regarding their accounting practices, it led to fifty different education finance systems (Della Sala & Knoeppel, 2015). In addition to uniform standards and reporting capabilities, the state education finance systems assisted states in understanding how to distribute funding to their school districts and ensure that every citizen received the same access to an equal education (National Center for Education Statistics, 2014). The states

used education finance systems to provide detailed expenditure reports because the focus was on education programs instead of operations such as special education, compensatory education, and gifted and talented education. Subsequently, to ensure that students had an equal opportunity to education, the state education finance system enhanced the states' ability to allocate resources by monitoring fiscal and non-fiscal information (U.S. Department of Education, 2016).

All state education systems are independent and based on each state's legislation and statutes, but how to provide an adequate education has been a point of contention since the conception of public education over two centuries ago (Hanushek, 2016; Hyman, 2011). To date, education policy makers do not have a formula to successfully allocate education resources to ensure that every student can receive an equal and efficacious academic experience (Baker & Levin, 2015). In 2014, the United States spent approximately $614 billion on elementary and secondary education; the federal government provided $52.9 billion, the states $288.6 billion, and local governments contributed $276.2 billion obtained primarily from property tax collections (U.S. Census Bureau, 2015).

The cost of school district operations for the past 50 years reveals that 60% of their budgets was for instruction, an indication of the states' responsibility to provide students with an adequate education (Burchbuckler, 2013; Picus, Odden, Aportela, Mangan, & Goeta, 2008). In the past, the largest contributor of funding was local government units; however, now, the states' contribution to public education funds has increased and covers approximately 46% of total expenditures (U.S. Census Bureau,

2015). Although the amount of money allocated for educational resources should have been sufficient to ensure an adequate education, disparities continue to persist. Thus, the primary objective for the states is to determine how to fairly quantify and create an adequate education system.

State educational funding methods. There are four formulas or formula combinations that states employ to calculate funding for K-12 public education (Verstegen, 2016), they include the following:

- Foundation programs use a base or uniform amount for per-pupil expenditure through a combined state and local school district funding formulas, 37 states use this method to fund schools;
- District power equalization (or Guaranteed Tax Base) the state guarantees each school district get an amount of funding, it changes annually because it is an annual tax rate, two states use this method;
- Full state funding. Hawaii is the only state to provide full state funding (i.e., all school district funding is provided by the state);
- Flat Grants. North Carolina is the only state that provides school districts with a uniform amount of funding per unit, such as per pupil; and
- Combined two-tier is a formula in which the foundation serves as the base and property taxes account for the additional funding; nine states use this method to fund their schools.

Funding Sources

Federal government. The federal government provides supplemental funding for public K-12 public education. The funding mechanism is the ESEA Act, and its largest grant program is Title I. It was created to provide programs and services to assist certain student subgroups achieve state-based proficiency requirements (U.S. Department of Education, 2016). In 2015, states received $14.4 billion, in 2016, $14.9 billion, and in the 2017 budget, states will receive $15.4 billion in Title I grants. The projected 2017 budget will also include the following for education funding: $1.3 billion for pre-school programs; the creation of a new "Computer Science for All" will receive $4 billion in mandatory funds (these are entitlement programs and required by law) and $100 million in discretionary funds (adjusted annually by Congress); $1 billion for a new teachers program, RESPECT, is designed to encourage focus on the needs of low-income and minority students, in addition, $2.8 billion in discretionary funds is allocated for professional development programs (U.S. Department of Education, 2016). Hence, all of the funding provided by the federal government is designed to assist states to provide an adequate education for its citizens.

State government.

Georgia QBE Act (1984). Georgia's constitution is identical to the charge of other state laws regarding its obligation to provide an adequate education for the citizens and the responsibility to pay for their education (Art. 8, § 1, ¶ 1.). Georgia receives financial assistance from the federal government and its local jurisdictions from local property taxes. In 1985, the state enacted its education finance system, the QBE Act

(QBE, 1985). QBE is responsible for identifying the methodology to allocate state funds to the public school systems. QBE is a foundation formula program; however, the state utilizes a two-tiered process to finance its schools (Verstegen, 2014). To distribute and allocate resources it uses the weighted full-time equivalent (FTE) student enrollment method. This formula supplies the state contribution allotment of funding and local contribution is determined primarily from the local property tax base (Alm, 2013; Rubenstein & Sjoquist, 2003). In FY 2014, Georgia received $14.5 billion in revenue, or $8,530 per FTE for its public K-12 school districts; federal contribution, 7.8 %; state contribution, 51.4%, and the local contribution was 40.9% (Davis & Ruthotto, 2015).

Local government.

In Georgia, every school district contributes to the QBE finance system (QBE Act, 2011). Local funds come from local property taxes and the state's foundation formula allotments. The ability of systems to raise local funds varies depending on differences in property wealth per student and the taxpayers' ability or willingness to pay higher taxes (Davis & Ruthotto, 2015). Once the QBE formula calculates the amount of funds to supply an 'adequate' education, local districts are responsible for covering additional funds that represents five mills, plus an equalization grant to qualifying districts.

Five mills are known as a district's Local Fair Share (LFS). When districts levy their required five mills, they are raising funds equal to 40% of their equalized property tax digest and subsequently multiplying the 40% net tax digest by 0.0050 to arrive at the LFS. Local Fair Share, per the QBE Act, must not exceed 20% of the total QBE formula

allotment. The QBE formula apportions funds based on FTE counts that occur between October and November. The final FTE count takes place between March and May (Georgia Department of Education, n.d.e).

Although the property tax is essential to school funding, the downside of the revenue is that it is responsible for the inequities in educational resource allocation (Kurban, Gallagher, & Persky, 2012; Youngman, 2016). To address the discrepancies associated with the tax, Aroche (2014) proposed a legislation-based program to alleviate inequity in school finance systems due to local property tax education funding processes. The program, as an incentive, would tie a percentage of federal Title I funds to states who implemented new methods to reduce inequity to educational opportunity. Aroche argued that due to states' long-term reliance on local property taxes to fund public education, has produced considerable disparity and unequal statewide educational spending practices.

These differences have contributed to students that attend low-property-wealth school districts subjection to unequal inputs, state-based proficiency standards and minimal improvement in outputs, and student academic performance. Aroche surmised that because previous efforts from the judicial system and state-based reform policies failed to resolve the equity issue, maybe congressional involvement would produce different results. The author tied the validity and conceptualization of the program to Congress' authority via the Taxing and Spending Clause of the Constitution and the Supreme Court ruling in *South Dakota v. Dole*.

The proposed remedy would encourage states to modify their school finance formula for distributing funds. Although most states use foundation formulas (Verstegen,

2016), nevertheless Aroche recommended implementing the Guaranteed Tax Base (GTB) method as an alternative to existing processes. Viewed as a subsidy, the GTB could direct school districts to increase their tax rates, which would primarily benefit low-property-wealth districts. Foundation formulas operate on the premise that there is a specific level or base that represents the minimal cost associated with per pupil expenditures to provide an adequate education.

Under the current system, states require each school district pay a 'required local effort' or property tax rate. If a school district is unable to achieve the uniform foundation level (the tax rate multiplied by assessment property values) of per-pupil expenditure, then the state makes up the difference. However, if a school district's foundation level exceeds the state requirement amount, they are authorized to keep any overage amount. Consequently, this process is why wealth became a factor in funding public school systems (Youngman, 2016). According to Aroche, the GTB method is another technique to minimize the inequity that is prevalent among school districts throughout the country today.

By adopting the GTB method, to qualify for federal funds, this program would contain a mandatory minimum per-pupil expenditure based on the cost of living amount. In addition, it would enforce uniform foundation levels which typically penalize low-property-wealth school districts. Consequently, the funding of schools would affect federal Title I allocations for school districts that refused to participate in the program.

Aroche's goal for the program does not recommend removing current mandates but to focus on the allocation of school funding. Furthermore, it would require states to

maintain their accountability and administration of their school funding operations. By limiting Title I funding to 10%, it does not require the school districts to choose between adopting the policy and losing federal funds. The program would be an avenue for school districts to minimize the effect of wealth and remove another obstacle to equalize per pupil expenditures. Thus, the program would have a direct effect on removing inequities to access educational opportunity and closing the student academic achievement gap.

According to Youngman (2016), the ongoing challenge for states has been how to best utilize local revenue for low-property-wealth school districts. The problem is poorer school districts resource levels are insufficient to support an equal opportunity education. These districts are unable to keep up with the funding sources found in wealthier school districts even though their tax rates may be higher (Kenyon, 2007). Thus, to improve access to an equal education, states must move beyond an exclusive reliance on local property taxes which is a local problem for funding every school district.

Resource Allocation

To address growing public concerns regarding the allocation of funds and programs, education policy makers had to address the concept of equality in public education (LaPlante, 2012; Niven et al., 2014; Odden, Archibald et al., 2003). The U.S. Supreme Court operationalized the term, equality, in the *Brown v. Board of Education* (1954) decision which served as the vehicle to expose this deep-rooted problem that existed within the public education system. Although the court's focus in 1954 was on equal accessibility to the public education system, it did not address the concept of educational equality for all citizens (Hoffman, Wiggall, Dereshiwsky, & Emanuel, 2013).

Equality in public education pertains to the allocation of fiscal and non-fiscal resources (Pan et al., 2003; Sorenson, 2016), an ongoing issue for education policy makers and stakeholders. The challenge for states became how to provide an education that was fair and acceptable to every student. Subsequently, states were charged with the task to redesign the education system to reflect equity and adequacy, two concepts which to date are still unresolved (Toutkoushian & Michael, 2007).

Equity and Adequacy

According to Picus (2001), an adequate education refers to the different approaches, methods, or strategies used to determine or measure the cost of an adequate education for the average child. As a result of federal guidelines and state adopted standards, state finance systems should reflect equal education opportunity and higher academic achievement levels for its students (Baker, 2014; Baker & Levin, 2015). For school systems to know what an adequate and equitable education was required policy makers to define and identify a process on how to perform this task. The problem is there is no agreed upon solution to answer the "how" (Figlio, 2004).

To address educational adequacy and equity, Figlio (2004) stated that schools must review the following questions: What level of school quality and academic outcomes represent an adequate education, and to meet adequacy levels, how much funding is required to satisfy state-mandated student academic achievement performance? Hence, the state is required to measure adequacy by estimating the cost of obtaining positive student academic outcomes. After decades of school systems'

challenges to quantify equity among its schools and students, national school litigation led to states' obligation to provide an adequate education (Verstegen, 2011).

The role of state reforms concerning equity and adequacy.

In the 1970s, states continued to wrestle with the concept of educational equity. States turned to the judicial system to understand the national focus on public education (Hoffman et al., 2013). To address this issue, two court cases *Serrano v. Priest* (1971) and the *San Antonio Independent School District v. Rodriguez* (1973) focused on the role of property taxes and the subsequent disparities in school funding within the same school districts. Although *Serrano* (1971) was the first case to deal with property taxes and school funding, California suffered a setback when *Rodriguez* (1973) sought equal education based on the Fourteenth Amendment. Subsequently, the court ruled in the *Rodriguez* decision that school funding cases were a state problem and not protected by the U.S. Constitution (Aroche, 2014).

In 1976, *Serrano v. Priest* was presented again in state court. This second attempt led to the introduction of states' developing equalization formulas to offset the significance of property tax collections as the primary mechanism for school funding (Alm et al., 2012). Subsequently, multiple school systems throughout the country that were in litigation, required clarification of the role of their state constitutions' obligation to provide an adequate education for its students (Aroche, 2014). However, once the public recognized that it was the courts that would take on equity issues, there was another level of concern, how to define adequacy (King, Swanson, & Sweetland, 2005).

Like equity, the introduction of adequacy required the courts to determine what "opportunity" meant in the distribution of educational resources (Aroche, 2014). The reason this became important is because there is a link between state proficiency standards outputs (student performance), input levels, and allocating resources (Knoeppel & Della Sala, 2015). The litigation and new interpretation of equity led to the development of adequacy education reform (Ananthakrishnan, 2012).

In the 1980s, the movement towards defining adequacy (which focused on whether the right amount of resources provided by the states were enough to help students achieve state proficiency standards), also required the courts' involvement (Toutkoushian & Michael, 2007). Subsequently, the benefits achieved by this reform litigation identified the type of resources students were receiving compared with what was needed to attain state-based proficiency standards (Della Sala & Knoeppel, 2015). Additionally, the change toward adequacy led to another situation, the necessity to integrate the concept into school education finance systems, (which to date is still an ongoing exercise among the states) (U.S. Department of Education, 2016).

To address adequacy and equity, the challenge became how and when to apply the appropriate amount of resources based on the equity framework in the distribution of educational funding. Berne and Stiefel (1984), in their seminal work, "The Measurement of Equity in School Finance," identified two forms of equity, horizontal and vertical. They defined horizontal equity as equals treated equally and vertical equity as the unequal treatment of unequals. Toutkoushian and Michael (2007) pointed out that due to

the complexity of the concepts, Berne and Stiefel created the definitions to help clarify the individual nuances that face education policy makers.

According to Berne and Stiefel (1984) horizontal equity, is the equal treatment of equals. This concept requires school districts to allocate the same amount of financial resources to schools based on the similarities that exist among the typical student. That is, states are obligated to ensure that everything is equal among the schools within the same districts, and every student have access to equal educational opportunity, which is a form of horizontal equity (Della Sala & Knoeppel, 2015; LaPlante, 2012).

Vertical equity, the unequal treatment of unequals, applies to the education of student subgroups (Ananthakrishnan, 2012). However, vertical equity requires school district allocation funding to accommodate student subgroups because compared to the average student population the cost to educate them is higher than the average student (Toutkoushian & Michael, 2007). Nevertheless, despite what each concept represents, there is still an unacceptable definition for educational equity within the public education system (LaPlante, 2012). Neither is there an established process to measure the cost of providing an adequate education (Baker, 2014; Reschovsky & Imazeki, 2000). Therefore, the goal of every school system is to guarantee each citizen the opportunity of a receiving a fair education regardless of the socioeconomic status of the student.

The courts' major contribution concerning adequacy required states to determine the right mix of educational resources to ensure an acceptable education (Ananthakrishnan, 2012; King et al., 2005; Sorenson, 2016). That is, state courts placed the burden of determining adequacy on the school district plaintiffs to provide evidence

through the valid and reliable methodology for the cost of providing an adequate education (Hoffman et al., 2013). Subsequently, this directed the efforts of the school districts to seek out several methods and approaches that had been developed in the 1920s (Aroche, 2014). This allowed them to satisfy the courts' directive to measure and determine the cost of an adequate education for the typical student. To date, there are four costing-out methodologies that determine the cost of an adequate education (Baker & Levin, 2015): resource cost model, education cost function, the successful schools, and the professional judgment method.

The resource cost model (RCM), measures the cost of educational services (Baker & Levin, 2014; Chambers, 1999) by utilizing the professional judgment and evidence-based methodologies. According to Baker et al. (2004), these methods measure the cost of an adequate education; however, they have different approaches to recognizing the required resources. The basis of the professional judgment approach consists of a panel of education experts (stakeholders, educators, and policy makers), who recommend the cost of resources that will meet state proficiency standards. Whereas, the evidence-based approach uses school reform models that promote resource allocation that have proven to be effective concerning positive student academic outcomes.

On the other hand, when education decision makers want to emphasize student academic outcomes, the focus of the analysis is performance-based. The education cost function is an econometric method that employs statistics to estimate the cost of educational resources based on data at the district level. The data includes district and student characteristics relative to the effect on school funding and student academic

outcomes. The objective of the analysis is to use data from the average student population and district characteristics to calculate the average cost of producing desired academic performance (Baker et al., 2004).

Similarly, the successful schools' method identifies school districts that have strong proficiency levels. This approach develops costs by analyzing district expenditures and adequacy levels (Baker & Levin, 2015) based on the weighted average of per-pupil spending (Ananthakrishnan, 2012). These approaches are designed to arrive at the best combination of resources and cost estimates to produce an adequate education. State education finance systems employ these methods to guarantee students an equal, adequate, and effective public education.

Once adequacy became the focus of school finance policy and a general definition was accepted (the level of monetary resources required for a student to achieve proficiency standards) (Picus & Odden, 2011), this was hailed as a major accomplishment within the public education system. Although states have a reasonable definition for adequacy, they still must deal with vertical equity, because it requires that all student subgroups also achieve state proficiency standards. The allocation of resources must be enough to ensure their access to an adequate and equal education comparable to every student in the public school system.

Moreover, the 50-year era of education reforms has made way for the current era of accountability and its link to improving academic achievement for every student (U.S. Department of Education, 2016). The implementation of the NCLB Act of 2001 is significant because it promotes higher accountability measures to monitor student

achievement among various student groups. The act also impacts the distribution of resources due to its reliance on the use of school-related performance data (U.S. Department of Education, 2002). Therefore, the obligation of the states to provide an education that can lead to higher learning or a career, is incumbent on students' having at least, equal access to a solid educational structure in the public schools of America.

For 20 years, public school finance has shifted its attention away from the concept of equity, which focused on equalizing educational resources for every type of student, to adequacy, a concept that addresses every student's right and access to an equal education. Although in the current education system environment, the goal is to ensure that every student satisfies state developed student proficiency standards through accountability and student academic outcomes. The only problem is that there has been a limited amount of change in states' willingness to follow the rules they either created or were forced by the courts to embrace.

The evidence points to the fact that for 50 years (since *Brown v. Board of Education*, 1954), states are still being called upon to explain and justify why they are unable in 2017, to provide an adequate education for the children of the United States of America. Unfortunately, aside from a few favorable rulings passed down by the courts, school districts are still responsible for ensuring that every child attends a school facility that is not dilapidated, does not have sub-standard or outdated educational equipment, or that prohibits a child from receiving an education in an amenable environment – so why is this still an issue? The following literature review will attempt to provide examples of

the public education systems' responsibility to ensure that every student obtains a fair and adequate education.

Public education viewed as a complex system, consists of a vast array of policies, procedures, processes, behaviors, policy makers, and students. The pursuit of education professionals and researchers is to understand the mechanism that would yield improvements in student academic achievement and include the role of school finance systems (Hanushek, 2016; Odden, Goetz, & Picus, 2008). To analyze the levels of adequacy and equity within school learning opportunities, LaPlante (2012) examined the role of per-pupil expenditures. The perspective of this analysis is the aftermath left by the recent recession and collapse of the real estate market on state budgets. When the states' spending practices defined adequacy as operational funds and per-pupil expenditures (or horizontal equity), many states realized that they were not following legislative adequacy requirements (LaPlante, 2012).

LaPlante (2012) selected Maine for analysis to determine to what extent, if any, the state learning resources were distributed equitably to every student enrolled in its public schools. To verify whether an educational opportunity was evident, the author reviewed the level of academic resources (used in favorable court rulings on behalf of school plaintiffs) funded throughout the state. The results of the analysis found significant differences between schools within the same districts and among schools throughout the state. Unfortunately, what LaPlante discovered was consistent with litigation rulings for the past 50 years, that disparity in the condition of facilities, lack of

equipment, and weak curriculum content still existed throughout the state's school districts.

In addition, the findings revealed that by using per-pupil expenditures as the measure to confirm equity, they also exposed the disparities in resource allocation. That is, this measure disclosed what the money purchased. Based on the evidence, the use of per-pupil spending to equalize resources uncovered the unrelated link between the allocation of learning resources and the cost of an adequate education. The study demonstrated how this methodology could lead to overfunding and underfunding school districts regardless of enrollment and vertical equity. The findings also revealed that using per-pupil expenditures as a measure to determine whether adequate resources and financial allocations are equitable was not the best indicator to demonstrate an adequate education.

According to Verstegen (2016), per-pupil funding should reflect comparable funding levels for all school districts; however, when per-pupil expenditures are measured, it produces a wide variation of funding levels found within the education finance system (Toutkoushian & Michael, 2007). Furthermore, Kurban et al. (2012) acknowledged that the disparities in per-pupil spending are due to the combined impact of local property tax revenue and income levels in high-property-wealth school districts compared with low-property-wealth districts. The reason these communities have additional educational items is that after the distribution of the foundation base level and the collection of local property tax revenue, any extra funds remain with the school

district. The problem with the foundation program is that states permit communities with higher wealth to provide extra amenities to a relatively small group of schools.

Sciarra and Hunter (2015) analyzed the courts' responses to violations to states' constitutions concerning their responsibility to provide an adequate education for all students. The courts used individual states' performance standards as a benchmark. The standards the courts used to determine if students had access to equal educational opportunities revealed a prevalence of poorly maintained school facilities, a lack of standard classroom equipment, and unsatisfactory instructional material. In addition, the courts found that many states' education finance systems were not integrated with their new college-and-career-ready standards designed to measure student preparation for higher education and the workforce (U.S. Department of Education, 2002). According to the authors, the problems they discovered, were dominant in school districts located in low-income communities where many student subgroups lived. Based on the evidence, the courts concluded that if this group of students had any chance of obtaining an equal education compared with their peers in more affluent communities, then it was essential that additional support services and programs be made available to them. To support their hypothesis, the authors identified Massachusetts, Arkansas, Ohio, and New Jersey as states who received unfavorable rulings from the courts due to their school funding systems that possessed severe deficiencies in educational opportunities.

In addition, the authors cited an analysis made by a 2015 National Report Card. The report stated that extreme inequities still existed in urban and rural communities due to questionable state school funding systems, which led to an updated definition for a fair

education system. The new definition included funding additional student services, equal access to rigorous academic content, and curriculums as evidence of equal educational opportunities. However, the report did acknowledge that some states such as New Jersey already possessed a funding system that met the new definition and served as the basis for a new model for resource accountability.

Sciarra and Hunter's goal for the model required states to change how they traditionally allocate resources, which led to a continuous cycle of inequitable funding. The process included the following steps: step 1, identify the available funds; step 2, negotiate funding objectives with policy makers; and step 3, distribute resources. The new approach operated in the reverse of the traditional method: step 4, identify funding and resources that will be needed to achieve state standards; step 3, determine the cost to implement the new standards; step 2, identify the new components and procedures to obtain new funding; and step 1, execute the standards. They argued that the traditional process favored affluent districts and the new model would make all school districts equal in the distribution of resources.

The authors concluded that as an enhancement to the state constitution, accountability of educational resources was essential to achieving state-based targets and objectives. They viewed resource accountability as an investment for the betterment of all students. Through sufficient funding and an understanding of the link between the services and programs to the students who rely on them, resource accountability can be the mechanism school districts use to attain established proficiency levels in state academic performance standards.

To determine the degree of accessibility to equal educational opportunities achieved within the states, Della Sala and Knoeppel (2015) evaluated the correlation between state education finance systems and strategies for maintaining state accountability policies. To address this issue, the authors developed a new concept, the opportunity gap metric, to identify inequities within these two systems. They defined levels of inequity as the difference between the state's perceived finance inputs and performance outputs when compared to the actual inputs and outputs. They hypothesized that when the state education finance system and accountability policies are inequitable, the opportunity gap grows, and the gap is reduced when they are equitable.

In this article, equity served as the basis for identifying educational opportunity in this study since the concept influences inputs, outputs, and as a combined policy. The term opportunity, is indicative of equality. It is based on how states manage their education funding systems' allocation resources and their accountability policies designed to measure student academic performance. According to the authors, the traditional process to measure equity requires decision-makers to review or monitor each mechanism individually. However, they developed the 'opportunity gap' to measure whether there was a simultaneous misalignment between the finance system, accountability, and student performance.

The authors' goal concerning the opportunity gap was to determine whether states had an equitable finance system. To accomplish their objective, Della Sala and Knoeppel used data from several states to test the opportunity gap. However, this was problematic because each state has developed individual education policies which made it difficult to

compare uniform educational opportunity inputs and outputs. Nevertheless, the authors selected nine states (Colorado, Kentucky, Massachusetts, Minnesota, New York, Ohio, South Carolina, Texas, & Washington) to understand the relationship between the education systems, accountability policies, school finance processes, and academic performance, they conducted a correlation analysis.

According to the authors, an adequate finance system can produce student performance outputs and accountability data concurrently by using the opportunity gap metric. However, based on the findings, none of the state systems produced equitable measures. The equity ratio was unable to establish the existence of alignment between the education finance systems and their individual accountability policies. Although the researchers did not find alignment, the study revealed the need for states to continue to maintain their responsibility to pursue the objectives delegated to them in their constitutions, to provide every student with an acceptable education.

In keeping with the idea of minimizing inequities in education finance systems, Houck and Debray (2015) proposed a new program to reduce the effect of inequities within state education finance systems. Instead of relying on states and the judicial system to correct disparities in educational opportunity, they recommended the federal government implement a reward or competitive grant program. The program would distribute funding to any state that redesigned its education finance system to correct inequities within their local school districts. Although the idea may be feasible, however, the problem is that states are already trying to (or unwilling) improve their finance systems. So, to suggest that states would elect to participate in such an exercise is

unrealistic. The problem is states have been unable for the past five decades to come up with a formula that can distribute the right amount of funds to distribute the right mix of educational resources.

To meet the demands of students and their subgroups, local school administrators must be active in the decision-making processes of state education finance systems especially as it pertains to the distribution and allocation of educational resources (Hanushek & Lindseth, 2009; Hill, Roza, & Harvey, 2008; Niven et al., 2014). Whereas state school finance systems were developed to help school districts equitably distribute resources (Chingos et al., 2013; Neely, 2015), they are composed of multiple parts that are interactive and interrelated to provide an equal education opportunity. However, if educating students is not the primary focus of policy makers, then the school finance system only becomes an individual operation that seeks its own agenda.

Systems Theory

In the United States, the public school system is available for every student in every state. The concept, public education, is a large, complex, and ever-changing system that consist of students, teachers, administrators, policy makers, and processes designed to ensure that all students obtain an education. However, for 50 years, the federal government has attempted through various reforms to ensure that the education received is adequate to produce a knowledgeable citizenry (Houck & Debray, 2015). Even though the academic achievement gap between low-income and high-income students continue to grow (Bartz, 2016; Craft & Slate, 2012), states can continue to strive to produce an

educated and socially equipped workforce, by using innovative methods and processes that are needed to improve student performance outcomes for all students.

Unfortunately, there are few positive results in the governments' attempt to reduce the achievement gaps for many student subgroup populations (Chingos et al., 2013). Due to this lack of progress in achieving equitable academic achievement among all students, the time is ripe to introduce another concept for addressing complex and ongoing problems. Systems thinking, as a management tool is a proven method to solve and improve prolonged, entrenched issues (Senge, 2006). Therefore, since the public education system is representative of a complex entity, made up of multiple components with a single goal, the time to try another process is at hand.

Systems theory originated in the 1950s by the biologist, Bertalanffy (1950/2008). Bertalanffy presented the idea that systems are composed of multiple entities, are managed by laws about their environment (Duryan et al.,2012), and it is interested in how the parts of a system respond to nonlinear interrelationships and behaviors (Thien & Razak, 2012). Systems theory is not like reductionism which views a system as a sum of its parts (Bates, 2013; Andreadis, 2009). The theory's focus is on the totality of the various components of the whole system, that is, the premise is to observe the interactions and connections based on behavioral patterns created within the system.

Systems theory is an interdisciplinary field made up of various disciplines. Thus, every field uses the framework relative to their individual perspective and context (Ison, 2010; Monat & Gannon, 2015). Many disciplines employ systems theory ideology to enhance their understanding and knowledge of the mechanisms within their fields. Ison

(2010) demonstrated that this has led to the evolution and development of multiple approaches in the application of systems theory principles in fields such as the social sciences, physical sciences, computer information, and technology. Thus, systems theory can result in a different perspective to address matters not previously considered by an organization.

Systems thinking, as a management tool, can generate an understanding of how systems can inform stakeholders and society to address problems where multiple parts, groups, or environments exist (Sandri, 2013). To identify how systems thinking can benefit an organization, Pascoe (2006) outlined its key features (a) it understands that in the world, most things exist within a group, (b) a system is not a tool but is a naturally occurring process, (c) it helps us to expand our perception about the relationship between people, and (d) it connects the group to its environment.

Characteristics of a System

A system consists of a larger entity that incorporates smaller subsystems that are engaged and interdependent within the whole system (Betts, 1992). A system is not a tool or mechanism, but an evolving process of various components necessary to achieve a common goal (Bardoel & Haslett, 2006). As a whole entity made up of parts, the removal of key components will cause the system to cease to exist (Johnson, 1984). A system reflects nonlinear behavior that displays the existence of a cause and effect reaction (Bertalanffy, 1950/2008). Due to the dynamics of the whole system, what happens in one area of the system may lead to unexpected actions in another part of the system. For instance, because of the complex nature of a system, a policy change in an organization

may lead to an unintended response from its other parts in the form of resistance (Sterman, 2000). Thus, a system is an intricate structure that consists of individual, interrelated components in which the behaviors and interactions among the parts impact the entire system.

Since its conception, there are several characteristics that define system theory components and features: elements, structure, environment, boundaries, hierarchies, homeostasis, and purposiveness. The elements are the link to the structure. The element identifies and describes each concept that affects various parts and divisions (Betts, 1992). The elements reveal the nonlinear actions and causal loops that occur within the whole system (Guevara, 2014). The elements define the relationships of the subsystems (Monat & Gannon, 2015). Whereas, structures reveal how the system divides and coordinates responsibilities within the organization (Johnson, 1984). Structures can reveal the underlying source of problems within a system (Senge, 1990); the reason why the interrelationships are critical to the ongoing survival of the system.

The system's boundaries and environment display how the various components affect the whole system (Wolstenholme, 2004). Boundaries reveal the structure and process of the system that affects behavior (Moberg, 2001). Boundaries expose the purpose and the position of the system which includes function, culture, and the levels of authority in an organization (Wolstenholme, 2004). According to Betts (1992), boundaries are essential to understanding the specific information to transfer to the appropriate subgroups. Consequently, a system is defined by its purpose.

The environment of the system is composed of inputs, throughput processes, outputs, and causal loops. Inputs are derived from the environment and produce the outputs. The throughput process turns the input into an output which is the anticipated or desired outcome. Within the environment, the causal loop shows the activities that lead to continual analysis, feedback, and applies changes as needed (Collins, Friday-Stroud, & Ashley, 2010). Therefore, it is essential that the process has balance with all its parts to obtain the necessary resources for its survival.

The hierarchy, homeostasis, and purposiveness are characteristics of a system that maintain order (Betts, 1992). The hierarchy is responsible for the location of the various divisions or sections within the system. Homoeostasis is the self-regulation capability of the system. It is the effort or energy to ensure that every component of the system is aware of what is happening within the system. Purposiveness requires that every system has a well-defined, singular goal or recognize that there may be many conflicting goals (Betts, 1992).

Consequently, it is essential that an organization grasp the significance of these multiple characteristics. A lack of understanding the interrelationships between people and things can limit their ability to see how the system or organization functions within a specific environment (Pascoe, 2006). A system is anything that is composed of a group of parts that are interrelated and has a pattern of integrated behavior. Therefore, systems are subjective, and definitions of systems (their elements, structure, boundaries, subsystems, and environments) can be described and identified for every purpose that uses a system.

Closed and open systems. A closed system environment occurs when internal situations are not affected by the external environment (Anthony, Gould, & Smith, 2013). Open systems have relationships outside of its environment (Senge, 1990). External inputs such as information are received and transformed into outputs in the form of programs and services (Johnson, 1984). Bates (2013) emphasized the difference between a closed and open system; a closed system uses feedback loops to address linear causality and control stability externally. The open system's structure and environment determines its ability to survive. A system will be able to produce new sources of energy or effort if it can transport energy across its environmental boundaries. Open systems' import and export energy and a closed system can do neither operation (Betts, 1992). Therefore, a system's inability to create enough energy or effort to affect change and cross boundaries will not survive.

Open systems theory. Based on the research of organizational theorists Katz and Kahn (1978), open systems theory (OST) views an organization as a system whose environment consists of interactions with multiple entities that influences its behavior and contribute to its processes which ensure its existence (Thien & Razak, 2012). The system maintains its elements by exchanging the right amount of energy or effort because the goal of the system is to seek balance and self-regulation (Betts, 1992). To ensure the whole system achieves the goals specified by its environment, the following processes are present (Thien & Razak, 2012; Andreadis, 2009):

- Negative entropy occurs when the environment notifies the system to adjust its purpose when the system begins to import more energy or effort than it exports.

- Specialization occurs when the system, to achieve stability due to growth needs to create new capabilities
- Equifinality is the ability of the system to arrive at the same final state by more than one path or condition
- Feedback refers to the nonlinear interactions concerning inputs that evaluate the adequacy of the system's output and goals. There are two types of feedback, positive and negative:
    - Positive feedback evaluates whether the environmental requirements are in alignment with the desired goals
    - Negative feedback addresses alignment between the output to the desired goals
- Equilibrium refers to the systems state of stability because of the transformation process. A system needs equilibrium to survive as a whole entity.

Another aspect of OST pertains to the system's three collaborative elements: input, throughput, and output and their connection to feedback and equilibrium generated by the system during the cyclical event process (Katz & Kahn, 1978). This event replicates the status of resources as a continuous cycle through importing, transforming, and exporting the right mix of elements (Thien & Razak, 2012). The cycle event involves the inputs, throughput, and output processes of the open system. The objective of the system is to transform external inputs or resources obtained from the environment into outputs by way of the organizational processes or throughput.

***Education and schools are open, social systems*.** From a systems theory perspective, the structure of the public education school system has many of the attributes of a system. Like any other complex entity, an education system consists of interdependent and interrelated components whose objective is to achieve its goals on behalf of the whole system to educate students (Guevara, 2009). That is, an education system is a diverse and complex environment; it consists of nonlinear behaviors identified by causal feedback loops; and numerous individuals that interact within the system (Pascoe, 2006).

Viewed as a social and open system (Anthony et al., 2013), the structure of a public school consists of elements, hierarchies, boundaries, and a diverse group of interrelationships (Betts, 1992). A school system exposes the entire organization as complex and comprised of a variety of interconnected components (Thornton, Peltier, & Perreault, 2004). Interconnectedness occurs when the elements focus on the whole system. In addition, resources and organizational objectives are based on actual circumstances as opposed to distributing resources to insignificant causes or parts (Duryan et al., 2012). Public education-based processes and functions require schools to conform and adapt to changes prevalent in its environment. This includes government policies, regulations, socio-economic and cultural issues, and political forces if it expects to reach its goals. As in the case of the NCLB (2002), as a system, it is important when mandates and reforms are passed down from the federal government to the states and local governments.

Public education, is a system of multiple components. Traditionally, public schools are controlled by local government units; however, viewed as an open system, federal education policy monitors the operation of public school districts (Neely, 2015). The continuous role of education finance systems means that inputs such as school resources transform outputs via the throughput process. and leads to desired outputs such as student academic performance outcomes. To achieve the common goal to educate our students, it requires interrelationships and interactions within a particular environment in which people, processes, and policies are components of the education system.

Systems Thinking is a Management Discipline

To date, there is no agreed upon definition of systems thinking (Monat & Gannon, 2015; Shaked & Schechter, 2013); however, it is a subgroup of systems theory (Senge, 1990). Although systems thinking did not originate with Peter Senge (1990), he was instrumental in advancing its influence in the field of management (Monat & Gannon, 2015). Senge recognized that systems thinking could help the organization address the cyclical aspect of causality. Senge developed principles to serve as the basis for participants who wanted to use the systems thinking approach within an organization.

According to Senge (1990), the principles identified can assist an organization resolve problems or create new goals. Systems thinking require an organization to (a) be aware of the influence of relationships and behaviors that exist within its structure; (b) systems and organizations do not readily welcome change and tend to be resistant to changes in policies; and (c) accept that leverage or small steps can produce significant improvement and long-term changes.

In addition to these core values, Senge wanted organizations to know that cause and effect is a cyclical event. Senge promoted the idea that the effect of systems thinking in an organization can produce invaluable information and change the whole system. Conversely, this can only happen if the organization is willing to do the work that will encourage new behaviors among its diverse parts.

Management Approaches.

As it relates to organizations, Richmond (1994) viewed systems thinking as a process that combined understanding behavior and identifying the underlying structures that affect an organization. Sterman (2000) surmised that if the participants in the system understood the link between its variables and structure, then they would recognize the complexity of the of the entire organization. Meadows (2008) concluded that systems thinking allowed organizations to seek out innovative ways to identify root causes and resolve problems. Halverson (2010) described systems thinking as the way an organization understands, produces, explains feedback, and its connection to every participating subgroup. Systems thinking is activated when an individual or group understands the link that exists between all the parts of an organization while simultaneously working as an efficient unit (Rodríguez, 2013).

Systems thinking management approaches can improve the organization. Two of these approaches, hard and soft systems, were developed by Checkland (1981) to focus on the impact of culture and ethics found in organized group interrelationships and interactions. These concepts are embedded in the structure of a system and are linked to the authority or power that encompasses the organization's responsibility (Duryan et al.,

2012; Sandri, 2013). Hard systems methods begin the improvement process with a clear understanding of the problem. It allows for a detailed picture of the situation (Senge, 1990), it offers direct interaction with the actual participants and is capable of hypotheses testing (Rodriguez, 2013; Sandri, 2013). Causal loops are an essential feature in hard system processes because they reveal the ongoing dynamics of problem solving and goal seeking (Duryan et al., 2012).

In contrast, the soft systems approach is a method to learn what needs to be corrected or improved in a system without a clear understanding of the problem (Duryan et al., 2012). It requires a willingness to identify with the other individuals whose issues and concerns should be included in the decision-making process (Rodriguez, 2013; Sandri, 2013). Or for instance, if the goal of the NCLB Act is to minimize the achievement gap among certain subgroups, this requires the input of all stakeholders, educators, policy makers, and parents. These approaches are ideal when dealing with systemic problems represented by diverse groups, policies, and regulations.

Due to the multi-disciplinary characteristics of systems thinking concepts, the public education school structure as a system is an excellent candidate to use systems thinking. School systems can benefit from systems thinking as a tool in the decision-making process as an approach to solving its complex and wide-range of problems (Thornton et al., 2004). As a framework for problem-solving, systems thinking methodologies allow organizations to grasp the vastness of the whole system and recognize when change is necessary (Melzer, 2013). In addition, the way a school system and its parts respond to its environment can lay the groundwork for improving student

performance outcomes through participation from all stakeholders (Rodriguez, 2013). Systems thinking can aid policy makers to understand and define the structure of a school system because every stakeholder needs to know the reasons why many current and past approaches have been unsuccessful. Therefore, systems thinking can provide another perspective on the problems associated with educating our students.

Tools of systems thinking. With its foundations in systems theory, Senge (2006) turned his attention to the theory's most transformative concepts: causal (feedback) loop diagrams, archetypes (standards), computer models, and non-linear relationships. To address and resolve a problem, decision- makers must be able to examine the entire organization and not just the division or component that is affected.

According to Senge (2006), the advantage of feedback loops is they can describe the reason for the positive or negative behavior in an organization. A positive or reinforcing feedback loop demonstrates how a change in one section of the organization results in a change within a different section in the organization. Positive feedback loops are evident during rapid growth at a high rate of change that exhibits exponential growth or collapse based on the direction of the change (Braun, 2002; Duryan et al., 2012).

A negative or balancing feedback loop is used for analysis, to enhance a goal and while seeking equilibrium within the organization (Duryan et al., 2012). Consequently, the intention of the balancing loop is to bring about stability, resist change, and accept the behavior that is present (Braun, 2007). An entity uses feedback loops when it wants to gain a better understanding of the core problem or desired goal observed by the organization or system.

Causal or feedback loop diagrams provide information and understanding about the activities that take place throughout the organization both visually or through troubleshooting (Duryan et al., 2012). That is, the diagrams simplify information by using a visual tool to understand a relationship that's hard to explain verbally (Monat & Gannon, 2015). Also, feedback loops allow organizations to see the actions of the behavior as a circular event and provide a deeper meaning to the problem or goal throughout the whole system (Senge, 2006). The diagram can also describe linear cause and effect interrelationships and their effect on the behavior within an organization (Bardoel & Haslett, 2006). These tools help individuals or groups transform their thoughts into visual images that can generate better communication skills and the ability to strategize with clarity and purpose.

Conversely, delayed feedback occurs within a system because it is unable to produce an immediate return to the organization. Senge (2006) pointed out that when there is a delay in the system, the response of individuals in the group may influence or lead to an inaccurate action. When delays occur in a reinforcing loop, the conclusion may be that nothing is happening and to accept the status quo. However, when a negative or balancing loop experiences a delay, the organization's determination to reach the goal can result in an increased rate of oscillation. Or the oscillation will slow down until the organization accepts the unchanged, established goal (Bardoel & Haslett, 2006).

According to Senge (2006), when there is no link between the delay and the cause and effect, decision-makers can conclude that the changes did not produce the expected results. For instance, when NCLB expected every student enrolled in public school to be

proficient in math and reading by the 2013–2014 school term and this did not happen, the federal government came up with another program (Ayers & Owens, 2012; Education Week, 2015). Therefore, it is the responsibility of the organization to seek out and remove the delays from the system, to achieve the desired change, and enhance the goal.

Another tool conceptualized by Senge (1990) is the systems archetype. They are a dynamic management tool used by organizations to comprehend organizational behaviors and the associated circular activities that automatically includes every part of the organization (Senge, 1990). An archetype can assist organizations to determine why the same problem persists. They help decision-makers recognize that a problem does not happen in isolation but is relative to the actions of other parts of the system (Wolstenholme, 2004).

Archetypes describe behavioral patterns that are familiar to the organization and can be used to diagnose the underlying cause of the problem, or as a mechanism for strategic planning (Braun, 2002). To aid organizations in understanding common organizational behaviors, Senge developed the following archetypes (Braun, 2002): Limits to Growth (Limits to Success); Shifting the Burden; Eroding (Drifting) Goals; Escalation; Success to the Successful; Tragedy of the Commons; Fixes that Fail; Growth and Underinvestment; Accidental Adversaries; and the Attractiveness Principle.

Modeling an archetype requires the organization to select an intended problem, process, or policy relationship because the link between the behavior and interactions can produce unintended consequences (Wolstenholme, 2004). The non-specific attributes of an archetype, as a rule, is unable to expose which variables in the organization contribute

to the problem or goal (Senge, 1990). Consequently, for the organization, the lack of knowledge concerning the relationship between the variables and system structure can limit decision-makers' ability to bring about positive solutions (Braun, 2002). As a result, a systems archetype can lead to a more detailed understanding of what is going on. This is significant because it can help an organization seek the appropriate remedies to resolve the underlying problems that exist among the connecting parts of the whole system.

The systems thinking concept is an acceptable mechanism to help every kind of organization perceive and understand the overall structure of behaviors and their effect on the well-being of its components. This is promising because systems theory and systems thinking have not remained stuck in 50-year old ideologies but have been progressive to remain significant among a diverse array of disciplines. As the country wrestles with ongoing, ineffective, and inefficient school reforms, systems thinking approaches seem to be an ideal candidate to assist public education and school systems experience real change.

Systems thinking as a management tool can be employed to assist education-related organizations to use non-traditional concepts and methods to understand and expand their capacity as problem-solvers. Zehetmeier, Andreitz, Erlacher, and Rauch (2015) examined a teachers' professional development program and its influence on their view of the whole educational system. Three theoretical frameworks: action research, constructivism, and systems theory served as the basis for understanding how teachers responded to the objectives of the program. However, the article's primary approach was to implement systems theory concepts and promote their link to social systems. The

researchers used a longitudinal study design to gather data from interviews and an online survey. The participants were 131 teachers from Austria during the school years, 2006–2008 and 2009–2011.

The researcher's theoretical focus was how components of the professional development program could engage verbal communication as a vehicle for carrying out policies, processes, and decision making. After a review of various key elements from systems thinking, which included autopoiesis (self-creation, which represents the different expressions of the organization about its environment), self-reference, boundaries, and observation; they decided to focus on observation. Observation was the concept chosen because action research pertains to the need to produce the right action to address the situation.

Senge (2006) stated that observation is an important aspect of verbal communication because it can tacitly monitor the behaviors of other individuals. The observation approach helped the professional development program participants recognize the interrelationships among the subgroup and the goals and outcomes of the education social system. In addition, they found that systems theory techniques revealed how reflection loops could sustain and produce information about itself that could create changes in every area of the organization.

Kensler, Reames, Murray, and Patrick (2012) examined the participation rates in two school districts' program development workshops. The purpose of the research was to show participants how to effectively use evidence-based decision making for their school improvement program. To assist the teams, the researchers used systems thinking

tools which were appropriate considering the NCLB Act's focus on student achievement and the role of data for analytical decision making.

The challenge was to help the schools' leadership teams understand how to recognize data-generated evidence. The reason, was because reliance on anecdotal conversations, personal knowledge/experience, and the variables associated with each school district would be ineffective to interpret and synthesize data. The systems thinking tools allowed the teams to focus on the many interdependencies of the whole school system instead of examining only student performance data in their quest for overall school improvement. The researchers decided to use systems thinking methodologies as a rational method to understand how data can aid in the decision- making process.

The goals of the researchers were to train the teams to develop questions that could generate answers through conversations and dialogue-based activities. They wanted the teams to see evidence as representative of actual events and to connect the relationship between their professional experiences and their approach to gathering knowledge. To aid in understanding how to interpret evidence-based data, the researchers introduced the teams to "behavior over time graphs" to analyze activities and chart data over specific time frames.

Feedback loops were presented to identify the interdependencies and interrelationships that lead to certain behaviors in the organization's culture (Senge, 1990). These tools were selected to ensure that the teams' conversations were focused on the schools' data and not on personal opinions. By introducing systems thinking skills to the leadership teams, led to a greater appreciation for the purpose of data and its

connection to the whole school system. Nevertheless, the researchers recognized that the overall process would take a considerable amount of time to appreciate, understand, and practice evidence-based data analysis.

A key feature among archetypes is the use of feedback loops that incorporate timing, goal-seeking, and interpreting the underlying problems within the organization (Wolstenholme, 2004). Anthony et al. (2013) used an archetype to examine student academic performance outcomes. The archetype, success to the successful (STS) was utilized to recognize and explain the inequities identified in educational attainment data for students enrolled in public K-12 schools in Georgia, Washington, and the United States, from 1990–2009.

The STS archetype focuses on the behavior or goal within an organization that competes for resources (Braun, 2007). Their premise was the group that received the resources were perceived to obtain advantages because of the resource. If the group continued to outperform the other groups within the organization, it was because of the resource. However, in reality, the outcome was due to who was first to receive the resources instead of which group performed the best.

Anthony et al. stated that in a school system, the STS could describe a pattern of behavior that rewards students who receive the best grades compared with their peers. That is, in a school, students are in competition for a limited resource, grades and the most successful students would use their grades to continue their education (from undergraduate to a terminal degree). The STS archetype revealed an expected pattern of the link between the distribution of student academic performance or grades to actual

education achievement levels. They concluded that although every student's education levels began on the same level (kindergarten), the attainment of higher education demonstrated that the STS archetype could explain how resources benefit those that continue the education process.

Duryan et al. (2012) provided an overview of their decision to use systems dynamic modeling. The purpose of the modeling technique was to develop strategies to improve the distribution and resource allocation processes. A case study approach was used to understand the data collected from the management staff of a healthcare-related organization. The goal of the study was to understand how "resource sharing issues" affected the "scarcity of resources and increasing consumer demand." Interviews from the management staff became the basis for developing feedback loops throughout the process based on group analysis.

To determine the patterns of behavior, the archetype, "shifting the burden" was selected. It can instruct organizations as to why resources were lacking, and services were inefficient to meet the objective of the organization, to improve services. The archetype identified both short-term (symptomatic) and long-term (fundamental) elements that typically cause tension within an organization (Braun, 2007). Conflict occurs when management confronts the problem and the solution simultaneously (Senge, 2006). The "shifting the burden" archetype mapped the consequences of how previous decisions led to the underutilization of resources and the solutions implemented to solve the problem.

Throughout the feedback cycle, the short and long-term strategies were presented to the organization as methods to resolve the problem. When an organization resolves the

problem using short-term solutions, the organization is left with a quick fix and only the appearance of the solution occurs. Conversely, the long-term approach requires an in-depth grasp of the system's environment that includes (a) more time to implement the strategy, (b) an acceptance that there will be delays prior to seeing the progress or results, and (c) understand that the resolution of the problem requires a patient commitment from the organization.

According to the authors, the archetype, shifting the burden, was instrumental in recognizing the organization's problem and possible solutions. The archetype demonstrated how feedback diagrams, delays in seeing results, and the interrelationship between the entire organization could assist decision makers in understanding the severity of the problem. Ultimately, the benefit of using this archetype demonstrated to the organization the methodology to execute the best process necessary to improve its resource allocation distribution practices.

Student Academic Performance

The public education and school finance systems are complex entities that merge at the intersection of politics, finances, instructional content, and student academic performance (Della Sala & Knoeppel, 2015; LaPlante, 2012; Leachman & Mai, 2014). The opportunity for every student to receive an adequate education is not always possible due to the decisions of local school systems, the effect of litigation, and the students' position in life. Unfortunately, everyone has heard the sad and malicious stories that highlight the downward spiral of individual communities where students enter school buildings rife with decay and hopelessness. Nevertheless, to offset the perception of this

reality for a certain group of students, society tries to discover the root causes and innovative solutions. Therefore, this section of the literature review will present articles that address the issues concerning student academic performance.

No Child Left Behind Act of 2001

The education reform policy, NCLB (2002), is the reauthorization of the ESEA Act of 1965. ESEA contained a block grant program, Title I, Part A that was created to provide educational, financial assistance to schools with a high percentage of underprivileged children. The program's objective was to ensure that every financially disadvantaged student would have a chance to attain state-based academic performance standards. The funds were to be used to supplement school districts that provided educational support on behalf of this student subgroup (NCLB, 2002).

The enactment of NCLB represented the federal government's expanded involvement in K-12 public education reform. The primary goal of NCLB was for all children to perform at proficient levels in English and math by the 2013–2014 school year. Title I funds were provided to help students served by the grant to have accessibility to an equal opportunity education through programs and services designed to ensure they met and attained these state standards (U.S. Department of Education, 2002).

Under NCLB, every state was required to develop academic standards and tests, and an accountability feature that was tied to test scores and their school districts (U.S. Department of Education, 2002). However, when it was viewed as a device to allocate funding to the states, its purpose seemed forced and ominous. From this perspective, NCLB tied federal funding to state-based standards and annual testing to measure student

achievement. Subsequently, it required public access to test score results, and linked those scores to school districts and schools, to determine whether annual state-based proficiency standards were met (Kornhaber, Barkaukas, & Griffith, 2016).

One of the primary objectives of NCLB was to "close the achievement gap between high and low-performing children, especially the achievement gaps between minority and non-minority students, and between disadvantaged children and their more advantaged peers" (Section 1001.3). Prior to the enactment of this reform policy, narrowing the achievement gap continues to be an ongoing challenge (U.S. Department of Education, 2002). Nevertheless, Ladson-Billings (2006) pointed out that in the United States, achievement gaps in public education has been an ongoing problem for many decades especially among Title I subgroups (Bibb & McNeal, 2012). To support this conclusion, Bibb and McNeal cited the National Research Council (2011) that high-stakes standardized testing strategies developed to improve math and reading scores, had not occurred. Neither had the achievement gaps been reduced between racial groups or groups' income levels.

In addition, although the federal mandate appeared to be innocuous, over time it has become perceived as a negative concept tied to the communities that it was supposed to improve (Magnuson & Waldfogel, 2008). The researchers revealed that an unintended consequence of NCLB was that its accountability directives turned achievement gaps into a local issue and the failure of local school districts. Likewise, Lipman (2011) stated that NCLB accountability measures amplified the socio-economic disparities of low-income

students that attend low-achieving schools to the extent, that closing the achievement gap was unattainable.

Another negative aspect of NCLB was revealed by Bogin and Nguyen-Hoang (2014) in their examination of the negative implications associated with the policy. They uncovered the federal education policy's unexpected, negative affect on property values due to the school label, "in need of improvement" also referred to as a "failing" school. This was an unintended consequence of the terminology, because "failing" became associated with the Title I grant programs; a federal identifier for low-income communities and specific student subgroups that receive federal educational funding for fiscal and non-fiscal resources.

The problem is, the label was not intended to be associated with school quality but referred to a school or district that did not achieve adequate yearly progress for two consecutive years. The designation is the result of a subgroup enrolled at the school who did not successfully meet state-based standards (even a high-quality school can receive this designation). Regardless of these facts, to the general public, school quality is often tied to test scores and the location of the particular school district and housing (Mensah et al., 2013; Seo & Simon, 2008).

Furthermore, to analyze this unintended effect on property values, the authors selected a school district in North Carolina to test this phenomenon. They used a hedonic model (components that make up the features of a house) with fixed effects, test scores, student characteristics, county property values and tax levy rates as the variables to investigate the influence of the negative school title. The model revealed that home

values associated with an NCLB designated school as ‘failing” caused the property value of the average home to drop by 6% or $6,978. An occurrence the researchers described as unfair because the designation does not always apply to the overall quality of the school experience. Therefore, the authors pointed out that the relationship between school quality and property value is based on perception and stigma, not on facts.

The policy implication is that by using the term “failing” instead of “in need of improvement” has led to a situation that can worsen without intervention. The authors recommended that the U.S. Department of Education become proactive and reach out to communities to explain what the term actually means. This is necessary to mitigate the public’s negative perception of this label and stop the downward spiral of associated communities’ local property values.

The primary focus of student performance pertains to its connection to variables that affect students’ access to equal educational opportunities and the following articles expand on this research topic. Because many education reform initiatives focused on school districts in the United States, Chingos et al. (2013) examined the relationship between school districts and student achievement.

During their research, Chingos et al. discovered that there was a limited amount of research on the connection between school districts and student achievement. Instead, there was a significant amount of research on school districts and leadership. The authors pointed out that these studies on leadership are inconclusive because they do not separate the data for correlation from causation. That is, because the effect on academic performance may be due to leadership style, student demographics or the role of teachers

employed by the school districts. Consequently, the inability to identify causation has affected most studies that assessed the connection between districts and student academic performance. Subsequently, due to limited empirical research concerning the relationship between school districts and student academic performance, the authors decided to investigate the link between the two variables.

To determine whether there is a relationship between school districts and student achievement the authors conducted a study of fourth and fifth-grade student level data for Florida and North Carolina over a 10-year period. The longitudinal study examined statewide data analysis to discover the variations in student academic outcomes across statewide school districts. The goal was not to show causality using data but to identify the possible links such as test scores or between districts and student characteristics. Additionally, the researchers wanted to know if their findings could benefit state and federal policies geared towards district-level reforms by evaluating the connection and influence on the distribution of educational resources.

The authors results indicated that districts contribute a minimal amount of influence on student academic achievement. However, there was more variation with the relationship between student achievement and teachers compared with student achievement and the schools they attended. Conversely, they did find enough variation that suggested one standard deviation in district effects led to an increase in student achievement by 0.07- 0.14 standards deviations. That is, it translated into an additional seven weeks of school and in North Carolina, 10–12 weeks of additional instruction.

Although the correlation between school districts and student performance was small, there was evidence that performance can increase, decrease, or remain unchanged.

Smith, Trygstad, and Banilower (2016) reviewed the effect of student population labels and the inequities in the distribution of resources. The purpose of their article was to explore how three resources for science education—well-prepared teachers, material resources, and instruction—were allocated among classes of students with various levels of prior achievement and their access to an equal opportunity education. In this article, the 2012 National Survey of Science and Mathematics Education was used to determine whether there was a correlation between achievement levels in science classes and resource allocation practices relative to a certain student subgroup.

The study consisted of students enrolled in public school science classes identified by ability groupings or tracking (students with similar skill sets). The authors wanted to know what happens when low achieving students are grouped together and denied access to certain learning resources. They surmised that this approach would lead to a greater achievement gap when compared with students who are identified as high achievers. In addition, the authors wanted to confirm whether low-achieving students identified by ability groupings experienced inequities in the distribution of resources.

The data included a sample of science and mathematics courses and the teachers who taught the classes for grades K-12. The researchers recognized that because the information was derived from the teacher's personal observations and opinion, the basis of prior achievement was subjective. As a result, the authors acknowledged that as a measure of student performance, student test scores were more reflective of student

ability versus the outcome of one class. The findings revealed that ability grouping was less prevalent at the elementary and middle school levels; however, it was the norm for high school students. The data indicated that at the high school level, 10-14% (approximately several millions) of students enrolled the science classes were made up of low achievers.

After evaluating the teachers' backgrounds, how they prepared to teach class, and their perception of which students were low achievers, they discovered the following (a) these students have minimal access to teachers who are prepared to teach the subject, (b) the teachers avoided interacting with students, (c) they did not encourage the students, (d) these teachers were less likely to participate in professional development activities; and (e) they limited the students access to technologies and their opportunity of being enrolled in high quality and rigorous learning environments. Consequently, the study exposed one of the many barriers that can result from the practice of ability groupings among low-performing students, limited access to equal educational opportunities such as rigorous coursework in K-12 public schools.

Niven et al. (2014) analyzed the Texas school foundation program's equity connection to student performance and socioeconomic status. In 2011, the Texas legislature cut the public education budget by $5.4 billion in which the primary cuts came from socio-economic status (SES) programs. A subsequent court case decided the state's school finance system violated the Constitution's obligation to ensure every student received an equal share of financial resources and access to the same academic content. Because of the state's action and the successive favorable court ruling for school districts,

this study evaluated the correlation between statewide districts' student SES, school funding, property wealth per student, test scores, and the significance of these relationships through multiple regression analysis.

The goal of the researchers was to expose any inequities that occurred between Texas school districts. Equity was measured by the state's target revenue variable used by the legislature to cut education funding levels. The authors used the distribution of student financial resources as a gauge to determine whether funding was allocated equally during the school years, 2011–2012 and 2012–2013. The findings uncovered disparities in equity among student subgroups; however, they did not discover a significant correlation between funding amounts, property tax collections, and test scores.

The results indicated the need for an assessment of the funding formulas and the reallocation of resources for low-income students. Neither was there any correlation between property values and student achievement based on the multiple regression analysis. In addition, the authors found that high property value school districts did not receive an increase in state education funding. However, they did discover a significant relationship between low-income students and low test scores due primarily to the 4.4 million citizens in the state who lived in poverty in 2010.

Li et al. (2015) examined the relationships between the use of test results and U. S. students' math, reading, and science performance in the Programme for International Student Assessment (PISA) 2009. The researchers hypothesized that the 16 items in the PISA questionnaire, which are related to test results, could be categorized into four test use variables: holding schools accountable to authority, informing parents of their

children's performance (these are external pressures to improve school performance), providing information for instructional purposes, and evaluating teachers and principals (these are concerned with internal decision-making within schools).

Confirmatory factor analysis revealed that there is a strong correlation, 0.752, between the factor holding schools accountable to authority and the public factor of informing parents of their children's performance. The correlation was also high, 0.719, between the factor of holding schools accountable to authority and the public and the factor of providing information for instructional purposes. Concerning student performance in the subject areas, it was found to have a positive relationship to the test use variables, holding schools accountable to authority and the public.

The results supported PISA's analyses of the datasets that occurred when accountability policies and test results are made public. While student performance is higher than when accountability is not present, the authors provided a summary of previous research studies that mirrored the findings of this research. Hanushek and Raymond (2005) argued that in general, accountability policies had a positive effect on student achievement. This was also the case in states where penalties were attached to student achievement.

Consequently, Dee and Jacob (2011) suggested that there is a link between accountability and consequences motivated by school districts to perform better under NCLB's policies. In contrast, Rothstein, Jacobsen, and Wilder (2008) concluded that NCLB's accountability systems would likely cause a shift in how resources are allocated to focus on state test performance for core subjects like math, reading, and science.

Rothstein et al. (2008) included National Assessment of Educational Progress (NAEP) data which also supported the positive effect of school accountability policies on student academic achievement and test score outcomes. Additionally, the authors found a lack of empirical evidence on how to use test results in schools related to students' academic performance in the U.S.

Sorenson (2016) examined how changes in local revenues in North Carolina and the subsequent changes in educational funding levels affect students' academic achievement and behavioral outcomes. The author wanted to know whether increased spending on education-related resources, led to higher test scores. The research examined whether public school districts should provide support services for non-school related challenges that affected students in their classrooms. The findings revealed that when the county spent an extra $100 for per-pupil non-instructional services, student test scores increased between 0.014 and 0.099 standard deviations. These results were not consistent with previous research. Hanushek (2016) concluded that variations in how school districts allocate education resources were not related to increases in student academic achievement outcomes. Whereas, Dee (2005) found that increases in instructional spending led to an increase in student subgroups high school graduation rates.

Jackson, Johnson, and Persico (2016) analyzed court-ordered school finance reforms to evaluate the variations in school expenditures. They concluded that schools in high-property-wealth school districts experienced positive school effects when total per-pupil funding was increased. However, when increased per-pupil funding was applied to

low-property-wealth school districts, there was little or no change in their school experiences.

The intent of the federal education reform, NCLB, was to improve accessibility to an equal, educational opportunity and help students reach proficient academic levels. However, for many states the reform became an overwhelming and unrealistic burden. From this viewpoint, the NCLB mandates led to a fear of failure and caused a negative shift in the behaviors and goals of many state school systems, school leadership, and policy makers. Subsequently, this led stakeholders to adjust or lower their self-imposed, state-based proficiency measures.

Even though the states' decision to lower their standards was designed to appear to fulfill federally mandated requirements (Aroche, 2014), the decision to change the rules applied another layer of deficiency on students who were already in need of improvement. Therefore, any students who were struggling to meet state proficiency standards fell behind even more, because it denied them the opportunity to enhance their learning experience and meet state-based standards.

A major drawback of states' decision to reduce their performance level requirements, brought attention to their inability to measure up to the federal government's stringent goals and objectives. Unexpectedly, the result of these actions by state school systems led to a snowball effect that caused the federal government to question their mandate to close the achievement gap. Subsequently, the federal government decided to follow the states (Ayers & Owen, 2012; Education Week, 2015) when it became apparent that most students would not meet the NCLB proficiency

requirements by 2013–2014, the federal government also lowered its requirements. As a result of the states' decision, in 2011, the Obama administration began issuing waivers to remove these states from participating in the NCLB mandate (Whitehouse.gov, 2015).

Looking at this situation from a systems theory perspective, I saw the behavior identified by the systems archetype, "eroding or drifting goals." According to Senge (1990), in the case of eroding goals, decision makers are confronted with their inability to meet a stated goal; narrow the achievement gap by instituting another education reform, NCLB. To initially address the problem, the decision-makers sought out a basis (the short-term, symptomatic solution) for changing the goal to one that seemed more reasonable. This occurs when an organization is reluctant to put in the work and understand what prevented the goal from coming into fruition (the long-term, fundamental solution); that every student achieved successful proficiency standards by 2013–2014.

The eroding goals archetype examines the results of forecasts for the future based on current behavior or results (Braun, 2002). Although it can be argued that the mandate goal was probably unrealistic, it was the federal government's responsibility to find out whether the requirement could be met. That is, there had to be a way to measure or gauge the success of the target. The premise of this archetype states that

> a gap between a goal and an actual condition can be resolved in two ways: by taking corrective action to achieve the goal, or by lowering the goal. It hypothesizes that when there is a gap between a goal and a condition, the goal is

> lowered to close the gap. Over time, lowering the goal will deteriorate performance (p. 6).

Thus, was the situation with student academic performance, because the government was unable to minimize the academic achievement gap, it reduced the goal's requirement.

Summary and Conclusions

This chapter included insight into the complexity and magnitude of the public education system in the United States. The theoretical framework consisted of three concepts, public finance, resource allocation, and systems theory, each one attempted to make sense of the many components that represent public education. Understanding public education finance is essential to states responsibility to provide every student an adequate, fair, and equal education. The funding component is an intricate array of concepts such as identifying equity and equality as it pertains to allocating the best resources for educating students.

A fundamental principle of public education is ensuring that every citizen regardless of their demographics, socio-economic factors, and intellectual capabilities receives an education. Resource allocation dealt with how to distribute the right mix of fiscal and non-fiscal resources to assist every student achieve academic success. Education reform through litigation and federal involvement in state school systems revealed the interrelationships and interactions required for policy makers and stakeholders to ensure the public that educating our children is still an urgent priority.

The application of systems thinking, organizational processes, and behaviors revealed the many elements and key players involved in improving student academic

performance and closing the achievement gap. Therefore, the decision to approach a 200-year-old institution required several perspectives to fill the gap in the literature, concerning why the achievement gaps still exists.

Chapter 3 includes a review of the research design for this study, as well as the sample selection and sample size. The chapter includes step-by-step research procedures and a description of the data used to assess student academic performance. Lastly, the chapter includes statistical procedures used for data analysis.

Chapter 3: Research Method

Under NCLB (2002), every state was required to develop academic standards and tests, and an accountability feature that was tied to test scores and their school districts. The primary goal of NCLB was to minimize the achievement gap among certain subgroups (U.S. Department of Education, 2002). To understand the financial management aspect of Georgia's reliance on local property tax revenue for funding its public school districts and its relationship to student academic performance, I evaluated the resource allocation practices at the student, school, and district levels. The focus of the evaluation included school district costs, school-level budgeting, activity-based funding, and the generation of local tax revenue levels. The purpose of this quantitative study was to determine whether a difference exists in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend high property wealth middle schools.

Research Design and Rationale

The purpose of this quantitative research study was to determine whether a difference existed in student academic achievement outcomes based on the location of the public middle schools and school districts, and the amount of property tax revenue that was generated to fund them. The independent variables are the total number of eight-grade students who took the Georgia EGWA, the total middle school property valuation, the total ED property valuation, and the average median sale price. The dependent variable was the total number of eight-grade ED students who passed the EGWA.

Case and Light (2011) stated that the research question influences the type of methodology the researcher selects to conduct research. In addition, developing the appropriate research methodology was essential for supporting the theoretical framework, the research methods, and design (Case & Light, 2011). A characteristic of quantitative research is that it is based on theory (Gelo et al., 2008; Trafimow, 2014). Quantitative methodology is deductive, and it tests hypotheses through empirical investigation whereas qualitative approaches develop hypotheses and theories derived from observations (Gelo et al., 2008). I selected quantitative methods because they explain the significance of the information collected and determine whether a relationship exists between variables. Conversely, qualitative approaches attempt to understand the reason or purpose for the actions of the subject matter (Trafimow, 2014).

Although a qualitative method is feasible to understand the reason(s) why the degree of student academic achievement occurs among certain subgroups, unlike quantitative methods, it cannot convert the information collected into numerical values to perform statistical analysis (Trafimow, 2014). Instead, qualitative research methods use information that is nonnumerical and is typically presented in a written or oral format (Cook & Cook, 2008); consequently, a quantitative methodology was the better choice for this research study.

A critical step in the research process is the selection of an appropriate research design from among the four main types of quantitative research: descriptive, correlational, causal-comparative/quasi-experimental, and experimental research. Descriptive and correlational research designs were used for this study. The descriptive,

correlational research design can determine the extent of the relationship between the variables by using statistical data for analyses (Gelo et al., 2008). Turner et al. (2013) stated that descriptive research should answer the how and what questions concerning variables instead of why a phenomenon occurs.

In a correlational research study, the researcher tries to determine the extent of a relationship between two or more variables, whether the relationships are positive or negative, and the strength of the relationship, but not the cause and effect (Teddlie & Yu, 2007). Cook and Cook (2008) found in their study of special education and student achievement outcomes that correlational research was the best choice when the goal is to investigate and compare the differences between specific subgroups and the relationship between the variables. The correlational design was ideal for this study to determine whether a difference existed in student academic performance of low-income students. In addition, I used this design to address the hypothesis that the contributing factor, property tax revenue, may significantly affect student academic achievement outcomes.

I considered using other qualitative research methodologies such as grounded theory and case study approaches. A grounded study uses several levels of data collection and interactions to understand and explain the reason behind a particular process or action. Acquiring multiples sources of data and categorizing its output is ideal for analysis. However, this approach is better suited for qualitative research that involves participation from individuals. A case study is a qualitative study approach that provides a detailed analysis of the observation of "an event, a process, a program, or system" during a definite point in time or place (Creswell, 2007, p. 244). Although I addressed the

relationship between the independent variable, local school district property characteristics and the dependent variable, student academic achievement, the type of data used in the analysis was not feasible for a qualitative study. I focused on the data, the distribution and relationships of the variables being studied.

Methodology

Population

The target population in this study was public middle schools located in Metropolitan Atlanta area school districts in the state of Georgia. The 11 school districts and 141 middle schools are located in eight counties. The student population was every eighth-grade student enrolled in one of the middle schools in this study during the 9-year study period, 2006–2014.

Sampling and Sampling Procedures

For this study, I used purposive or judgment sampling, a non-probability sampling method. The technique relies on the judgment of the researcher concerning the population that will be explored (Teddlie & Yu, 2007) and typically, the sample is chosen prior to the launch of the study (Gelo et al., 2008). That is, the rationale for selecting the population is specific and addresses the research questions. Another feature of this sampling method is that it takes into account the issue of generalizability or transferability (Teddlie & Yu, 2007).

The site of the sampling process was middle schools in Georgia. I selected the geographic area because each school district is adjacent to (or in close proximity to) Fulton County, the largest county in the state. The City of Atlanta, the state capital, is in Fulton

County. To increase its generalizability, the school districts represent both urban and suburban geographic locations and a similar mix of socioeconomic features. The schools are in areas with similar residential and commercial structures which is significant since all the districts receive a portion of its education revenue from local property taxes. There are expensive, high property and low property value neighborhoods represented in each district. The students attend neighborhood schools in which some students walk to school and other students are bussed into the school district. In Georgia, every student can attend the school of their choice on a regular basis (Georgia Department of Education, 2016).

The student population included ED eighth-grade students who must have passed the EGWA used to evaluate their writing skills before attending high school. In this study, ED students represented the overall student population which included race, ethnicity, gender, English Language Learners (ELLs) and students with disabilities (Georgia Department of Education, n.d.b.). The students in the study represented many student sub-groups enrolled in middle school between 2006–2014.

Archival Data

I used an education-based dataset for 11school districts located in eight Georgia counties tracked for 9-years between 2006 and 2014 and matched to eighth-grade middle school students during this period. All information obtained for school district characteristics and the school-level measures came from the Georgia Department of Education, public, online records (Georgia Department of Education, n.d.f.). The school district characteristics information consisted of the number of schools in each district, total school enrollment, the number of students who received free or reduced lunch,

race/ethnicity totals, and the total revenues per-pupil. The basis of the student academic achievement outcomes for this study was the individual school-level measure, the EGWA test scores.

To analyze the resource allocation policies, I obtained the 2006–2014 county property values and property tax revenue information from the Georgia Department of Revenue. The county level data included annual sales and market prices, housing values (property and assessed), and the property tax revenue. I used Zillow's research data online database (Zillow.com, 2017) to obtain information for the average median sale price data for each school district. The sales information included only residential property that sold during 2006–2014, the sale price ranged between $50,000 to $999,999, were constructed before 2005, and located within the boundaries of each middle school in the study.

I selected each county's tax base as the measure to determine property wealth, which is the basis of the per-student revenue valuation (Rubenstein and Sjoquist, 2003). I used annual sales ratio studies to identify the low property and high property wealth areas for each school district. In Georgia, policy makers use the sales report to determine the level of assessment of high and low property values relative to other counties in the state. (Georgia Department of Revenue/Audits, 2016; McMillen, 2013). The Georgia Department of Education uses the local property tax assessment and revenue information to calculate the QBE Act formula program allocations (Georgia Department of Education, n.d.e.).

The information that I gathered from the Georgia Departments of Education and Revenue represented current and historical data. I assumed that the information was

reliable due to consistent oversight by the departments and the accessibility to the general public. Likewise, the information generated from these websites were the most accurate and best source of data because the information could be validated and retrieved from each local jurisdiction. Microsoft Excel screened, cleaned, and prepared the data for analysis.

Operationalization of Variables

The independent variable, Total8thGradeTested represented the total number of eighth-grade students who took the Georgia EGWA. To measure the variable TotalMiddleSchoolPropertyValuation, I used the total dollar amount of property wealth or real estate within each school district. To calculate the total middle school property valuation, I divided the total school district property valuation by the number of middle schools in the district. This value was used to calculate the property tax revenue for each school district. The variable, TotalEconDisadvPPPropertyValuation was the measure that represented the property valuation of each ED middle school student. I calculated the total ED per-pupil property valuation by dividing the total middle school property valuation by the total number of ED students enrolled in each middle school. The final independent variable was AvgMedianSalePrice, which is an indication of the degree of property wealth in each school district. This variable represents the sale price located at the mid-point of the range between the high and low sale prices for each middle school in this study.

The dependent variable TotalEconDisadvPassedEGWA represented the total number of eighth-grade ED students who passed the EGWA. In this study, ED students

pertained to the students who participated in the free and reduced-price lunch program (Georgia Department of Education, n.d.c). Accurately identifying the students who were in this student sub-group was key to conducting this research study.

The Georgia EGWA is an annual standardized test that measures eighth-grade student proficiency levels in expository and persuasive writing (Georgia Department of Education, n.d.h). I selected the EGWA to quantify student academic achievement outcomes. Neymotin (2010) stated that test scores are appropriate because they measure class attendance, what the student learned, the natural intellectual ability of the student, the degree of study time, and parental inputs concerning education. However, Dee and Jacobs (2011) questioned the reliability of test scores as an indicator of student academic performance due to the limited nature of assessing one content area.

The first research question compared the academic achievement of ED students who attended middle schools located in high and low property wealth districts. For this study, a low property wealth district is represented by a middle school located in an area in which at least 10 % of the owner-occupied housing had a minimum property value of $50,000. A high property wealth district is represented by a middle school located in an area in which at least 10% of the owner-occupied housing had property values that were greater than $150,000. Annual sales information and annual county property tax digests served as the basis for how I decided high and low property assessment/property values (Georgia Department of Revenue, n.d.d).

The second research question examined the relationship between ED students' test scores, the location of the school, and local funding from property tax revenue.

Because many education reform initiatives focused on school districts in the United States (Chingos et al., 2013), I decided to examine the relationship between ED academic achievement and the role of property taxes in funding public education. An analysis of local property tax rates and revenues (as per-pupil expenditures and current expenditure functions) included the following: support services, expenditures, general administration, instructional staff support, pupil support services, and school administration (Baker, 2014; Pan et al., 2003). The variables I selected for this study were used to determine the relationship between student academic performance and school enrollment in either a high or low-property-wealth school district.

Data Analysis Plan

I selected this quantitative, correlational research design based on the type of variables and data collected in this study. According to Gelo et al. (2008), the process to determine which statistical test to use is based on the type of research questions, the scale used to measure the variables, and the population distribution. Inferential statistics requires that the researcher draw conclusions about a population based on information regarding population characteristics (Teddlie & Yu, 2007) and can be used for hypothesis testing (Turner et al., 2013).

I used descriptive statistics to identify the school districts' characteristics and student demographic variables such as school enrollment counts and the number of students who participated in the free/reduced lunch program. The data generated from these statistics provided a general overview of the composition of the study population.

By using this research method, I generated the means, standard deviations, and confidence intervals associated with the independent and dependent variables.

To measure the relationships between the independent variables and the dependent variable, I used statistical analysis techniques. The first technique was the Pearson's product-moment correlation coefficient, *r*, which I used to measure the association between interval values that ranged between -1.0 and +1.0 to reveal the direction and strength of the relationship (Teddlie & Yu, 2007). Multiple regression was selected because I wanted to test the significance of the model by determining whether the independent variables could predict the dependent outcome variable (Teddlie & Yu, 2007).

I selected the statistical software, SPSS version 21, to calculate various multiple regression coefficients and residual analysis including estimates, model fit, *R*2, change statistics, descriptive, parts and partial correlation, and multicollinearity analysis. For this study, I focused on multiple regression analysis because it was the best technique to predict the combined and individual effects of the independent variables on the dependent variable.

Threats to Validity

Reliability was concerned with quality and consistency of the operational measures, and the level of random errors present in the results. The objective was to ensure that the defined measures were dependable when tested under similar conditions and arrived at the same conclusions for any other researcher. My goal was to discover

whether different approaches and sources would arrive at the same conclusions (Singleton & Straits, 2010).

Validity pertained to the credibility and authenticity achieved through data collection, analysis, and the ability of the research to explain the study (Teddlie & Yu, 2007). I relied on this concept to validate whether the data represented the intended purpose or design of the study. That is, I wanted to make sure my findings and conclusions drawn from the data accurately explained the relationships that existed between the local property tax system and student academic performance.

External Validity

External validity referred to the degree that a study could be generalized beyond the current population and setting (Teddlie & Yu, 2007). By selecting a non-probability sampling method, I relied on my judgment as the researcher, which may have posed a threat to validity. The timing may have been a factor because the study pertained to two specific events and timeframes. First, the national financial circumstances associated with the housing market crisis that occurred between 2006 through 2009. Second, the timeframe of NCLB (2002) that required proficiency levels be met by the 2013–2014 school term. However, since the mandate, NCLB has been replaced by a new education reform (Whitehouse.gov, 2015). Therefore, the data presented in this study may have limited use and may not be relevant to future research.

Internal Validity

The primary threat to internal validity was the continual adjustment and updating of property values and tax collections rates. Validity should be evident in this research

because the data was derived from existing local government and educational source data. The statistical analysis generated results that supported the initial problem that compared the student academic achievement among ED students who attended low and high-property wealth schools. It was essential that the measures produced the same results regarding the property tax revenue and local school district test score information. Reliability occurred because the data could be obtained by any researcher and the statistical results should be the same regardless of who performed the analysis. That is, the analysis can be repeated and tested by using these techniques because the annual reports and analysis is generated by the Georgia Departments of Education and Revenue.

Construct Validity

Construct validity referred to how accurately the measure, measured the proposed construct in the test and its link to other variables (Utvær, Hammervold, & Haugan, 2014). In their study, Utvær, Hammervold, and Haugan tested the constructs by assessing the degree of correlation between variables. In this study, the construct, student academic achievement was measured by the EGWA test scores, a test administered to every eighth-grade student in Georgia (Georgia Department of Education, n.d.h). It was valid because the format, criterion, and scoring were performed consistently on an annual basis, and during the same period. Therefore, whether a student passed or failed the test was a reliable indication of the student's knowledge of the subject matter, up to this point in their academic experience. Consequently, the construct validity for student academic achievement should be able to predict whether there was a relationship to the other variables.

Ethical Procedures

It is the responsibility of the researcher to abide by ethical issues that prohibit inflicting harm upon participants in any manner while acquiring information to be used for the research study. Ethical issues include obtaining consent agreements informing participants of the nature of the study. When participants understand, and are willing to participate, they should know that it is on a voluntary basis, and they can end participation at their discretion. The right of privacy and confidentiality produced confidence in participants knowing their rights are protected by the researcher. The reporting of my research findings was presented with integrity and available for review and discussion among professional colleagues and organizations (Leedy & Ormrod, 2005). The intent of my research study was to identify the correlation between the local school funding and student academic achievement. The secondary data that I used in this study reflected the ethical and moral responsibility requirements established by Walden University's Institutional Review Board (IRB).

Summary

In Chapter 3, my research methodology provided an overview of how funding local education by property tax revenue could affect student academic achievement (Cook & Cook, 2008; Neymotin, 2010). To determine the extent of the connection, I selected a quantitative, descriptive correlational research design (Turner et al., 2013). In addition, the chapter included the rationale and methodology for the selected research design (Gelo et al., 2008), the choice of archival data, the operationalization of variables, and how reliability and validity (Utvær, Hammervold, & Haugan, 2014; Teddlie & Yu,

2007) could affect this research study. Chapter 4 includes the results, the findings, and limitations of the study.

Chapter 4: Results

In Chapter 3, I introduced the research questions in this research study. The purpose of this quantitative correlational study was to determine whether a difference existed in student academic achievement outcomes of a student subgroup based on the location of the public middle schools, school districts, and the amount of property tax revenue that was generated to fund them. The central question that guided this research was: Do Georgia's education policy makers use the student achievement data in its decision-making process when allocating resources? The research questions addressed the following:

Is there a difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts?

$H_0$1: There is no statistically significant difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts.

$H_1$1: There is a statistically significant difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts.

To what extent, are school districts with high property tax revenue more likely to have higher test scores than school districts located in areas with low property tax revenue?

$H_0$2: There is no statistically significant difference between the test scores of school districts with low property tax revenue compared with the test scores of school districts located in areas with high property tax revenue.

$H_1$2: There is a statistically significant difference between the test scores of school districts with low property tax revenue compared with the test scores of school districts located in areas with high property tax revenue.

The chapter includes the results of the quantitative data analysis presented in figures and tables. In the first section, I describe the demographic characteristics of the sample, descriptive statistics of the variables followed by correlation and multiple regression analyses. In the final section, I will summarize the statistical findings relative to the proposed hypotheses.

Data Collection

I began the data collection process after I received approval from Walden University's IRB (Approval No. 08-08-0064680). I collected data for a 2-week period from public-access, online databases. Because I used only archival data, there was no contact with the sample representatives. The focus of the data collection covered a 9-year timeframe, 2006–2014, for education-based information obtained from the Georgia Department of Education and Department of Revenue.

During the data collection phase of this study, two discrepancies occurred that I was not aware of when I wrote Chapter 3. Originally, I planned to obtain my sales

information from each County Tax Assessors Departments. However, because of the excessive cost and volume of the sales data for a 9-year period, 2006–2014, instead I obtained the sales information from the Zillow home value index online database (Zillow.com, 2014).

The second discrepancy was the inconsistent number of middle schools that changed throughout the study's timeframe. Although I obtained data for a total of 141 middle schools to conduct the analysis (due to the closure and construction of new schools over the 9-year study period), the actual number of schools for each year of the study ranged from 119 to 138. Despite the varying number of schools and the students who took the Georgia EGWA, there was enough data to continue with my research and produce analytical results to address the research questions.

Demographic characteristics of sample.

Demographic information on the student population consisted of every eighth-grade student who passed the EGWA. It was the test the state used to evaluate writing skills before attending high school. The EGWA is an annual standardized test that measured eighth-grade student proficiency levels in expository and persuasive writing (Georgia Department of Education, n.d.). Table 1 provides an overview of eighth-grade students who took the EGWA.

The target population was ED students who passed the EGWA. In this study, ED students represented the overall student population based on race, ethnicity, gender, ELLs, and students with disabilities (Georgia Department of Education, n.d.a). The total number of eighth-grade students tested between 2006–2014 ranged from 43,062 to

46,626, and the number of ED who took the test ranged between 18,894 and 27,136. Among all of the students in the general eighth-grade population who took the test, 88% passed, and 84% of the ED students passed. In Table 1, I provide an overview of all of the students who took and passed the EGWA.

Table 1

Total Eighth-Grade Students Tested

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Eight-Grade Tested	43,062	45,547	45,243	44,488	44,978	44,071	45,351	45,769	46,626
%Eighth-Grade Passed	88%	69%	79%	79%	82%	86%	84%	84%	83%
TotalED Tested	18,894	21,809	22,334	21,922	24,168	23,990	26,608	26,655	27,136
% ED Passed	84%	61%	73%	74%	78%	83%	81%	81%	80%

Note. ED, economically disadvantaged. Source: Georgia Department of Education (2016).

Descriptive statistics of variables.

From 2006–2014, 11 school districts' 141 middle schools administered the Georgia EGWA. The total number of ED eighth-grade students who passed the EGWA was the dependent variable, TotalEconDisadvPassedEGWA. The total number of eighth-grade students who took the test was the variable, Total8thGradeTested; school-level property wealth was the variable, TotalMiddleSchoolPropertyValuation; the variable for ED per-pupil property valuation was TotalEconDisadvPPPropertyValuation; and AvgMedianSalePrice was the final independent variable in the study. According to Aczel and Sounderpandian (2009), to meet normal distribution, kurtosis and skewness values should be close to zero and range between -1 and +1. For the duration of the analysis, in most years the skewness and kurtosis values met this condition.

Because of the study's 9-year period, the descriptive statistics are presented separately by variable type for each year. The data in Tables 2, 3, 4, 5, and 6 provide a summary of the descriptive statistics for the independent and dependent variables. Table 2 displays the mean number for the total number of ED students who passed the EGWA. The highest average number of ED students who passed the test occurred in 2014, 156 (*SD* = 91) or 80% from among the 136 middle schools. For years 2006 to 2013, the mean value and standard deviations ranged from 100 (*SD* = 70) to 155 (*SD* = 88). The kurtosis and skewness values ranged between -1 and +1, which is an indication that normal distribution requirements were met during the study period.

Table 2

Descriptive Statistics of the Variables: TotalEconDisadvPassedEGWA

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	131	71	.24	-.54
2007	126	100	55	.45	.05
2008	141	114	79	.78	1.20
2009	130	122	78	1.32	3.25
2010	138	134	79	1.28	3.37
2011	138	142	83	.91	1.49
2012	138	154	82	.84	1.11
2013	137	156	88	.91	1.06
2014	136	156	91	.95	1.20

Source: Georgia Department of Education (2016).

Table 3 summarizes the mean values for the total number of eighth-graders who took the test, Total8thGradeTested. The highest average number of Total8thGradeTested occurred in 2006, which represents 43,443 students at 119 middle schools, 362 (*SD* = 148). The average range of Total8thGradeTested between 2007 to 2014 was 319 (*SD* = 126) and 361 (*SD* = 146). The kurtosis and skewness values ranged between -1 and +1

which is an indication that normal distribution requirements were met during the study period.

Table 3

Descriptive Statistics of the Variables: Total Eighth-Grade Students Tested

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	362	148	1.206	2.020
2007	126	361	146	1.361	2.603
2008	131	345	152	1.603	3.441
2009	130	342	158	1.677	3.510
2010	138	326	128	1.263	2.523
2011	138	319	126	1.111	2.793
2012	138	329	120	1.052	1.75
2013	137	334	123	1.002	1.761
2014	136	343	126	.988	1.590

Source: Georgia Department of Education. (2016).

Table 4, displays the property wealth levels in assessment dollars. The variable for TotalMiddleSchoolPropertyValuation measured the dollar amount of property wealth or real estate within a school district. The TotalMiddleSchoolPropertyValuation was derived by dividing the total school district property valuation by the number of middle schools in the district. This value is used to calculate the property tax revenue for each school district.

The largest mean occurred in 2007 and consists of all properties located within the 127 middle school boundaries. The TotalMiddleSchoolPropertyValuation's mean value, $278,886,334.86 (*SD* = $100,392,626.81) reflects the real estate boom that took place between 2006–2009 and before the economic downturn that severely impacted the national economy (Bernanke, 2012; Shiller, 2007). The skewness value met the normal distribution range, however the acceptable range for kurtosis was not always met.

Table 4

Descriptive Statistics of the Variables: Total Middle School Property Valuation

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	123	264,048,104.91	91,570,296.18	.619	-.111
2007	127	278,886,334.86	100,392,626.81	.710	.427
2008	132	277,164,721.70	106,500,816.78	.542	-.062
2009	130	272,863,181.15	108,356,714.70	.588	-.097
2010	138	239,409,274.00	98,615,166.92	.605	.430
2011	138	221,061,035.73	97,573,242.88	.789	1.083
2012	138	212,719,827.78	91,490,704.41	1.017	2.028
2013	137	210,800,802.51	99,573,213.60	1.152	2.463
2014	136	221,844,346.13	106,759,106.63	1.178	3.268

Source: Georgia Department of Revenue (2016).

Table 5 presents the highest level of property wealth per ED student for each middle school in assessment dollars. The independent variable, TotalEconDisadvPPPropertyValuation measured the property valuation of each ED middle school student. The total ED per-pupil property valuation was derived by dividing the total middle school property valuation by the total number of ED students enrolled in each school. The largest mean for TotalEconDisadvPPPropertyValuation also occurred in 2007. A total of 126 schools had the mean value, $463,366.26 (SD = $195,581.63). The kurtosis and skewness values ranged between -1 and +1 which is an indication that normal distribution requirements were met during the study period.

Table 5

Descriptive Statistics for the Variables: ED Per-Pupil Valuation

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	300,748.21	106,460.11	.875	-.441
2007	126	463,366.26	195,581.63	1.410	1.919
2008	131	397,867.16	189,599.01	1.743	3.036
2009	130	393,082.11	179,557.39	1.369	1.271
2010	138	332,749.90	159,776.13	1.425	1.732
2011	138	288,310.73	143,088.91	1.423	1.437
2012	138	279,767.24	132,733.24	1.365	1.254
2013	137	274,349.70	146,599.82	1.584	2.057
2014	136	289,132.63	157,301.74	1.585	2.125

Source: Georgia Department of Revenue (2016).

The final independent variable is the AvgMedianSalePrice. It measured the sale price located at the mid-point of the range between the high and low sale prices for each county represented in this study. The average median sale price variable provided an indication of the degree of property wealth in each school district. The largest mean for AvgMedianSalePrice occurred in 2012, $199,282.27 (*SD* = $132,949.40). The sale prices are for residential properties situated within the boundaries of 141 middle schools. Table 6 provides the results. The kurtosis and skewness values ranged between -1 and +1 which is an indication that normal distribution requirements were met during the study period.

Table 6

Descriptive Statistics of the Variables: Average Median Sale Price

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	141	195,198.63	52,324.09	.809	.518
2007	141	197,384.38	58,790.05	.927	.858
2008	137	177,645.12	73,301.20	.523	.270
2009	122	182,564.40	73,525.05	.906	.891
2010	118	166,005.79	83,166.06	.898	.473
2011	111	153,948.31	85,134.43	1.163	1.025
2012	114	199,282.27	132,949.40	1.759	3.543
2013	108	176,920.94	77,411.63	.612	.270
2014	118	173,998.35	83,744.46	.921	1.265

Source: Georgia Department of Revenue (2016) and Zillow.com (2017).

Evaluating correlation and multiple regression assumptions.

To ensure that the statistical analyses would generate the correct results, prior to running the correlation and regression statistics, I had to make sure the data met four statistical assumptions. The assumptions include linearity, multicollinearity, homoscedasticity, and if the observations are independent. I will present each assumption individually for each year in the study.

The first assumption that must be met was linearity which considers the dispersion or spread of the variable points/scatter plots around the regression line (Aczel & Sounderpandian, 2009). The purpose of the scatter plots was to assess whether there was a linear relationship between the dependent and independent variables. A visual examination of the scatterplots demonstrated that for most years the independent variables were clustered together around the dependent variable (See Appendix A). Although in certain years the linearity among the variables was minimal, other assumptions supported the use of the variables in this study.

The second assumption that had to be met was multicollinearity and is determined by the tolerance and Variance Inflation Factors (VIF) values. Multicollinearity occurs when the variable characteristics are closely related to each other. When this happens, the model cannot identify which variable contributed to the variability of the outcome variable (Aczel & Sounderpandian, 2009). That is, when this assumption is violated it is difficult to determine the contribution that each independent variable has on the dependent variable.

To ensure that each variable could be included in the study, the individual variable had to fall within the acceptable range for the tolerance value which is > 0.1 and a VIF value < 10 (Vaz & Mansori, 2013). For this study, all of the variables were within the acceptable parameters which proved that multicollinearity does not exist among the independent variables in this study.

The multicollinearity results for total middle school property valuation is presented in Table 7. For each year in the study, the tolerance value range between .157 and .251, which is greater than 0.1. The VIF values are less than 10 and range between 3.980 and 6.378.

Table 7

Multicollinearity Analysis: Total Middle School Property Valuation

			Correlations		Collinearity Statistics	
Model	Year	Zero-order	Partial	Part	Tolerance	VIF
1	2006	.084	.188	.155	.167	5.975
	2007	.224	.148	.119	.251	3.980
	2008	.170	.043	.033	.196	5.110
	2009	.264	-.131	-.093	.184	5.425
	2010	.168	-.153	-.110	.184	5.441
	2011	.113	.007	.005	.157	6.378
	2012	.095	-.063	-.052	.167	5.980
	2013	.080	.000	.000	.196	5.095
	2014	.100	.024	.017	.174	5.741

Dependent Variable: Total8thGradeEDPassed

The multicollinearity results for the total number of eighth-grade students who took the EGWA is presented in Table 8. For each year in the study, the tolerance value is greater than 0.1 and range between .149 to .282. The VIF values are less than 10 and range between 3.548 to 6.712.

Table 8

Multicollinearity Analysis: Total Eighth-Grade Tested

			Correlations		Collinearity Statistics	
Model	Year	Zero-order	Partial	Part	Tolerance	VIF
1	2006	.101	-.053	-.043	.149	6.712
	2007	.393	.187	.151	.233	4.294
	2008	.440	.257	.207	.189	5.290
	2009	.575	.452	.356	.187	5.338
	2010	.518	.470	.379	.240	4.165
	2011	.522	.381	.296	.263	3.803
	2012	.459	.330	.288	.222	4.503
	2013	.514	.389	.311	.282	3.548
	2014	.512	.432	.344	.277	3.608

Dependent Variable: Total8thGradeEDPassed

The multicollinearity results for the total ED per-pupil property valuation variable is presented in Table 9. The tolerance value is greater than 0.1 and range between .232 to .365. The VIF values are less than 10 for each year in the study and range between 2.738 to 4.313.

Table 9

Multicollinearity Analysis: Total ED Per-Pupil Property Valuation

			Correlations		Collinearity Statistics	
Model	Year	Zero-order	Partial	Part	Tolerance	VIF
1	2006	-.068	-.020	-.016	.232	4.313
	2007	-.104	.018	.015	.365	2.738
	2008	-.213	.030	.023	.312	3.201
	2009	-.175	.188	.135	.282	3.543
	2010	-.129	.215	.157	.249	4.015
	2011	-.204	.074	.054	.255	3.927
	2012	-.191	.184	.154	.263	3.805
	2013	-.237	.035	.026	.283	3.528
	2014	-.191	.086	.062	.268	3.728

Dependent Variable: Total8thGradeEDPassed

The final multicollinearity results are for the average median sale price variable and is presented in Table 10. The tolerance value is > 0.1 and range between .473 to .836. The VIF values are < 10 for each year in the study and range between 1.216 to 2.116.

Table 10

Multicollinearity Analysis: Average Median Sale Price

			Correlations		Collinearity Statistics	
Model	Year	Zero-order	Partial	Part	Tolerance	VIF
1	2006	-.515	-.577	-.572	.836	1.196
	2007	-.387	-.486	-.441	.738	1.355
	2008	-.373	-.452	-.395	.693	1.443
	2009	-.374	-.409	-.315	.781	1.280
	2010	-.423	-.474	-.383	.822	1.216
	2011	-.408	-.486	-.399	.643	1.556
	2012	-.321	-.281	-.241	.473	2.116
	2013	-.370	-.444	-.365	.655	1.527
	2014	-.320	-.471	-.384	.553	1.807

Dependent Variable: Total8thGradeEDPassed

The next assumption to check is the independence of errors. The purpose for this assumption is to ensure that at least two observations are not correlated and should be independent for each observation. That is, there should not be a relationship among the variables or a pattern of the residuals that suggests autocorrelation (Aczel & Sounderpandian, 2009). Durbin-Watson analysis was used to test the assumption and determine whether the variables met the test statistic's range between 0 to 4. For this study, the statistics were between 1.588 to 1.968 which is within the parameters of acceptability to determine the presence of autocorrelation in the errors (Aczel & Sounderpandian, 2009). The test results are presented in Table 11.

Table 11

Model Summary: Durbin-Watson Analysis

Model	Year	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	2006	.588	.345	.322	58.23	1.968
	2007	.610	.372	.351	44.30	1.898
	2008	.625	.391	.371	60.31	1.852
	2009	.711	.506	.487	58.75	1.711
	2010	.704	.495	.477	61.08	1.588
	2011	.696	.484	.464	65.02	1.696
	2012	.568	.323	.298	72.97	1.715
	2013	.676	.457	.435	70.84	1.877
	2014	.694	.481	.462	70.39	1.648

a. Predictors: (Constant) AvgMedianSalePrice, TotalEDPPPropertyValuation, TotalMiddleSchoolPropertyValuation
b. Total8thGradeEDPassed

The final assumption that must be met is homoscedasticity. This assumption is met when the variance of the independent variable values is spread around the regression line at the same level (Aczel & Sounderpandian, 2009). An evaluation of residuals and scatter plots demonstrated that the variables were evenly dispersed along the fit line. A visual inspection revealed the assumption was met due to the dispersion and randomness of the variable points. An analysis of these assumptions suggested that the data was acceptable and could generate the appropriate statistics for this study. See Appendix B for the scatter plots that support the fact that no violation occurred, and the assumption was met.

Study Results

Correlation matrix analysis.

I used correlation analysis to examine the relationships between the dependent and independent variables required to test the hypotheses. Pearson's product moment correlation coefficient measured the association between the variables expressed as *r*. The *r* coefficient is the effect size and represents the strength and direction of the relationship and is stated as a number in the range of -1 and +1. The closer *r* is to 1.0 the stronger the association between two variables (Vaz & Mansori, 2013).

Another aspect of correlation analysis was used to test the hypothesis. The probability p-value was used to determine the significance of the relationships and whether the conclusions based on the effect size, *r*, is accurate or an error (Vaz & Mansori, 2013). In this study, to assess whether the test is significant for $\alpha = .01$ and .05, the following must occur: if $p < .01$ or .05, then, the test is significant and there is a significant relationship between the dependent and independent variables. Also, if $p > .01$ or .05, then the test is not significant and there is not a relationship between the variables. I used correlation analysis to evaluate the null hypothesis as evidence to reject or accept the hypothesis.

Table 12 showed that in 2006 there was a moderate, negative statistically significant relationship between the number of ED students who passed the EWGA and the average sale price $r\ (117) = -.515$, $p = .000$. However, there was not a significant relationship between the number of ED students who passed the EWGA and the variables total middle school property valuation $r\ (117) = .084$, $p = .362$, the total number of students who took the EGWA, $r\ (117) = .101$, $p = .273$, and ED per-pupil property valuation, $r\ (117) = -.068$, $p = .461$.

Table 12

Correlations: 2006

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.084	1			
3. Total8thGradeTested	.101	.648**	1		
4. TotalEconDisadvPPPropertyValuation	-.068	.288**	-.443**	1	
5. AvgMedianSalePrice	-.515**	.338**	.078	.308**	1

Note. N = 119. ** Correlation is significant at the 0.01 level (2-tailed).

Table 13 reveals that in 2007 there was a significant relationship between the ED students who passed the EGWA and middle school property valuation, r (124) = .224, p = .012 and the total number of students who took the EGWA, r (124) = .393, p = 0.000. The results revealed a significant negative relationship between the ED students who passed the EGWA and average median sale price, r (124) = -.387, p = .000. However, there was not a significant relationship between the number of ED students who passed the EWGA and the ED per-pupil property valuation, r (124) = -.104, p = .248.

Table 13

Correlations: 2007

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.224*	1			
3. Total8thGradeTested	.393**	.602**	1		
4. TotalEconDisadvPPPropertyValuation	-.104	.191*	-.485**	1	
5. AvgMedianSalePrice	-.387**	.397**	.098	.042	1

Note. N = 126. *. Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 14 reveals that in 2008, there was a significant relationship between ED students who passed the EGWA and the total number of students who took the EGWA, r (129) = .439, p = .000. However, there was a small, negative statistically significant relationship with the average median sale price, r (135) = -.328, p = .000. There was a significant negative relationship between ED students who passed the EGWA and ED per-pupil property valuation, r (129) = -.216, p = .013. There was not a significant relationship with middle school property valuation, r (139) = .164, p = .060.

Table 14

Correlations: 2008

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.164	1			
3. Total8thGradeTested	.439**	.636**	1		
4. TotalEconDisadvPPPropertyValuation	-.216*	.216*	-.464**	1	
5. AvgMedianSalePrice	-.328**	.447**	.135	.093	1

Note. Total8thGradeEconDisadvPassed, *N* = 141, TotalMiddleSchoolPropertyValuation, *N* = 132, Total8thGradeTested, *N* = 131, TotalEconDisadvPPPropertyValuation, *N* = 131, AvgMedianSalePrice, *N* = 137. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 15 displays that in 2009, there was a significant relationship between ED students who passed the EGWA and all of the variables. The total middle school property valuation, r (128) = .253, p = .004 and the total number of students who took the EGWA, r (128) = .562, p = .000. Conversely, there was a significant negative relationship between ED students who passed the EGWA and ED per-pupil property valuation, r (129) = -.217, p = .013, and average median sale price, r (110) = -.374, p = .000.

Table 15

Correlations: 2009

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.253**	1			
3. Total8thGradeTested	.562**	.614**	1		
4. TotalEconDisadvPPPropertyValuation	-.217*	.268**	-.447**	1	
5. AvgMedianSalePrice	-.374**	.302**	.035	.075	1

Note. Total8thGradeEconDisadvPassed, *N* = 130, TotalMiddleSchoolPropertyValuation, *N* = 130, Total8thGradeTested, *N* = 130, TotalEconDisadvPPPropertyValuation, *N* = 130, AvgMedianSalePrice, *N* = 112. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 16 reveals that in 2010, there was a significant relationship between ED students who passed the EGWA and the variables, middle school property valuation, r (136) = .170, p = .046, and the total number of students who took the EGWA, r (136) = .496, p = .000. There was a significant negative relationship between ED students who passed the EGWA and average median sale price, r (113) = -.423, p = .000. There is not a significant negative relationship between ED students who passed the EGWA and ED per-pupil property valuation, r (129) = -.155, p = .069.

Table 16

Correlations: 2010

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.170*	1			
3. Total8thGradeTested	.496**	.510**	1		
4. TotalEconDisadvPPPropertyValuation	-.155	.447**	-.391**	1	
5. AvgMedianSalePrice	-.423**	.324**	.048	.144	1

Note. Total8thGradeEconDisadvPassed, N = 138, TotalMiddleSchoolPropertyValuation, N = 138, Total8thGradeTested, N = 138, TotalEconDisadvPPPropertyValuation, N = 138, AvgMedianSalePrice, N = 115. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 17 shows in 2011, there was a significant relationship between ED students who passed the EGWA and the total number of students who took the EGWA, r (136) = .485, p = .000 and average median sale price, r (107) = -.408, p = .000. There is a significant negative relationship between ED students who passed the EGWA and ED per-pupil property valuation, r (136) = -.201, p = .018. There is not a significant relationship between ED students who passed the EGWA and middle school property valuation, r (136) = .098, p = .253.

Table 17

Correlations:2011

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.098	1			
3. Total8thGradeTested	.485**	.497**	1		
4. TotalEconDisadvPPPropertyValuation	-.201*	.553**	-.302**	1	
5. AvgMedianSalePrice	-.408**	.527**	.077	.371**	1

Note. Total8thGradeEconDisadvPassed, *N* = 138, TotalMiddleSchoolPropertyValuation, *N* = 138, Total8thGradeTested, *N* = 138, TotalEconDisadvPPPropertyValuation, *N* = 138, AvgMedianSalePrice, *N* = 109. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 18 presents 2012, that there was a significant relationship between ED students who passed the EGWA and the total number of students who took the EGWA, r (136) = .437, p = .000. There was a significant negative relationship between ED students who passed the EGWA, ED per-pupil property valuation, r (136) = -.213, p = .012, and average median sale price, r (111) = -.321, p = .001. There was not a significant relationship between ED students who passed the EGWA and middle school property valuation r (136) = .054, p = .531.

Table 18

Correlations: 2012

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.054	1			
3. Total8thGradeTested	.437**	.472**	1		
4. TotalEconDisadvPPPropertyValuation	-.213*	.500**	-.378**	1	
5. AvgMedianSalePrice	-.321**	.591**	-.085	.525**	1

Note. Total8thGradeEconDisadvPassed, N = 138, TotalMiddleSchoolPropertyValuation, N = 138, Total8thGradeTested, N = 138, TotalEconDisadvPPPropertyValuation, N = 138, AvgMedianSalePrice, N = 113. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 19 shows that in 2013, there was a significant relationship between ED students who passed the EGWA and the total number of students who took the EGWA, r (135) = .486, p = .000. There was a significant negative relationship between ED students who passed the EGWA, ED per-pupil property valuation, r (135) = -.237, p = .005, and average median sale price, r (105) = -.370, p = .000. Conversely, there was not a significant relationship between ED students who passed the EGWA and middle school property valuation, r (135) = .074, p = .389.

Table 19

Correlations: 2013

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.074	1			
3. Total8thGradeTested	.486**	.487**	1		
4. TotalEconDisadvPPPropertyValuation	-.237**	.499**	-.343**	1	
5. AvgMedianSalePrice	-.370**	.499**	.124	.174	1

Note. Total8thGradeEconDisadvPassed, N = 137, TotalMiddleSchoolPropertyValuation, N = 137, Total8thGradeTested, N = 137, TotalEconDisadvPPPropertyValuation, N = 137, AvgMedianSalePrice, N = 107. ** Correlation is significant at the 0.01 level (2-tailed).

Table 20 presents for 2014, that there was a significant relationship between ED students who passed the EGWA and the total number of students who took the EGWA, r (134) = .490, p = .000. There was a significant negative relationship between ED students who passed the EGWA, ED per-pupil property valuation, r (134) = -.174, p = .043, and average median sale price, r (112) = -.320, p = .001. However, there was not a significant relationship between ED students who passed the EGWA and middle school property valuation r (134) = .113, p = .191.

Table 20

Correlations: 2014

	1	2	3	4	5
1. Total8thGradeEconDisadvPassed	1				
2. TotalMiddleSchoolPropertyValuation	.113	1			
3. Total8thGradeTested	.490**	.503**	1		
4. TotalEconDisadvPPPropertyValuation	-.174*	.500**	-.320**	1	
5. AvgMedianSalePrice	-.320**	.602**	.229*	.182	1

Note. Total8thGradeEconDisadvPassed, N = 136, TotalMiddleSchoolPropertyValuation, N = 136, Total8thGradeTested, N = 136, TotalEconDisadvPPPropertyValuation, N = 136, AvgMedianSalePrice, N = 114. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Multiple regression analysis.

I used hierarchical multiple regression to discover the ability of the independent variables, to predict the TotalEconDisadvPassedEGWA when $p < .05$ and $p < .01$. To assess this research question, the coefficient of determination, R^2, measured the amount of variance in the dependent variable from the predictor variables for when considered as a group (Aczel & Sounderpandian, 2009). The analysis of variance (ANOVA) tested the model using p =.05. to determine whether the overall regression model was significant. The coefficients tested each predictor at alpha = .05 to discover what the specific amount of variance was due to each individual predictor. My goal from this analysis was to determine how much variance the model predicted and whether it was statistically significant or greater than zero. If $p < .05$, then it accounted for the variance of the outcome variable (Aczel & Sounderpandian, 2009).

I used the following procedures to determine whether the four regression models were significant. Additionally, I identified the predictor variables that affected the outcome of the dependent variable for each school year. The following is the sequence of variables entered into each model: TotalMiddleSchoolPropertyValuation was entered into Model 1. In the second step, the variable Total8thGradeTested was entered into Model 2 to determine whether it affected the overall model beyond the variable, TotalMiddleSchoolPropertyValuation to predict the TotalEconDisadvPassedEGWA. In the next step, TotalEconDisadvPPPropertyValuation was entered into Model 3. In the final step, AvgMedianSalePrice was introduced into Model 4.

For school year 2006, the following variables were not statistically significant as predictors of TotalEconDisadvPassedEGWA: TotalMiddleSchoolPropertyValuation, R^2 = .007 F (1, 117) = .838, p = .362, TotalEconDisadvPPPropertyValuation, R^2 = .007, F (1, 115) = .874, p = .352, and Total8thGradeTested, R^2 =.004, F (1,116) = .440, p =.508. Only the variable, AvgMedianSalePrice was statistically significant, R^2 = .327, F (1,114) = 56.96, p = .000, p < .05 and explained 33% of the variance for TotalEconDisadvPassedEGWA. The final model had one out of four predictor variables that were statistically significant, AvgMedianSalePrice (β = -.51, p < .001). Table 21 has the regression output for 2006.

Table 21

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2006

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	.084	0.00	0.00	0.032	0.00	0.00	0.21	0.00	0.00	0.38
TotalEighthGradeTest				0.04	0.06	0.08	-0.05	0.12	-0.11	-0.05	0.09	-0.11
EDPPPropertyValue							0.00	0.00	-0.18	0.00	0.00	-0.03
AvgMedianSalePrice										-0	0.00	-0.63
R	0.08			0.1			0.14			0.59		
R^2	0.01			0.01			0.02			0.35		
R^2 Change	0.01			0			0.01			0.33		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

For school year 2007, two variables were not statistically significant as predictors of TotalEconDisadvPassedEGWA, TotalMiddleSchoolPropertyValuation, $R^2 = .050$, F (1, 124) = 6.56, $p = .012$ and TotalEconDisadvPPPropertyValuation, $R^2 = .050$, F (1, 124) = 6.56, $p = .012$. However, there were two variables that were significant and contributed a significant amount of variance, Total8thGradeTested $R^2 = .104$, F (1,123) = 15.16, p =.000 and explained 10% of the variance in TotalEconDisadvPassedEGWA. The AvgMedianSalePrice was also statistically significant $R^2 = .195$, F (1,121) = 37.50, p = .000, $p < .05$ and explained 20% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant with Total8thGradeTested having a higher Beta value ($\beta = .31$, $p < .001$) than AvgMedianSalePrice ($\beta = -.51$, $p < .001$). Table 22 has the regression output for 2007.

Table 22

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2007

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.22	0.00	0.00	-0.02	0.00	0.00	-0.2	0.00	0.00	0.24
TotalEighthGradeTest				0.15	0.04	0.4	0.24	0.06	0.63	0.12	0.06	0.31
EDPPPropertyValue							0.00	0.00	0.24	0.00	0.00	0.02
AvgMedianSalePrice										0.00	0.00	-0.51
R	0.22			0.39			0.42			0.61		
R2	0.05			0.15			0.18			0.37		
R2 Change	0.05			0.1			0.02			0.2		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

For school year 2008, TotalMiddleSchoolPropertyValuation, $R^2 = .029$, F (1, 126) = 3.73, $p = .056$ and TotalEconDisadvPPPropertyValuation $R^2 = .022$, F (1, 124) = 3.54, $p = .062$ were not statistically significant nor were they predictors of TotalEconDisadvPassedEGWA. However, Total8thGradeTested was significant and explained the model's variance 18%, $R^2 = .184$, F (1,124) = 29.20, $p = .000$. In addition, AvgMedianSalePrice was statistically significant $R^2 = .156$, F (1,123) = 31.53, $p = .000$, $p < .01$. The variable explained 16% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant with Total8thGradeTested having a higher Beta value ($\beta = .48$, $p < .001$) than AvgMedianSalePrice ($\beta = -.48$, $p < .001$). Table 23 has the regression output for 2008.

Table 23

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed:2008

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.17	0.00	0.00	-0.18	0.00	0.00	-0.39	0.00	0.00	0.08
TotalEighthGradeTest				0.27	0.05	0.55	0.4	0.08	0.81	0.24	0.08	0.48
EDPPPropertyValue							0.00	0.00	0.25	0.00	0.00	0.04
AvgMedianSalePrice										0.00	0.00	-0.48
R	0.17			0.46			0.48			0.63		
R2	0.03			0.21			0.23			0.39		
R2 Change	0.03			0.18			0.02			0.16		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

For school year 2009, TotalMiddleSchoolPropertyValuation was statistically significant $R^2 = .070$, F (1, 110) = 8.26, $p = .005$ and explained 7% of variance in TotalEconDisadvPassedEGWA. In the second step, all of the remaining predictor variables were significant and explained the variance in the model. Total8thGradeTested explained the variance in the model at 27%, $R^2 = .274$, F (1,109) = 45.57, $p = .000$. TotalEconDisadvPPPropertyValuation was also significant as a predictor of TotalEconDisadvPassedEGWA since $R^2 = .062$, F (1, 108) = 11.31, $p = .001$; it added 6% more variance. AvgMedianSalePrice was statistically significant $R^2 = .099$, F (1,107) = 21.94, $p = .000$, $p < .01$ and explained 10% of the variance for TotalEconDisadvPassedEGWA. Each predictor variable in the final model was statistically significant with Total8thGradeTested having a higher Beta value ($\beta = .82$, $p <$

.001) than the other three variables. Thus, for 2009 every variable contributed to the TotalEconDisadvPassedEGWA. Table 24 has the regression output for 2009.

Table 24

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed:2009

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.26	0.00	0.00	-0.15	0.00	0.00	-0.55	0.00	0.00	-0.22
TotalEighthGradeTest				0.35	0.05	0.67	0.57	0.08	1.1	0.43	0.08	0.82
EDPPPropertyValue							0.00	0.00	0.44	0.00	0.00	0.25
AvgMedianSalePrice										0.00	0.00	-0.36
R	0.26			0.59			0.64			0.71		
R2	0.07			0.34			0.41			0.51		
R2 Change	0.07			0.27			0.06			0.1		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

For school year 2010, TotalMiddleSchoolPropertyValuation was not statistically significant $R^2 = .028$, F (1, 113) = 3.30, $p = .072$ and was the only variable unable to predict TotalEconDisadvPassedEGWA. The remaining variables were significant to predict and explain the variance in the model. Total8thGradeTested explained the model by 25%, $R^2 = .253$, F (1,112) = 39.51, $p = .00$, TotalEconDisadvPPPropertyValuation, $R^2 = .067$, F (1, 111) = 11.39, $p = .001$; it added 7% more variance to the model. AvgMedianSalePrice was statistically significant at $R^2 = .146$, F (1,110) = 31.87, $p = .000$, $p < .01$ and explained 15% of the variance for TotalEconDisadvPassedEGWA. Three out of four predictor variables in the final model were statistically significant with

Total8thGradeTested having a higher Beta value (β = .77, p < .001) than the other two statistically significant variables. Table 25 has the regression output for 2010.

Table 25

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed:2010

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.17	0.00	0.00	-0.14	0.00	0.00	-0.6	0.00	0.00	-0.26
TotalEighthGradeTest				0.39	0.06	0.59	0.66	0.1	0.99	0.51	0.09	0.77
EDPPPropertyValue							0.00	0.00	0.5	0.00	0.00	0.31
AvgMedianSalePrice										0.00	0.00	-0.42
R	0.17			0.53			0.59			0.7		
R2	0.03			0.28			0.35			0.5		
R2 Change	0.03			0.25			0.07			0.15		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *p < .05 **p < .01

For school year 2011, TotalMiddleSchoolPropertyValuation was not statistically significant R^2 = .013, F (1, 107) = 1.40, p = .240 and neither was TotalEconDisadvPPPropertyValuation since R^2 = .018, F (1, 105) = 2.81, p =.097. The variables were not predictors of TotalEconDisadvPassedEGWA. However, Total8thGradeTested explained the amount of variance in the model was 29%, R^2 =.294, F (1,106) = 44.91, p =.000. The AvgMedianSalePrice was also statistically significant R^2 = .159, F (1,104) = 32.13, p = .000, p < .01 a. The and explained 16% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant; Total8thGradeTested had a slightly higher Beta value

(β = .58, p < .001) than AvgMedianSalePrice (β = -.50, p < .001). Table 26 has the regression output for 2011.

Table 26

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2011

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.11	0.00	0.00	-0.22	0.00	0.00	-0.47	0.00	0.00	0.01
TotalEighthGradeTest				0.44	0.07	0.64	0.57	0.1	0.83	0.40	0.1	0.58
EDPPPropertyValue							0.00	0.00	0.26	0.00	0.00	0.11
AvgMedianSalePrice										-0.01	0.00	-0.5
R	0.11			0.55			0.57			0.70		
R2	0.01			0.31			0.33			0.48		
R2 Change	0.01			0.29			0.02			0.16		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *p < .05 **p < .01

For school year 2012, TotalMiddleSchoolPropertyValuation was not statistically significant R^2 = .009, F (1, 111) = 1.01, p = .318 nor was TotalEconDisadvPPPropertyValuation significant as a predictor of TotalEconDisadvPassedEGWA since R^2 = .036, F (1, 109) = 5.28, p = .024. Total8thGradeTested was significant and the amount of variance explained by the model was 22%, R^2 =.220, F (1,110) = 31.43, p =.000. The AvgMedianSalePrice was also statistically significant, R^2 = .058, F (1,108) = 9.29, p = .000, p < .01 and explained 6% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant. Total8thGradeTested had a slightly

higher Beta value (β = .61, p < .001) than AvgMedianSalePrice (β = -.35, p < .001). Table 27 has the regression output for 2012.

Table 27

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2012

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.1	0.00	0.00	-0.16	0.00	0.00	-0.47	0.00	0.00	-0.13
TotalEighthGradeTest				0.37	0.07	0.53	0.57	0.11	0.83	0.42	0.12	0.61
EDPPPropertyValue							0.00	0.00	0.37	0.000	0.00	0.3
AvgMedianSalePrice										0.00	0.00	-0.35
R	0.1			0.48			0.52			0.57		
R2	0.01			0.23			0.27			0.32		
R2 Change	0.01			0.22			0.04			0.06		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *p < .05 **p < .01*

For school year 2013, TotalMiddleSchoolPropertyValuation was not statistically significant R^2 = .006, F (1, 105) = .668, p = .416 and was not a predictor of TotalEconDisadvPassedEGWA. When TotalEconDisadvPPPropertyValuation was entered into Model 3 neither was it significant as a predictor of TotalEconDisadvPassedEGWA since R^2 = .023, F (1, 103) = 3.57, p = .062. Total8thGradeTested was significant and explained 29% of variance in the model, R^2 =.294, F (1,104) = 43.61, p =.000. The AvgMedianSalePrice was statistically significant R^2 = .133, F (1,102) = 25.04, p = .000, p < .01 and explained 13% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant. Total8thGradeTested had a higher Beta value (β = .59,

$p < .001$) than AvgMedianSalePrice ($\beta = -.45$, $p < .001$). Table 28 has the regression output for 2013.

Table 28

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2013

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.08	0.00	0.00	-0.22	0.00	0.00	-0.45	0.00	0.000	0.00
TotalEighthGradeTest				0.45	0.07	0.62	0.6	0.11	0.82	0.43	0.1	0.59
EDPPPropertyValue							0.00	0.00	0.27	0.00	0.00	0.05
AvgMedianSalePrice										-0.00	0.00	-0.45
R	0.08			0.55			0.57			0.68		
R2	0.01			0.3			0.32			0.46		
R2 Change	0.01			0.29			0.02			0.13		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

For school year 2014, TotalMiddleSchoolPropertyValuation was not statistically significant $R^2 = .010$, F (1, 112) = 1.13, $p = .290$. Neither was TotalEconDisadvPPPropertyValuation significant as a predictor of TotalEconDisadvPassedEGWA since $R^2 = .045$, F (1, 110) = 7.41, $p = .008$. Total8thGradeTested explained the variance in the model by 28% since $R^2 = .279$, F (1,111) = 43.54, $p = .000$. The variable AvgMedianSalePrice was statistically significant $R^2 = .148$, F (1,109) = 31.04, $p = .000$, $p < .01$ and explained 15% of the variance for TotalEconDisadvPassedEGWA. The final model had two out of four predictor variables that were statistically significant with Total8thGradeTested having a higher Beta value (β

= .65, $p < .001$) than AvgMedianSalePrice (β = -.51, $p < .001$). Table 29 has the regression output for 2014.

Table 29

Hierarchical Multiple Regression for the Variables for Predicting Total Eighth-Grade ED Passed: 2014

	Model 1			Model 2			Model 3			Model 4		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
MSPropertyValue	0.00	0.00	0.1	0.00	0.00	-0.19	0.00	0.00	-0.51	0.00	0.00	0.041
TotalEighthGradeTest				0.45	0.07	0.6	0.67	0.1	0.9	0.49	0.1	0.65
EDPPPropertyValue							0.00	0.00	0.38	0.00	0.00	0.12
AvgMedianSalePrice										-0.00	0.00	-0.52
R	0.1			0.54			0.58			0.70		
R2	0.01			0.29			0.33			0.48		
R2 Change	0.01			0.28			0.05			0.15		

Note. MS, middle school, EDPP, economically disadvantage per-pupil. *$p < .05$ **$p < .01$

Research question 1.

In this research study, I wanted to know whether there was a difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts? The specific variable that was used to address this question was the association between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. The AvgMedianSalePrice was an indicator of the level of property wealth located in the boundaries of the school districts. A Pearson's product moment correlation coefficient evaluated the null

hypothesis, when α = .01 and .05, the results provided evidence to reject or accept the null hypothesis. The correlation analysis was able to answer the Research Question 1.

For school years 2006-2014, there was a moderately, small, negative statistically significant relationship between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. The relationship ranged between r (112) = -.320, p = .001 to r (117) = -.515, p= .000 and reflects a significant inverse relationship; as average median sale prices decreased, there was a slight increase in the number of TotalEconDisadvPassedEGWA. The relationship can also mean that as sale prices increased the number of TotalEconDisadvPassedEGWA decreased.

Based on the analysis, the null hypothesis was rejected, and the alternate hypothesis was accepted. There is a difference in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend middle schools located in high property wealth school districts. Tables 21, 22, 23, 24, 25, 26, 27, 28, and 29 provide a summary of the results of the correlation analysis for the school terms, 2006–2014.

The results of the hierarchical multiple regression analysis revealed that the model was significant and that there were two key predictive variables, Total8thGradeTested and AvgMedianSalePrice that provided their unique influence on the number of ED students who passed the EGWA. The average sale price was the only variable that could predict the dependent variable during the entire study period. The variable explained the variance as 6%, R^2 = .058, F (1,108) = 9.29, p = .000, p < .01 to R^2 = .133, F (1,102) = 25.04, p = .000, p < .01 and explained the outcome variable by 13%. However, it was the

total number of eighth-grade students who passed the EGWA that had the greatest influence on the total number of ED students who passed the EGWA. For eight out of the nine school terms, it accounted for the variance by 10% to 29% and the regression ranged from R^2 =.104, F (1,123) = 15.16, p =.000 to R^2 =.294, F (1,106) = 44.91, p =.000. Although both variables were strong predictors to explain the variance, however due to the Beta value (β = .31 - β = .82, p < .001) for total number of eighth-grade students who passed the EGWA, was the best predictor for the total number of ED students who passed the EGWA.

Research question 2.

To what extent, are school districts with high property tax revenue more likely to have higher test scores than school districts located in areas with low property tax revenue districts. When, α = .01 and .05 the results reflected that there was significant evidence to reject or accept the null hypothesis. The specific variables used to address this research question were TotalEconDisadvPassedEGWA, TotalMiddleSchoolPropertyValuation, and TotalEconDisadvPPPropertyValuation. The two valuation variables are used by local jurisdictions to calculate property tax revenue.

The correlation results for the relationship between the TotalEconDisadvPassedEGWA and TotalMiddleSchoolPropertyValuation for 2007, 2009, and 2010 was a small, positive statistically significant relationship and ranged from r (136) = .170, p = .046 to r (128) = .253, p = .004. However, for the majority of school terms, 2006, 2008, 2011–2014, the relationship between the two variables was not

statistically significant and ranged from r (136) = .054, p = .531 to r (139) = .164, p = .060.

In contrast, the correlation between the TotalEconDisadvPassedEGWA and TotalEconDisadvPPPropertyValuation for 2006, 2007, and 2010, was not statistically significant and ranged from r (117) = -.068, p = .461 to r (129) = -.155, p = .069 and the null hypothesis was rejected. However, for 2008–2009 and 2011–2014, the association between the two variables reflected a small, negative statistically significant relationship that ranged from r (134) = -.174, p = .043 to r (135) = -.237, p = .005; the alternate hypothesis was accepted. That is, for six of the nine years, there was a difference between the test scores of schools with low property values compared with the test score of school districts located in areas with high property tax revenue. Based on these results, school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts. See Tables 12 - 20 for all correlation analysis results.

I selected multiple regression analysis to determine whether ED students who attended middle schools in school districts with high property tax revenue were more likely to have higher test scores than school districts located in areas with low property tax revenue districts. The regression analysis revealed that the model was statistically significant as a predictor that school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts.

Although TotalMiddleSchoolPropertyValuation was used to calculate property tax revenue, it was not a predictor of TotalEconDisadvPassedEGWA. The results of the regression indicated that for the majority school terms, the variable was not statistically significant and ranged from R^2 = .006, F (1, 105) = .668, p = .416 to R^2 = .050, F (1, 124) = 6.56, p = .012. However, it was significant for the 2009 school year at R^2 = .070, F (1, 110) = 8.26, p = .005 and explained 7% of variance in TotalEconDisadvPassedEGWA.

The second variable, TotalEconDisadvPPPropertyValuation was not significant and was unable to predict TotalEconDisadvPassedEGWA because it ranged between R^2 = .007, F (1, 115) = .874, p = .352 and R^2 = .045, F (1, 110) = 7.41, p = .008. However, for two out of the nine-year analysis period, it was a significant predictor. In 2009, R^2 = .062, F (1, 108) = 11.31, p = .001 and added 6% more variance. Likewise, in 2010, R^2 = .067, F (1, 111) = 11.39, p = .001 and added 7% more variance to the model.

The best predictor of the outcome variable, TotalEconDisadvPassedEGWA was the Total8thGradeTested between 2008–2014. During this period the results revealed that it accounted for 10% to 29% of the variance to predict the outcome of the ED students who passed the annual test and ranged from R^2 =.104, F (1,123) = 15.16, p =.000 to R^2 =.294, F (1,106) = 44.91, p =.000. The confidence interval which indicated the range where the sample mean was likely to fall was 95% C.I. (.078, .397) to 95% C.I. (.329, .691). Also, throughout the entire study period, the AvgMedianSalePrice was a key predictor of the number of TotalEconDisadvPassedEGWA, but it accounted for less than Total8thGradeTested. The regression results are in Tables 21-29.

Summary

The purpose of this quantitative correlational study was to examine the relationship between student academic achievement and the influence of attending a middle school in a low and high property wealth school district. The correlation results for Research Question 1, produced a moderately, small, negative statistically significant relationship between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. As a result of the analysis, the null hypothesis was rejected because there was a difference in the ED student academic achievement outcomes based on the location of the middle school. Hierarchical multiple regression analysis revealed that it was the influence of the total group of eighth-grade students who took the EGWA that predicted the outcome of the ED students who would pass the exam.

For Research Question 2, I wanted to know whether school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts. The specific variables used to address this research question were TotalEconDisadvPassedEGWA, TotalMiddleSchoolPropertyValuation, and TotalEconDisadvPPPropertyValuation. Both of these independent variables revealed that there was a difference between the test scores of school districts with low property values compared with the test scores of school districts located in areas with high property tax revenue. Regression analysis for this question arrived at the same conclusion as Research Question 1, that the predictor of the outcome variable was the total number of eighth-grade students who took the EGWA. The results conclude that for most school terms that it was the total eighth-grade student

population that determined the academic achievement of the student subgroup, ED and not the wealth or the location of the school.

Chapter 4 included the results of the study. However, Chapter 5 will consist of the interpretation of the researcher's findings and relevance to the gap in the literature. In addition, in the chapter I will address the limitations of the study, make recommendations for future research on this topic, and the practical and positive implications to social change.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative correlational research study was to gain insight into the relationship between Georgia public schools educational funding sources and student academic achievement. The specific focus of the study was to determine whether there is a difference in academic achievement between ED students who attend middle schools located in high and low property wealth school districts. I used descriptive, correlational, and regression statistical analyses to establish associations between variables at the school-level in the Metropolitan Atlanta area.

In this final chapter, I identified and interpreted key study results. In addition, I provided an overview of the study's theoretical contributions, the study's limitations, and recommendations. In the final section, I addressed the implications for positive social change, introduced suggestions for future research, and summarized the conclusions.

Interpretation of Findings

I developed two research questions to determine whether Georgia's state education finance system, the QBE Act, ensured that its public school students received an adequate education. The enactment of the NCLB (2002), required states to validate their students' academic achievement outcomes by evaluating their resource allocation structures. That is, the NCLB reform, focused on whether states were paying for the right mix of education financial resources (Aroche, 2014; Baker et al., 2004). My research contributes to the gap in the literature in determining whether a correlation exists between student academic achievement and their enrollment in a low property versus high

property wealth school district (Baker & Corcoran, 2012). I identified several conclusions based on the findings of this study.

The use of test scores to determine student academic achievement was supported by the researchers, Li et al. (2015). The authors identified the existence of a strong, positive correlation between holding schools accountable to policy makers, keeping parents informed about their children's performance, and for providing access to information concerning instructional purposes. Their findings supported the fact that student performance is higher when accountability is present within the school districts. Based on Li et al.'s conclusions, I decided to use test scores to measure the connection between public school resource allocation practices and student academic performance among a student subgroup.

To analyze the data for Research Question 1, I focused on the relationship between ED students who successfully passed the EGWA and the independent variable, the average median sale price. I selected the average sale price variable for two reasons. First, annual sale prices are the basis of the local tax base and the annual county property valuation digests (Georgia Department of Revenue, n.d.). Second, it is indicative of the level of property wealth located within the boundaries of each middle school (Rubenstein & Sjoquist, 2003).

Pearson's product-moment correlation and multiple regression analyses were the statistical procedures that I used to determine whether a statistically significant relationship existed between ED students' academic achievement levels, based on

whether these students attended a middle school located in a low or high property wealth school district. The criterion for establishing significance was alpha level .01.

The results of the correlation analysis revealed the existence of a small, negative, statistically significant relationship, or an inverse relationship between the ED students and the average median sale price. As the average median sale price increased, the number of ED students who passed the EGWA decreased and the opposite was true. As the average median sale price decreased, the number of ED students who passed the EGWA went up. The results support the analysis of Seo and Simon (2008), that there is a significant relationship between school performance and housing prices. Although the results revealed a slight difference in the academic achievement of ED students who attend a low or high property wealth middle school, I did not expect an inverse relationship.

Conversely, because of the inverse relationship, this suggested that when ED students attended schools with lower property values, they should do better on the exam. This finding supported Sciarra and Hunter's (2015) analysis of various courts' responses to violations to states' constitutions concerning their responsibility to provide an adequate education for all students. Sciarra and Hunter concluded that if student subgroups had any chance of obtaining an equal education compared with their peers in more affluent communities, then it was essential that additional support services and programs be made available to them. I supported this finding because if providing additional services and programs became the norm, then it is possible that ED students could achieve academic success from the schools located in the neighborhoods where they reside.

Mensah et al. (2013) found that where families lived had a direct relationship with their willingness to pay higher property taxes as long as it was reflected by better schools and high test scores. According to Neymotin (2010), the desire for productive neighborhood schools was not unusual because regardless of the students' SES, most parents tried to reside in the best school districts where their children could receive an adequate public education. In addition, Neymotin found similar evidence that there was a significant relationship between students who are ED and test scores. However, in this study the reason for the inverse relationship may have been explained by the model's predictor variable discussed next.

I used multiple regression analysis to determine which independent variable was the best predictor of the number of ED students who could pass the EGWA. After reviewing the results, I found that it was the total number of eighth-grade students who took the EGWA who had the highest variance and explained EGWA proficiency levels for 2009–2014. Although the average median sale price was a strong predictor throughout the entire study period, it was not as strong as the unique contribution derived from the total number of eighth-grade students who took the test. This finding supported the observations of Hanushek (2016) that there is no statistically significant relationship between the number of school resources and the learning processes that occur within each school.

My findings identified the influence of the other eighth-grade students' test scores on the scores of low-income students. The implication, is that it may have been the actions of the classroom teachers who were responsible for the overall performance of all

the students who took the EGWA. Another explanation for this finding came from Hanna and Morris (2014) who found that regardless of the amount of money associated with each school district and subgroup of students, it is possible for schools in the same school district to have different academic outcomes. That is, some schools just are more successful than others at producing good academic performance outcomes even though they have the same type of students and various funding levels.

To answer Research Question 2, I wanted to know whether school districts with high property tax revenue were more likely to have higher test scores than school districts located in areas with low property tax revenue. In Georgia, every school district contributes to the QBE finance system; the funds come from local property taxes and the state's foundation formula allotments. The ability of school systems to raise local funds varies depending on differences in property wealth per student and the taxpayers' ability or willingness to pay higher taxes (Davis & Ruthotto, 2015). Consequently, the amount of local revenue is directly related to the level of property wealth/value, location, and the actual tax revenue collected by each jurisdiction (Sjoquist, 2008).

To analyze this research question, I used the total middle school property valuation and the ED per-pupil property valuation levels as the variables to measure property tax revenue. The correlation between the number of ED students who passed the EGWA and the total middle school property valuation amount revealed a small, positive statistically significant association for three of the school years. However, for six of the nine years, the relationship was not statistically significant. Therefore, I concluded that

there was a difference between the test scores based on enrollment in middle schools located in areas with low or high property tax revenue.

The correlation between the number of ED students who passed the EGWA and the total ED per-pupil property valuation amount resulted in a moderate, negative statistically significant association for only three years. That is, as the number of ED students who passed the EGWA increased, the total ED per-pupil property valuation amount decreased, and the relationship was not statistically significant. Similarly, Neymotin's (2010) research did not find a significant relationship between per-pupil education revenue and test scores relative to the location of the school district. For this study, I concluded that there was a difference in the test scores depending on whether the middle schools were in areas with low or high property tax revenue.

I selected multiple regression to discover whether the total amount of middle school property valuation and the ED per-pupil property valuation influenced the number of ED students who passed the EGWA. During the study time frame, the average amount of middle school property valuation ranged from $264 million to $277 million and the ED per-pupil property valuation amounts ranged between $274 million to $463 million. Surprisingly, the amount of money that was allocated to the middle schools and ED students had virtually no effect on the academic achievement of the ED student who passed the EGWA.

My conclusions suggest that ED students who attend schools in an area with higher property wealth does not translate into them doing better academically. My assumption was that with more access to resources usually associated with schools

located in affluent areas, this would benefit ED students. However, this assumption was disputed by previous research that in some instances the quality or type of resources did not appear to influence student academic success (Bartz, 2016).

The level of resources was noted by Aroche (2014) who found that states like Georgia that used the foundation formula program to fund public education allowed communities with higher wealth to provide extra amenities. The additional educational amenities were due to extra funds that remained with the school district after the distribution of the federal and state funds, and the collection of local property tax revenue. The extra funding is attributed to differences in property wealth and property tax revenue collections. According to Kurban et al. (2012), the ability to raise funds differs among school districts and may affect student academic performance.

Nevertheless, once again, the overwhelming predictor was the total number of eighth-grade students who took the EGWA and the correlation between student academic achievement and school funding appeared to be minimal. These findings support Niven et al.'s (2014) analysis of the Texas school foundation program's equity connection to student performance and SES. Niven et al. did not discover a significant correlation between funding amounts, property tax collections, and test scores. Neither was there any correlation between property values and student achievement based on the multiple regression analysis.

The research of Chingos et al. (2013) found that there was a limited amount of research on the connection between school districts and student achievement. However, Chingos et al.'s findings supported the study results indicating that school districts have

minimal influence on student achievement. Like Hanushek (2016), the authors acknowledged that there was more variation with the relationship between student achievement and teachers compared with student achievement and the schools they attended. Thus, my findings support previous research that for 50 years, the public school system has struggled to arrive at the right mix of resources to provide a fair, equitable, and adequate education.

Limitations of the Study

Generalizability.

Generalizability measures the research study results based on a sample relative to a whole population. For quantitative research, it is used to address statistical analyses and predict the probable outcomes in hypothesis testing. Hence, generalization pertains to whether the study's findings generated from the sample can be applied to the general population and achieve the same results (Teddlie & Yu, 2007).

Georgia has 159 counties and 180 public school districts. However, in this study I selected only eight counties and 11 public school districts (this represents 6% of the school districts in the state). I focused on the counties and school districts that were in the Metropolitan Atlanta area and as a result, the study does not include rural or coastal school districts. Because the study was based on a limited geographic area and does not reflect the total school finance system in the state, caution should be used regarding any generalizations. Nevertheless, to increase the study's generalizability, the school districts selected represented both urban and suburban geographic locations that had a similar mix of socioeconomic features. In addition, the school districts had similar residential and

commercial structures which is significant because all the districts receive a portion of its education revenue from local property taxes.

External validity.

External validity is another method to determine whether the research sample results can be generalized to a larger population. That is, the goal is to ensure that the same study results can be generated for different time periods and locations. It is important to make sure the best sampling method is selected, which is an indication of how accurate the study findings will be. In quantitative research, statistical output such as confidence intervals can identify how appropriate the sample is based on the population of variables being studied (Aczel & Sounderpandian, 2009).

For this study, I used a non-probability sampling method. The site of the sampling process was middle schools in Georgia. I focused on one specific student subgroup, the ED students who took the Georgia EGWA. The findings are limited and may not provide a complete examination of what a typical eighth-grade student may learn during the entire school year. Instead, this analysis can be used to identify the students' readiness for high school English and language arts coursework.

Reliability.

The premise of reliability is to determine whether what's being measured is consistent and can achieve the same results under similar conditions (Teddlie & Yu, 2007). In this research study, there may be a limitation on reliability based on three situations that affected the conclusions. First, although there was a total of 141 middle schools analyzed, (however due to the closure and construction of new schools over the

9-year study period), the actual number of schools used ranged between 119 and 138 for each study year. Hence, the argument could be made that if all 141 middle schools were included, then, perhaps the statistical results would be different. The evidence reveals that the number of middle schools did not prohibit obtaining enough data to conduct the study.

Second, the time frame of this study, 2006–2014 was tied to two specific events in the United States. The national housing crisis and the Great Recession were taking place at the same time and presented a unique view of the country. Because these major economic-based events coincided with the timing of this study, the analyses may reflect limited or skewed property valuations and property tax revenue collections.

Third, the culmination of the NCLB Act deadline ended after the 2014–2015 school term. A key feature of the Act was to ensure that all students were proficient in math and English by 2014 (NCLB, 2002). Unfortunately, Georgia discontinued the test after the 2014–2015 school term and decided to use another test model to assess eighth-grade English proficiency levels (Georgia Department of Education, n.d.h). Consequently, there is no way to compare the results of this study to future students taking the EGWA because the test no longer exists.

A final limitation is that there are other variables that may affect the correlation between student academic achievement and the effect of attending middle schools located in low and high property wealth school districts. Like most states, Georgia uses the entire tax digest (every taxable property) to determine the total property valuation and subsequent tax revenue collection amounts. However, to address property wealth, the

average median sale prices were based only on residential properties within the boundaries of each middle school that ranged from $50,000 to $999,999. I did not use properties that sold for less than $50,000 because many could have been foreclosures that occurred during the housing crisis and did not reflect accurate property values. It is possible, if the total middle school and ED per-pupil property valuations were adjusted to reflect only residential properties, then the results may have been different.

Recommendations

The implementation of the NCLB Act was significant because it promoted higher accountability measures to monitor student achievement among various student groups (NCLB, 2002). Title I funds were provided to help students served by the grant to have accessibility to an equal opportunity education through programs and services designed to ensure state-based standards were met. My goal for this research study was to discover to what degree if any, ED students who took the Georgia EGWA had met the required proficiency level in English mandated by the NCLB Act.

The findings of my study indicate that more research is needed concerning student population subgroups' association with the total student population. To gain a first-hand understanding of the influence of the total student population's ability to pass required grade-based assessments, a qualitative study would be effective. Methods such as interviewing, and surveying teachers and students could provide an invaluable opportunity to understand the learning processes of all students. Using a qualitative research approach could provide needed feedback that may explain why students pass and fail annual standardized tests.

In addition, the study should be replicated throughout the state of Georgia to include a more diverse group of low-income students. For instance, by expanding the research throughout the state, the range of property valuations and property wealth would include rural, coastal, and regional differences that are not associated with urban areas. In urban areas, the total tax digest includes major commercial structures that have high property values and can create inequities when compared with non-urban areas. Therefore, if the study is conducted using school districts that reflect the state's demographics, it is possible that the results would be completely different from the current study.

Because I limited the study to eighth-grade middle school students' performance on a single test, another study should be conducted to include all eighth-grade standardized tests. The inclusion of other tests would give a better indication of the students' preparedness for high school. The results could possibly provide a more in depth understanding of any deficiencies that may have caused ED students' academic performance to be lower than the typical eighth-grade student. The findings suggest that while all of the students were learning in the same environment (i.e., school, teacher, and subject content) understanding why the test scores are different could lead to innovative processes to improve the academic performance of the entire ED student population.

A final recommendation, is school districts could invest in training its staff to identify specific problem areas that uniquely affect low-income students' ability to learn the required coursework. In addition, districts could hire social service staff who could recognize problem areas in the students that affects their lives outside of the classroom

and school district. With the right training and staffing decisions, this could be a positive step towards ED students excelling in their coursework at the same level as their peers, and not contingent upon where the school is located.

Implications

Positive Social Change

The outcome of this research study for social change pertains to Georgia's obligation to ensure that its students receive an equitable and adequate education. An adequate education refers to the different approaches, methods, or strategies used to determine or measure the cost of an acceptable education for the average child (Picus & Odden, 2011). Because of federal guidelines and state adopted standards, Georgia's state finance system, QBE, should reflect equal education opportunity and higher academic achievement levels for its students (Baker, 2014; Baker & Levin, 2015).

Another aspect of positive social change is this study will inform state education decision makers concerning the effectiveness of how they allocate funding and other resources in accomplishing their standards and assessment goals. Therefore, it is incumbent on policy makers to prepare its low-income, middle school students, for high school by improving their student academic achievement performance levels.

Positive social change can also be realized when school district leaders understand and execute their responsibility for every student to have access to robust coursework. Because achievement gaps in public education have been an ongoing problem for many decades, especially among Title I subgroups (Bibb & McNeal, 2012),

ensuring that individual students have equal access to relevant course content is the only way that every student will have a chance to meet state-based proficiency standards.

My findings validate the continued necessity to focus on student subgroups. The results revealed that ED students could pass an annual standardized test and the influence of their peers can affect their test scores. This suggests that although adequate funding is essential, understanding the role of the student population relative to their academic performance is an area that requires further research. To promote positive social change, policy makers should explore avenues that incorporate the role of other students. Just as the Coleman Report (1968) identified the role of the students' environment and family life as being instrumental in academic performance, analyzing the role of student-peers may also contribute to the academic performance of student subgroups.

The National Research Council (2011) found that high-stakes standardized testing strategies developed to improve math and reading scores, had not occurred and neither had the achievement gaps been reduced between racial groups. Therefore, instead of complaining about the achievement gap, why not focus on the reason subgroups are influenced by other students. Is it a form of peer-pressure, the school setting, or simply a greater interest in the subject matter?

Therefore, the inability to receive an education comparable to every other student in the district can limit knowledge and the skills required to be a productive citizen in society. Positive social change can be demonstrated when students are equipped to attain their desired goals. Subsequently, a good education is a prerequisite for pursuing higher education or obtaining rewarding employment.

Practical implications.

My focus for this study was Georgia's obligation to guarantee that its students receive an equitable and adequate education. My objective was to assist education policy makers to understand their responsibility to enhance student academic performance. The central contribution of this study can inform state education decision makers concerning the effectiveness of allocating funds and other resources required to achieve state-based standards and assessment goals.

From a practical perspective, education policy makers do not know exactly how to successfully allocate education resources to ensure that every student can receive an equal and efficient academic experience (Baker & Levin, 2015). However, because of NCLB, accountability measures heightened the socio-economic disparities of low-income students who attend low-achieving schools to the extent, that closing the achievement gap was unattainable (Lipman, 2011). My findings revealed that despite the amount of educational funding, it did not contribute to the ED students' ability to pass a standardized test, but other factors were involved. Specifically, recognizing how the influence of the average student populations may lead to new techniques that could make reducing the achievement gap attainable.

Theoretical implications.

Previous research has indicated that student subgroups have been unable to perform at the same academic levels when compared with the average student population due to their SES (Bartz, 2016). Since the enactment of NCLB, when education decision-makers want to emphasize student academic outcomes, the focus of their analysis became

performance-based (Baker, 2014). In order to perform the analyses, the data should include district and student characteristics relative to school funding and student academic outcomes. This is essential because to calculate the average cost of producing desired academic performance, the basis should be the average student population and district characteristics (Baker et al., 2004).

However, for decades, researchers have asked the question, "Does money matter relative to academic performance?" Most have concluded that what matters is how the money is spent. In Georgia, QBE is responsible for identifying the methodology to allocate state funds to the public-school systems. In FY 2014, Georgia received $14.5 billion in revenue, or $8,530 per FTE for its public K-12 school districts; federal contribution, 7.8 %; state contribution, 51.4%, and the local contribution was 40.9% (Davis & Ruthotto, 2015).

Verstegen (2016) concluded that per-pupil funding should reflect comparable funding levels for all school districts. However, when per-pupil expenditures were calculated, the expenditure usually produced a wide variation of funding levels within the education finance systems (LaPlante, 2012). As demonstrated by the amount of funding that goes into the public education system, it is clear that money matters but only to a degree. The key element that must become front and center in the debate of student achievement are the relationships between the student, teacher, school, and school district.

My research results have led me to the conclusion that a major change should be implemented to remove all data analysis functions from the teachers and transfer that

responsibility to a ‘standards/quality control’ division. By employing data analysts and support staff to input and interpret education-based data at the school-level would provide detailed insight and familiarity of the students and their needs. At the same time, teachers would participate in understanding the individual needs of their students based on assessments, test scores, in-class learning, and personal or external issues that may be affecting the student. A simple solution like this would allow the teaching staff to return their focus to teaching students how to learn, from an informed and knowledge-based perspective.

Conclusion

My curiosity concerning the future capabilities of public school students was the initial thought for this research study. My interest in public school students directed my desire to find out how children from lower socioeconomic backgrounds were doing in school compared with the average student population. These ideas served as the basis for my research question; whether there was a difference in the academic achievement of ED students who attend middle schools located in low property wealth school districts compared with ED students who attend schools located in high property wealth districts. In order to gain a better understanding about this topic, I focused on the role of education-based resource allocation and the concepts, equity and adequacy on student academic achievement performance outcomes.

To address growing public concerns regarding the allocation of funds and programs, education policy makers had to address the concept of equality in public education (LaPlante, 2012; Niven et al., 2014). Data-driven decision making became an

invaluable tool to aid policy makers, administrators, and educators make informed decisions. Previous research revealed that accurate data could lead to better resource allocations and could increase student academic outcomes (Della Sala & Knoeppel, 2015; Mandinach, 2012). To date, equality in public education pertains to the allocation of fiscal and non-fiscal resources (Sorenson, 2016). Whereas, equity, in school finance, pertains to fairness among all students and is used to measure the distribution of educational funding (Pan et al., 2003). As a result, equity has become an important concept because it defines how to address the differences in student populations.

Although the topic of student academic achievement, property valuation and property taxation are not new topics, the focus of this study was to understand the connection between the same type of student but in different school settings. My findings supported previous research that there is a difference in the academic outcome of ED students based on where they attend school and the location of the school (Bartz, 2016; Craft & Slate, 2012). Nevertheless, a key finding revealed that there is an inverse relationship between ED students who passed a standardized test to the sale prices of homes located in the school's boundaries. As ED students' test scores increased, sale prices decreased and as test scores decreased, sale prices increased. This was significant because at least one of the reasons why ED students excelled was due to the influence of other students who also took the test and passed it. Subsequently, this may signal to policy makers that money matters, but perhaps not as much as a good teacher.

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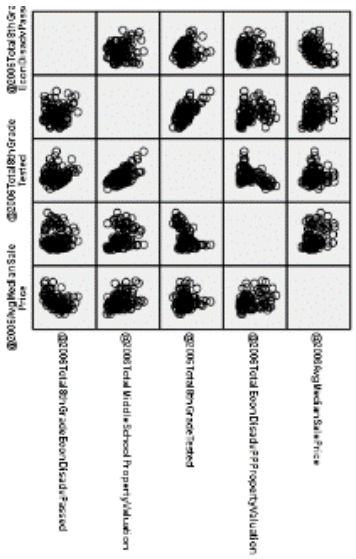
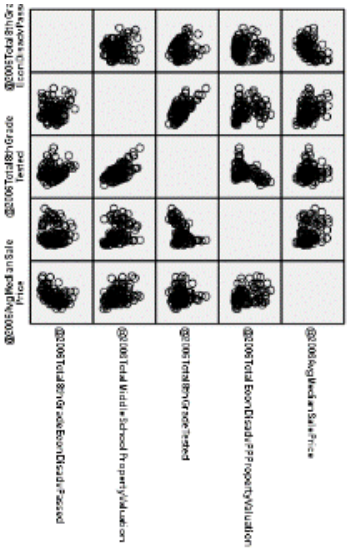
Appendix A: Linearity Assumption Scatter Plots

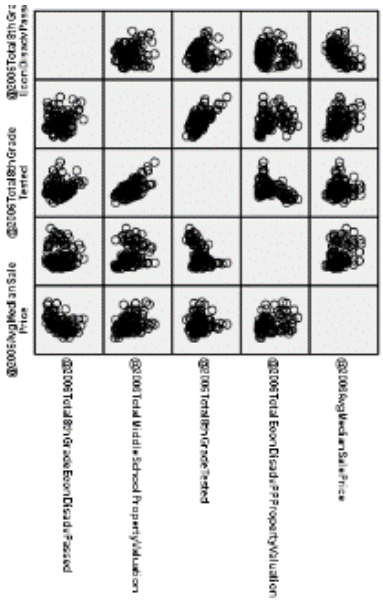
2006



2007



2008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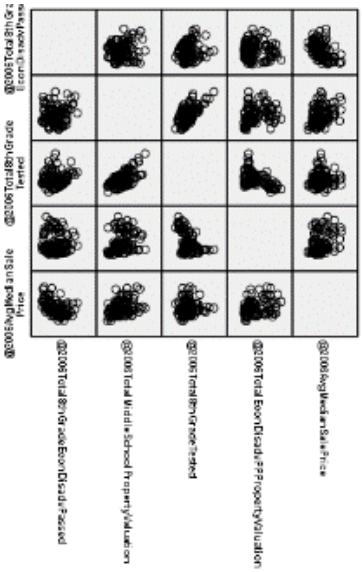
2009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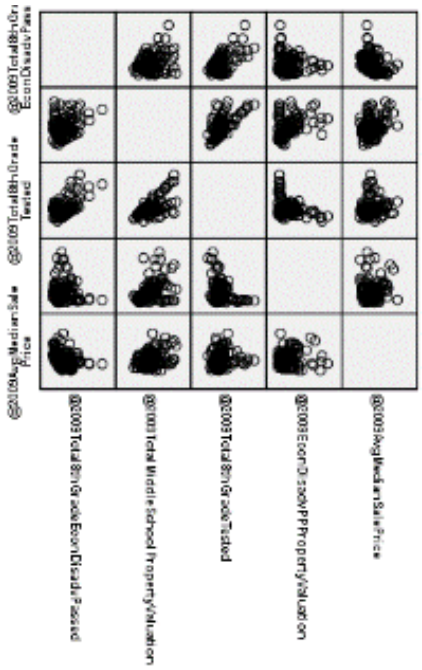
2010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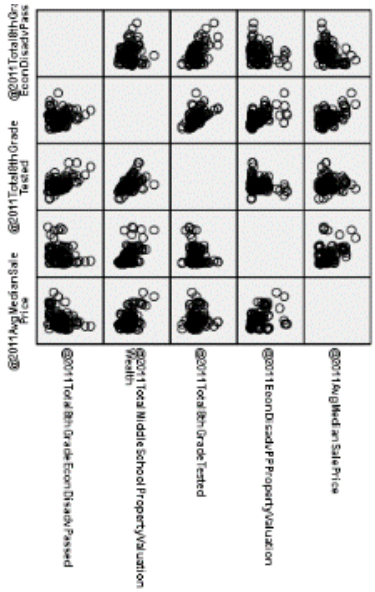
2011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@2011Total Middle School Property Valuation Wealth
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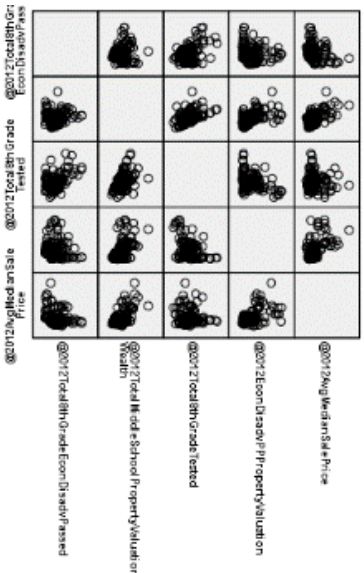
2012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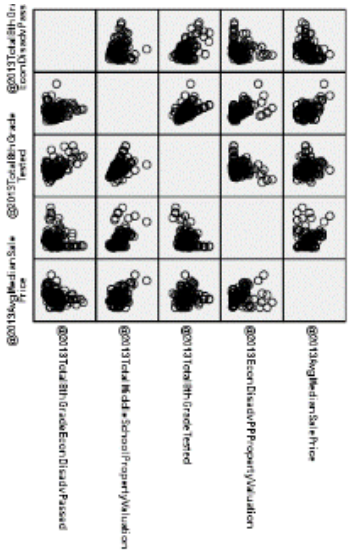
@@2012AvgMedianSale Price

2013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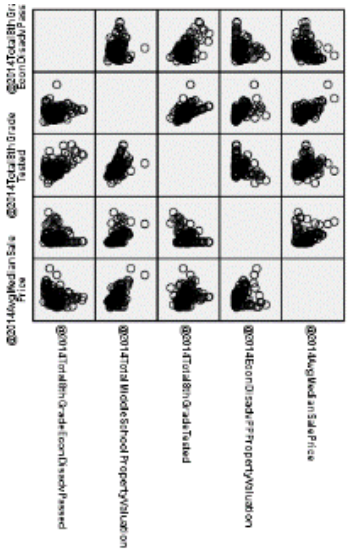
2014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@2014Total Middle School Property Valuation
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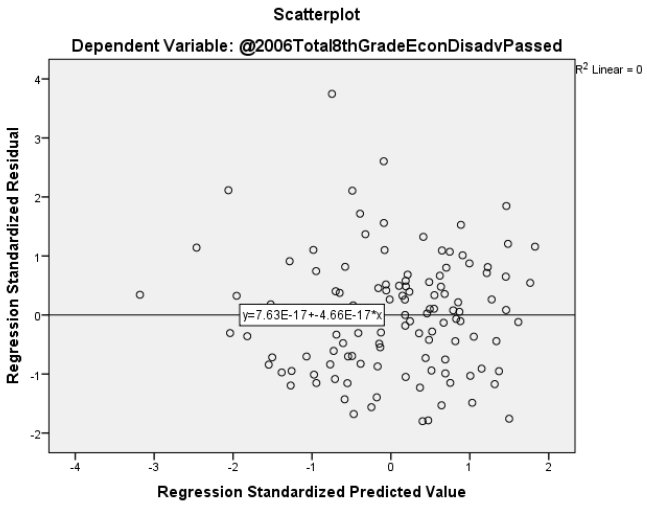
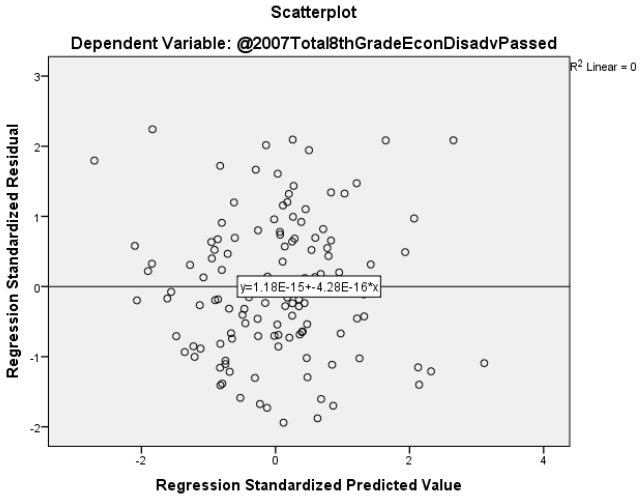
Appendix B: Homoscedasticity Assumption Scatter Plot with Fit Line

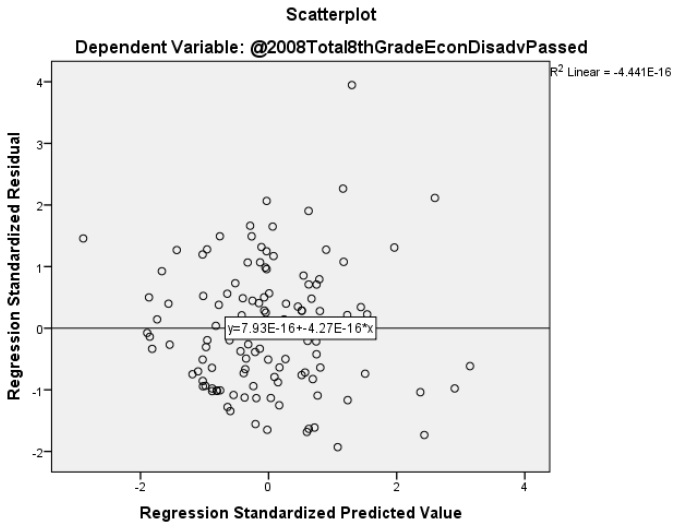
2006



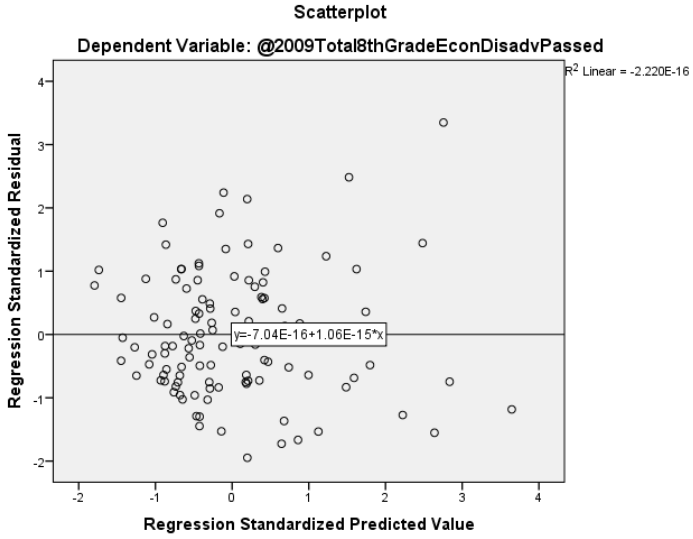
2007



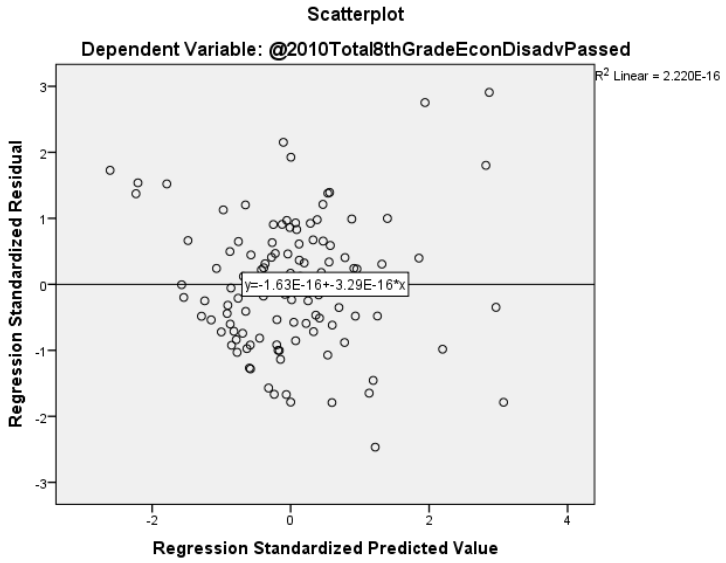
2008


Scatterplot
Dependent Variable: @2008Total8thGradeEconDisadvPassed
R2 Linear = -4.441E-16
y=7.93E-16+-4.27E-16*x
Regression Standardized Residual
Regression Standardized Predicted Value

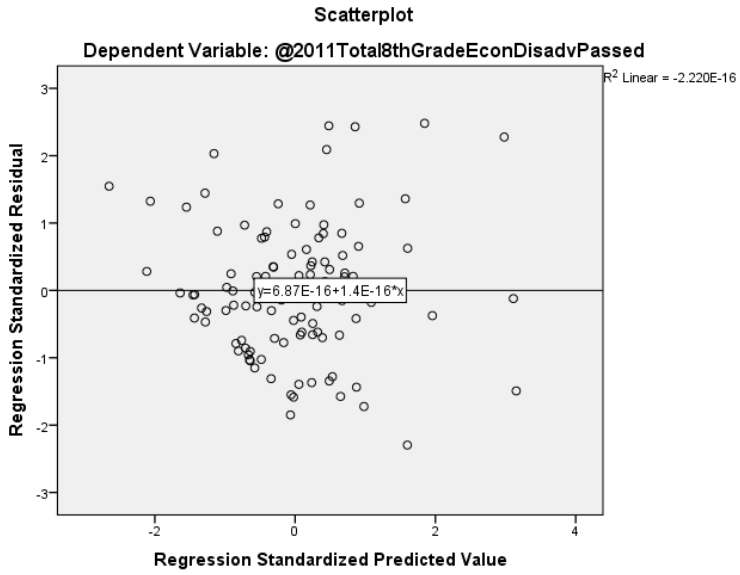
2009


Scatterplot
Dependent Variable: @2009Total8thGradeEconDisadvPassed
R2 Linear = -2.220E-16
y=-7.04E-16+1.06E-15*x
Regression Standardized Residual
Regression Standardized Predicted Value

2010


Scatterplot
Dependent Variable: @2010Total8thGradeEconDisadvPassed
R² Linear = 2.220E-16
y=-1.63E-16+-3.29E-16*x
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-2
0
2
4

2011


Scatterplot
Dependent Variable: @2011Total8thGradeEconDisadvPassed
R² Linear = -2.220E-16
y=6.87E-16+1.4E-16*x
Regression Standardized Residual
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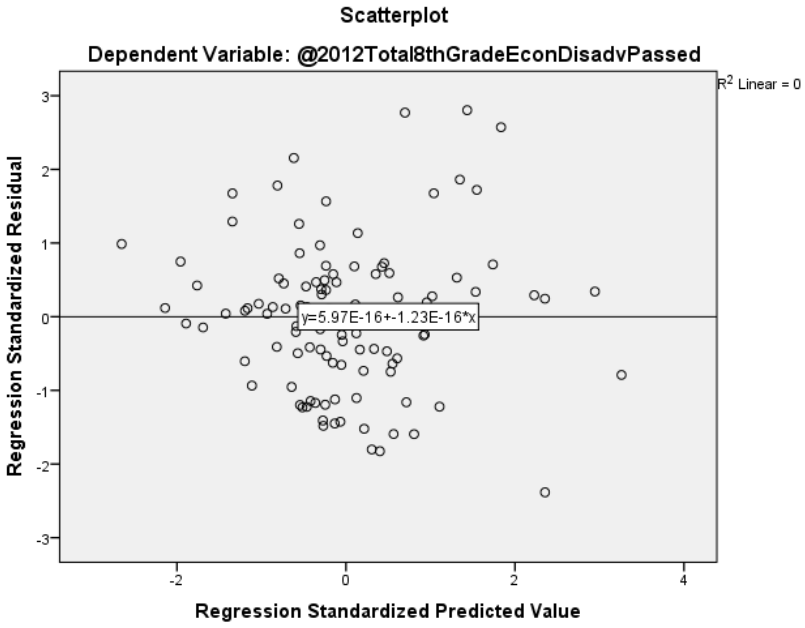
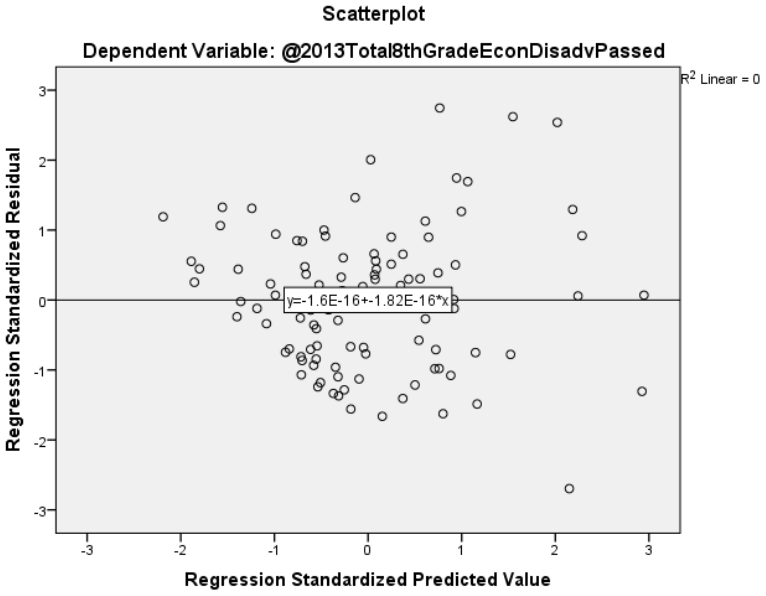
-1
-2
-3
-2
0
2
4

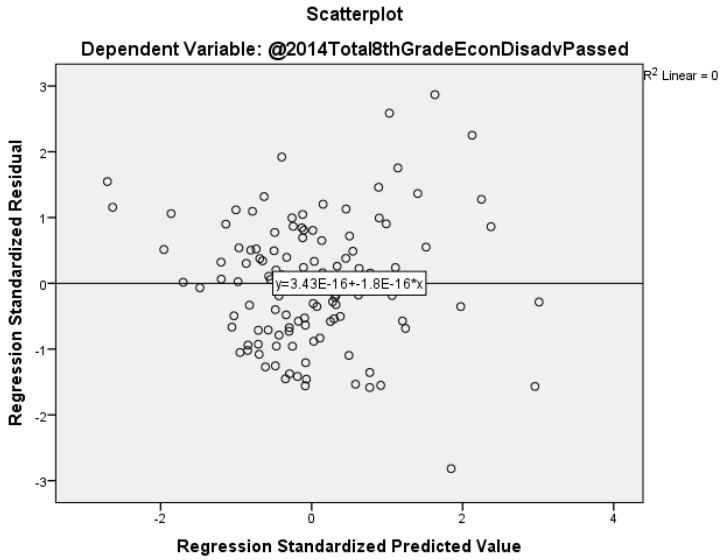
2012


Scatterplot
Dependent Variable: @2012Total8thGradeEconDisadvPassed
R2 Linear = 0
y=5.97E-16+-1.23E-16*x
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-2
0
2
4

2013


Scatterplot
Dependent Variable: @2013Total8thGradeEconDisadvPassed
R2 Linear = 0
y=-1.6E-16+-1.82E-16*x
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2
3

2014


Scatterplot
Dependent Variable: @2014Total8thGradeEconDisadvPassed
R2 Linear = 0
y=3.43E-16+-1.8E-16*x
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-2
0
2
4