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ACCEPTANCE

This dissertation, AN EXAMINATION OF STUDENT ACHIEVEMENT DIFFERENCES BETWEEN CHARTER SYSTEM SCHOOLS AND START-UP CHARTER SCHOOLS, by NAMIK SERCAN, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Philosophy, in the College of Education and Human Development, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.

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AN EXAMINATION OF STUDENT ACHIEVEMENT DIFFERENCES BETWEEN CHARTER SYSTEM SCHOOLS AND START-UP CHARTER SCHOOLS

by

NAMIK SERCAN

Under the Direction of Dr. Nicholas Sauers

ABSTRACT

Georgia Charter School Act of 1998 intends to increase student achievement through academic and organizational innovations, and increased flexibility granted to charter schools. With the legislative intent in mind, the primary purpose of this study is to investigate the extent to which student achievement in elementary schools, middle schools, and high schools differ across the Georgia start-up charter schools and charter system schools as measured by the achievement, progress, and achievement gap scores of 2014 Georgia's College and Career Ready Performance Index (CCRPI). The data set, which is publicly available on the Governor's Office of Student Achievement website and Georgia Department of Education (GADOE) website, includes 87 start-up charter schools and 265 charter system schools in operation during the school year 2013-14 as reported by the GADOE Office of District Flexibility and Governmental Affairs.

Informed by the legislative intent for the Georgia charter school law, the review of the literature conducted for this study examined innovations and increased autonomy in charter schools followed by the student achievement studies involving charter schools across the nation. The method of Factorial Analysis of Variance (ANOVA) was performed to analyze the data, following the selection of the sample through propensity score matching procedure. The Factorial ANOVA procedure revealed no significant differences between the mean scores for charter system schools and start-up charter schools as far as the achievement, progress, and achievement gap components of the 2014 CCRPI are concerned. This result led to the conclusion that start-up charter schools and charter system schools fulfill their legislative obligation of increasing student achievement to a similar extent.

This study contributes to the policy and political dialog surrounding charter schools. Results from the analysis will: (a) reveal which type of charter school fulfills statutory obligations of increasing student achievement more effectively, (b) inform legislators in adopting new laws or revising current laws regarding school choice options, (c) help leaders of charter systems decide whether to introduce or expand start-up charter school offerings in their district portfolios, and (d) help parents choose the best school option among those available.

INDEX WORDS: Charter school, charter district, achievement, CCRPI

AN EXAMINATION OF STUDENT ACHIEVEMENT DIFFERENCES BETWEEN CHARTER SYSTEM SCHOOLS AND START-UP CHARTER SCHOOLS

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NAMIK SERCAN

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DEDICATION

This dissertation is dedicated to my patient wife, Hulya, our cheerful, sweet, and kind-hearted little girls, Nuran, Azra and Esra, and to my loving parents who supported me despite their challenges during the course of my education career. Last but not least, I would like to dedicate this dissertation to authentic teachers “heroes of love” who gratefully and happily sacrifice their own lives for the sake of others.

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1 GEORGIA CHARTER SCHOOLS AND STUDENT ACHIEVEMENT BETWEEN CHARTER SCHOOLS AND TRADITIONAL PUBLIC SCHOOLS

Since the adoption of the nation's first charter school law in Minnesota in 1991, the charter school sector has grown drastically, serving over 2.5 million students in approximately 6400 schools across the forty-one states and the District of Columbia (National Alliance for Public Charter Schools (NAPSC), 2014). Charter schools would offer diversified school choice options for public education to incubate innovations in the area of educational programs, school governance, staffing and budgeting. Charter schools also serve as models for traditional public schools by demonstrating improved teaching and learning strategies (Wohlstetter, Smith & Farrell, 2013).

The Georgia General Assembly enacted legislation in 1993 that authorized formation of charter schools in the state. When the bill was signed on August 20, 1993, Georgia became the third state in the nation adopting its charter school law, which allowed for the conversion of existing public schools into charter schools called conversion charter schools (Opfer, 2001). From the beginning and through the myriad changes in the law since, the legislative intent of the Georgia General Assembly was "to increase student achievement through academic and organizational innovation . . . to utilize the flexibility of a performance based contract called a charter" (Georgia Charter School Act, 1998, p.1). With the legislative intent in mind, the measure of charter school success would be increased student achievement. The primary purpose of this study is to investigate the extent to which Georgia start-up and system charter schools fulfill their legislative obligations of increasing student achievement.

Guiding Questions

The research question for the study is, "Does student achievement in elementary schools, middle schools, and high schools as measured by the components of CCRPI scores differ across the start-up charter schools and charter system schools?" The study will specifically answer the following guiding questions:

1. Does student achievement in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the achievement component of the 2014 CCRPI?
2. Does the student progress in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the progress component of the 2014 CCRPI?
3. Does closure of the student achievement gap in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the achievement gap component of the 2014 CCRPI?

Literature Review

The literature review focuses on three key topics to provide the reader with a foundational understanding of the issues pertinent to an investigation of Georgia charter schools impact on student achievement. The first topic is the historical overview of the charter school movement across the nation and in Georgia as well as demographics and growth in Georgia's charter schools. Next the study will examine key tenets of the Georgia charter school law, which are innovation, flexibility and autonomy, and accountability. Finally, topic three will examine studies that attempted to analyze student achievement in charter schools compared to traditional public schools.

Charter School Concept

Charter schools are autonomous public schools that are exempt from significant state and/or local rules, which govern and sometimes constrain operation and management of traditional public schools. In exchange for increased flexibility and autonomy, charter schools are held responsible for meeting accountability measures stated in the contract or "charter" agreed upon between the charter authorizer and the group developing or operating the school (Wohlstetter, Smith, & Farrell, 2013). Since charter schools are public schools, programs, admission policies, and employment practices are nonsectarian (US Department of Education, 2014). Furthermore, being tuition-free public schools, charter schools admit students on a lottery basis (if more students apply for admission than the school's capacity), and are subject to all applicable federal, state, and local health and safety requirements (US Department of Education, 2014).

Ray Budde first introduced the charter school concept in the United States. In 1974, Budde used the term "charter" in his publication, *Education by Charter: Restructuring School Districts*. He proposed the idea of allowing a group of teachers to develop a comprehensive education plan called "an educational charter" and submit the plan to the school board for authorization. According to Budde, upon approval of the plan, teachers would be expected to implement new, innovative teaching methods within existing public schools, as outlined in their charter (Hassel, 1999).

Albert Shanker, president of the American Federation of Teachers, expanded on Budde's idea, proposing authorization of teachers to start new schools outside existing schools (Junge, 2012). Inspired by Shanker's proposal, the Citizens League, a nonpartisan think tank based in the Minneapolis-St. Paul metropolitan area of Minnesota, released the report "Chartered Schools = Choices for Teachers + Quality for All Students" in December 1988, which outlined the char-

acteristics of the charter schools it envisioned as well as provisions for legislation that would allow for the creation of charter schools (Junge, 2012).

In the meantime, many school districts across the nation implemented a variety of school autonomy initiatives that contained one or more important elements of today's U.S. charter schools, including increased local autonomy, site-based management, and higher accountability (Hill, Bonan, & RAND Corp, 1991). Learning from the school autonomy initiatives, Ted Kolderie, a former executive director of the Citizens League, claimed that site-based management and self-governing school models have limited potential and provide no incentives for systemic change (Kolderie, 1990). Furthering the ideas presented in the work of the Citizens League, Kolderie (1990) proposed instituting a charter contract, which would impose higher accountability and provide increased autonomy for organizing groups. The vision of Ted Kolderie and the Citizens League report laid the foundation for Minnesota's chartering legislation, which later became the nation's first charter school law in 1991 (Junge, 2012). Since the inception of the first charter school law, 42 states and the District of Columbia have adopted charter school laws allowing a variety of entities to authorize charter schools and oversee operations (Lake, 2013). NACSA (2013) reported 974 charter authorizers classified into six agency types including higher education institutes, independent chartering boards, local school districts or regional education agencies, non-educational government entities, not-for-profit organizations, and state education agencies. Across the nation, with the addition of over 600 new charter schools in the 2013-14 school year, there are now approximately 6,400 charter schools serving over 2.5 million students (NAPCS, 2014). Grade configuration for the charter schools in operation during the school year 2010-11 as reported by the NAPSC data dashboard is 44.3% elementary schools, 9.8% middle

schools, 19.9% high schools, 10.4% middle and high schools, and 11.3% serving grades K-12 (NAPSC, 2014).

Overview of Charter Schools in Georgia

Legislation. On August 20, 1993, Georgia became the third state in the nation to adopt a charter school law (Opfer, 2013), which allowed for the conversion of existing public schools into charter schools called conversion charter schools (Georgia Charter School Act, 1993). Following the adoption, three public schools in 1995, seven schools in 1996, and eleven schools in 1997 were converted from traditional public schools to charter schools (GADOE, 2010). In 1998, the charter school bill was amended through the Senate Bill 70 to allow an existing local public school, a private individual, a private organization or a state or local public entity to establish start-up charter schools upon approval by the local district in which the charter school would be located and the State Board of Education (Georgia Charter School Act, 1998). Outlining the process, the law required the petitioner seeking to create a start-up charter school to submit a petition to the local school system in which the proposed charter school will be located. In case of approval by the local board, the charter petition would be submitted to the SBOE for approval. Upon approval by the SBOE, the charter school would then become a locally-approved start-up charter school (Georgia Charter School Act, 1998). The first start-up charter school in Georgia, Oglethorpe Charter School was opened within and by the Savannah-Chatham County School System in 2000 (GADOE, 2010).

Georgia Charter School Act of 1998 was further amended through House Bill 1187, which was signed into law on March 1, 2000. The amendment allowed the State Board of Education to approve a charter school petition if the local board of education denied the petition. According to this amendment if the SBOE approved the petition following the denial from local

boards, then the proposed school were granted the status of "state chartered special school" (A Plus Education Reform Act, 2000).

Signed into the law on April 15, 2002, House Bill 1200 clarified differences between locally approved charter schools and state chartered special schools, as well as the differences between conversion charter schools and start-up charter schools. Among the differences between locally approved charter schools and state charter special schools were funding methods, attendance zones, and the charter petition process. House Bill 1200 stipulated that local charter schools would receive their shares from the state equalization grants, whereas state charter special schools would not be "included in distribution of the local system's equalization grant unless the voters of the local system have approved the use of local tax revenue to support the state chartered special school (p. 14)." The bill did not impose any differences in the Quality Basic Education formula earnings, applicable QBE grants, applicable non-QBE grants, and applicable federal grants. Regarding attendance zones, the bill allowed state chartered special schools to have a defined attendance zone as stated in the charter contract such as a city, district, combination of cities and/or districts, or statewide, while local charter schools could only enroll students that resided within the school system in which the charter school would be located. In relation to the charter petition process, the bill continued to allow start-up charter school petitions to be submitted to the SBOE for state-chartered special school status if denied by the local district, while a conversion charter school petition that was denied by the local district would not be further submitted to the SBOE.

Signed into law in May 2007, Georgia Charter Systems Act further amended the Charter Schools Act of 1998 to provide legislation for the establishment of charter systems, which were defined as "a local system that is operating under the term of a "charter" between the local board

of education and the SBOE. The act aims to provide schools and school systems with increased flexibility to tailor their educational programs to meet the unique needs of their communities by implementing innovative programs (Georgia Charter Systems Act, 2007). Each school in a charter system, called system charter school, operates under the control and management of school level governance in charge of "personnel decisions, financial decisions, curriculum and instruction, resource allocation, establishing and monitoring the achievement of school improvement goals, and school operations" (Georgia Charter Systems Act, p. 2).

Georgia General Assembly adopted the House Bill 1209 in 2008 - The Increased Flexibility for Local School Systems Act to afford traditional school districts flexibilities in the area of school governance and operation. The bill required all traditional school systems in Georgia to choose to operate as an Investing in Educational Excellence (IE^2), or a charter, or a status quo school system. Options of charter systems and IE^2 provides increased flexibility from certain state laws, rules, and regulations in exchange for increased accountability while status quo allows school systems to remain under all current laws, rules, regulations, policies, and procedures. (Increased Flexibility for Local School Systems Act, 2008).

The major difference between the IE^2 systems and the charter systems is that IE2 systems and the SBOE engage in negotiations on the terms of the contract, which establishes accountability measures, flexibility provided to the school system, and the consequences in case of noncompliance with the accountability requirements established in the charter (Increased Flexibility For Local School Systems Act, O.C.G.A. § 20-2-82, 2008). While the contracts for IE^2 systems provide increased flexibility in certain areas depending on the negotiated terms (O.C.G.A. § 20-2-84, 2008), charter systems are granted broad flexibility, which is also available to each school in the charter system as approved by the local board of education (Georgia Charter Systems Act,

2007). GADOE's school system flexibility report showed 28 charter systems and three IE^2 systems approved by July 18, 2014 (GADOE, 2014). The list of approved charter systems is provided in Appendix B.

Pursuant to House Bill 881 (2008), the Georgia Charter Schools Commission (GCSC) was established as a state level charter authorizing entity in 2008. According to the bill, GCSC was empowered to approve or deny petitions for start-up charter schools, renew or non-renew charters for existing schools, and terminate charter schools operating under the GCSC. GCSC ceased its operation following the Supreme Court of Georgia decision on May 16, 2011, that the state's involvement in the establishment of public charter schools was unconstitutional (Gwinnett County School District et al. v. Cox, 2011). GSCS approved 16 start-up charter school petitions during its operation. Of these 16 commission schools, 13 secured approvals from the SBOE to become state-chartered special schools and three were approved by their local boards of education and became locally approved charter schools (GADOE, 2012).

Signed into the law on May 2012, House Resolution 1162 proposed an amendment to the Constitution of the State of Georgia to authorize the General Assembly to establish special schools including state charter schools. Georgia voters approved the amendment on November 6, 2012 by 58.58% Yes to 41.42% No (Secretary of State, 2012). In conjunction with the House Resolution 1162, House Bill 797 further amended the Title 20 of the Official Code of Georgia in 2012 to provide legislation for the establishment of the State Charter School Commission (SCSC) as a state-level charter authorizing entity. By the law, the SCSC is authorized to approve or deny petitions that are already denied by the local school systems as well as petitions proposing statewide attendance zones without a district denial required. Upon the approval or renewal by the SCSC, the State Board of Education may overrule the approval or renewal of the charter

petition (H.R. 797, 2012). The SCSC has reported 27 charter schools approved by the SCSC as of September 2015 (SCSC, n.d.).

Through the amendments Georgia diversified its charter authorizers, including local school districts, the SBOE and the SCSC. However, according to the 2014 Charter School Law Rankings and Scorecard commissioned by the Center for Education Reform, Georgia earned only four points out of fifteen points possible in the category of independent authorizers since the state did not allow entities other than traditional school boards to authorize and manage charter schools. In other words, Georgia lacked independent charter authorizers such as universities, independent charter boards, nonprofit organizations, and/or mayors. Overall, Georgia ranked seventeen among forty-three states that have a charter school law (Center for Education Reform, 2014). A report of the National Association of Charter School Authorizers (NACSA) analyzing the progression of charter school authorizing practices across the nation, the State of Charter School Authorizing 2013 listed higher education institutes, independent charter boards, nonprofit organizations, and state education agencies as charter authorizers in addition to local school boards approving the most number of charters across the nations (NACSA, 2013).

Legislative intent. Georgia Charter Schools Act of 1998 currently governs all Georgia charter schools including start-ups, conversions, and system charter schools. The act indicates the legislative intent for the creation of charter schools "to increase student achievement through academic and organizational innovation by encouraging local schools and school systems to utilize autonomy and the flexibility of a performance based contract called a charter" (Georgia Charter School Act of 1998, 2014, p.1) The charter contract between the petitioner and the authorizer outlines accountability measures and specific waivers given to charter schools. As the accountability measures consist of academic and organizational goals, waivers indicate areas of

flexibility and autonomy that the charter school can exercise. Georgia Charter School Act of 1998 grants charter schools "broad flexibility" or "blanket waiver" from certain provisions of the Georgia Code Title 20 or "any state or local rule, regulation, policy, or procedure relating to schools within an applicable school system regardless of whether such rule, regulation, policy, or procedure is established by the local board, the state board, or the Department of Education" (Georgia Charter School Act, 1998). In exchange for such a waiver, the charter school agrees to meet or exceed the performance-based goals agreed upon between the state board, petitioner, and the local board if applicable. In the case of charter systems, the system agrees to meet or exceed the system-wide performance based goals, including raising student achievement (Georgia Charter School Act, 1998).

Operational Differences. The Georgia Charter School Act of 1998 governs all charter schools in Georgia. However, there are differences among charter schools by type and by authorizer in terms of formation, operation, and renewal. While not exhaustive, the major areas of differences between start-up charter schools and system charter schools are summarized as follows:

1) Approval Process: All start-up charter schools have to be approved individually by their authorizers while system charter schools are not approved individually by an authorizer. Instead, the school system as a whole needs to be approved by the State Board of Education. As a result, each start-up charter school operates under the term of its charter with the authorizers where as a system charter school does not have a charter and so operate by the system's charter with the State Board of Education (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2062, Supp. 2007).
2) School level governance: Georgia Charter School Act of 1998 allows for a broad flexibility waiver to be granted for charter schools and systems to implement academic and or-

ganizational innovations. With the waiver, Georgia charter schools and charter systems are exempt from certain rules, regulations, policies, and procedures established by local board, state board, and GADOE contained in the Title 20- Elementary and Secondary Education (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2065, Supp. 2007). Therefore, start-up charter schools, which are administered by their governing boards, exercise full autonomy in every area of school governance unless restricted by the charter contract between the school and the authorizer. In contrast, system charter schools, which are governed by their local school governance teams, have limited autonomy determined by the local board of education. While the law O.C.G.A. 20-2-2062 allows school level governance teams of system charter schools to make decisions in the areas of personnel, finance, curriculum and instruction, resource allocation, establishing and monitoring the achievement of school improvement goals, and school operations, GADOE's report on the school system flexibility indicates the actual level of autonomy is determined by the local school system boards based on the recommendation from the superintendent and the local school governance teams (GADOE, 2014).

3) Student admission: Start-up charter schools can define their attendance zones, subject to the approval of the authorizers. The attendance zone is the entire school district for a locally-approved start-up charter school (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2065, Supp. 2007) where attendance zone for a SCSC-approved charter school could be "all or a portion of a local system, one or more local school systems or portions thereof, or all local school systems in Georgia (H.B. 797, 20-2-2081, p. 12). In case of system charter schools, the attendance zone for each school in the charter system is limited to all or a portion of the school district as determined by the system (Georgia Charter

School Act of 1998, O.C.G.A. § 20-2-2065, Supp. 2007). In a sense, system charter schools are not considered schools of choice.

4) Funding mechanism: O.C.G.A. § 20-2-2068.1. governs the funding mechanism for locally approved start-up charter schools. In accordance with the code, "the local board and the state board shall treat a start- up charter school no less favorably than other local schools within the applicable local system with respect to the provision of funds for instruction, school administration, transportation, food services, and, where feasible, building programs" (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2068.1, p. 16). The language of the code "where feasible" leaves it up to discretion of the school districts whether or not start-up charter schools are included in the building program. In case of exclusion from the program, charter schools do not receive funding for securing and maintaining a facility, where system schools receive both funds and facilities. As a result, not only do charter schools earn less funding in average per student but have to pay for the facilities they are housed in out of their general budget. A comprehensive state-by-state analysis on the charter school law in terms of innovation growth, and quality, the Health of the Public Charter School Movement – 2014 cited equitable funding mechanism and facilities support to charters as areas of improvement for the Georgia's charter school law (NAPCS, 2014). Furthermore, the Charter School Funding Report commissioned by Ball State University illustrated that Georgia start-up charter schools earned 10.2% less funding per student as compared to district schools during the fiscal year 2007, $8,880 versus $9,892 respectively (Batdorff, Maloney, May, Doyle, & Hassel, 2010).

5) Accountability: All charter schools and charter systems in Georgia are to meet performance goals set forth in the charters. Failure to meet the goals may result in the charter being terminated or not renewed (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2068, Supp. 2008). In case of termination or non-renewal of the charter, the consequence for a start-up charter school is to cease the operation of the school as opposed to charter system reverting to traditional school system as noted in the GADOE report - IE2, Charter, and Status Quo School Systems (GADOE, 2014).

Student Population in Georgia Start-up and System Charter Schools. Pursuant to O.C.G.A. § 20-2-2070, each year GADOE Charter School Division is required to report to the General Assembly on the status of the charter school program. GADOE District Flexibility Office reported 265 system charter schools, 31 conversion charter schools, and 86 start-up charter schools in operation during the school year 2014-15 (GADOE, 2014). As far as the number students served by charter systems and charter schools is concerned, the growth has been drastic, which is 130,492 students to 265,431 students between the school years 2011-12 to 2014-15. The student enrollment growth is a result of the rapid growth of the number of traditional public schools that have become system charter schools since the enactment of the Charter System Act. Similarly, student enrollment in conversion and start-up charter schools increased from 58,611 to 75,247 between the school years 2011-12 and 2014-15 (GADOE, 2014). This increase generated only 28% growth in start-up and conversion charter school enrollment as opposed to over 100% growth in charter system schools' enrollment for the same period.

A review of the racial and ethnic composition of Georgia charter schools as reported in the GADOE's 2014 Charter Schools and Charter Systems Annual Report reveals a diverse student body in all charter school options. According to the report, system charter schools serve a

higher percent of Hispanic students than start-up charters. In contrast, start up charter schools serve a higher percent of black students than system charter schools. Table 1 below illustrates the demographic distribution by school type for the school year 2014-15, illustrated in the GADOE's District Flexibility and Charter School Division 2014 Annual Report:

Table 1

Student Demographics by School Type (%) – 2014-15 School Year

	White	Black	Hispanic	ED	SWD	ELL
Start-Up Charter Schools	40.0	45.2	7.5	59.4	13.0	4.0
Charter System Schools	48.0	27.9	15.6	54.7	13.7	11.9
Conversion Charter Schools	44.9	26.6	20.9	49.1	10.9	15.5
Traditional Public Schools	41.0	38.0	13.9	61.6	13.3	10.7

Innovations in Charter Schools

Innovation is a complicated term to characterize due to the absence of an agreed-upon definition. A comprehensive content analysis on the pool of definitions for organizational innovation, (Baregheh, Rowley, & Sambrook, 2009) define innovation as "the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their market place" (Baregheh et al., 2009, p. 1334). In the field of education, Lubienski (2003) categorizes innovation into two major areas: a.) educational changes that directly impact classroom practices (Lubienski, 2003) such as in the areas of academic support services (Preston, Goldring, Berends, & Cannata, 2012), and b.) administrative changes that involve organization-level practices and structural changes that do not directly impact classroom level practices (Lubienski, 2003), including staffing and governance (Preston et al., 2012).

Preston et al. (2012) adds the dimension of "relative prevalence" in a local district context by stating "a charter school is innovative in its use of a practice if that practice is not used in

its local school district." In that sense, a practice that is considered innovative in one setting may not be innovative in another. For example, Preston et al. (2012) reported that traditional public schools offer work-based learning at a greater percentage than charter schools, 70.4% and 47.4% respectively. While charter high schools are not considered innovative in this sense, 23% of middle schools offering work-based learning makes the practice innovative at the middle school level. Another implication of the relative prevalence is that the absence of a practice may be an innovation. Preston et al. (2012) reported that 92% of charter schools did not offer their teachers tenure in order to have the flexibility to adjust their relationship with the teachers as needed.

Freed from state and local regulations, charter schools are expected to tailor their instructional programs to meet the needs of their own students and communities, as this is the legislative intent in many states' charter school laws. Over 90% of charter school laws in the nation encourage charter schools to implement innovative educational options for students (Wohlstetter, Smith, & Farrell, 2013). A content analysis of thirty-eight charter school applications in California, North Carolina, and Texas revealed five main components of innovation in charter schools: target population, curriculum, instructional approach, classroom structure, and student services. Of the 38 schools examined, 21 (55%) targeted at-risk students, six (16%) targeted academically gifted students, and eleven (29%) did not target a specific group serving similar students to those in surrounding district schools (Christensen & Rainey, 2009). Surveying over 700 charter and matched non-charter schools in California, (Zimmer & Buddin, 2007) found that charters were more likely to target particular student groups than traditional public schools (TPSs). Specifically, the study reported 29% of charters versus 18% of TPS elementary schools, 33% of charters versus 11% of TPS middle schools, and 42% of charters versus 12% of TPS high schools focused on specific student groups (Zimmer & Buddin, 2007). This difference may be a result of

state provisions that the TPSs are restricted to their traditional enrollment zones where as charter schools are given larger attendance zones to target enrollees with a specific student profile. Examples of such provisions include Texas charter school law that allows certain charter schools to recruit students from the entire state. In the state of Georgia, start-up charter schools approved by the State Charter School Commission (SCSC) can have a state-wide attendance zone or a defined attendance zone where the charter school would demonstrate special characteristics such as special populations or special curriculum (H.R. 797, 2012). Locally approved start-up charter schools have to be open-enrollment and are limited to their local district in which the charter school would be located; therefore, they cannot target special populations within and beyond the district as they can offer special curriculum for all students in the district (Georgia Charter School Act of 1998, 2011). In case of system charter schools in Georgia, schools have defined attendance zones within the district (Georgia Charter System Act, 2007), which would not allow system charter schools to offer a tailored program for any specific student group. As a result, SCSC-approved charter schools have the highest level of flexibility to be innovative in offering special curriculum to specific student populations where as the system charter schools are limited in doing so. SCSC-approved charter petitions reflect school settings offering single-gender classes, single-gender schools, and specific programs for at-risk students, and for students who previously dropped out of high school (SCSC, n.d.).

Concerning innovation in educational programs implemented by charter schools, charter schools have mainly adopted and adapted existing programs rather than inventing completely new ones including departure from teacher-directed instruction, alternative classroom structures, and unique grade-span school configurations (Christensen & Rainey, 2009). Christensen and Rainey (2009) indicated that of the charter schools examined in California, North Carolina and

Texas, 51% employed student-centered instructional methods such as project-based, constructivist, and experiential learning, 55% used more alternative classroom structures that include grouping multiple ages or grades together or looping classes of students with teachers, and 24% employed unique grade span configurations including K-8, 6-12, and K-12. Preston et al. (2012) found that almost half of the charter schools employing looping strategy were innovative in their local contexts. On the other hand, only 16.8% of charter schools employing mixed-age or multigrade grouping were innovative in their local contexts (Preston et al., 2012).

Lake (2008) found that on average charter schools offers smaller school size and longer school years and spent more time on instruction. The study reported that almost 35% of charter schools implements a longer school year than the mandated minimum as compared to 22% in TPSs. Regarding the school days, charter elementary and middle schools offer 20 minutes longer school days than the average day in TPSs while charter high schools an average day is 20 minutes shorter than a typical in TPSs. Pertaining to the class size, charter elementary school classes have two fewer students per class on average than do classes in traditional elementary schools and at the high school level, charter classes have three fewer students than TPS classes. On the other hand, traditional middle school classes have one less students than charter middle classes on average (Lake, 2008).

Since innovation is one of the key tenets of the legislative intent for Georgia charter school law, the State and the larger school districts emphasize innovation from the perspective of relative prevalence during the charter application, operation and renewal process. According to the GADOE charter school application, petitioners are required to identify academic, organizational, and financial innovations that will be implemented in the proposed charter school and hold the school operators accountable for proper implementation of the proposed innovations

(GADOE, 2014). Although innovative practices implemented in Georgia charter schools vary from school to school, 74.5% of start-up charter schools reported using one or more nontraditional scheduling features to maximize the instructional time including extended day, extended week/weekend classes, and extended year/year-round calendar (GADOE, 2013). In relation to innovation in instructional model and structure, only 20 start-up and conversion charter schools reported employing national programs such as the Expeditionary Learning, International Baccalaureate, Montessori, and Core Knowledge while no system charter school reported using non-traditional instructional model during the school year 2011-12 (GADOE, 2013).

In their applications to the GADOE to become a charter system, school systems are required to identify innovative practices that they propose to implement in the school system (GADOE, 2014). For instance, the Fulton County's charter contract cites flexible, integrated and differentiated instruction, broader curriculum options, performance-based recruitment, placement, and retention of all staff, incentives for parental involvement, and school uniform (GADOE, n.d.). While the school system is held responsible for implementation of such practices, the local board retains its statutory power to allow schools to implement portion or all of the abovementioned practices as indicated in the GADOE's school system flexibility report (GADOE, 2014).

As the promise that charter schools make is higher student achievement, it is necessary to evaluate whether these innovative practices contributed to the desired results. Studies demonstrated opposing results on the impact of charter schools' innovative practices on student achievement. Zimmer and Buddin (2007) shows that the number of instructional days has no effect on achievement in reading or math at the charter elementary and high schools, at it has no effect in reading and insignificant positive effect in math at the middle school level. Studying

New York charter schools, Hoxby and Murarka (2009) found a positive association between the package of longer school years, longer school days, Saturday school and student achievement. At the same time, the authors noted that optional after school programs, and math and reading curriculum implemented in charter schools have no significant effect on academic achievement. Furthermore, Everyday Math and Open Court reading have statistically significant negative association with achievement (Hoxby & Murarka, 2009). Mirroring the findings from Hoxby and Murarka (2009), examination of academic innovations in 62 charter schools in Idaho, Indiana, and Minnesota yielded that schools where teachers reported increased instructional innovation generated lower achievement gains in the area of mathematics than those where teachers reported less innovation. Furthermore, the study found that teacher decision-making power was negatively associated with math gains (Berends, Goldring, Stein, & Cravens, 2010).

Parental involvement is the most recurring theme cited in many studies examining innovations in charter school settings. Studied aspects of parent involvement in schools include involvement in establishment of the school, school governance, day-to-day operation, instruction, and volunteering in the school events and activities. Overall parent involvement in charter schools has been reported at a higher level than TPSs in the areas of budget decisions (Lin, Gardner, & Vogt, 2005; Zimmer & Buddin, 2007), new staff hiring decisions (Preston, et al., 2012), and school governance (Zimmer & Buddin, 2007). Since parental involvement is encouraged and desired across the charter schools and TPSs, what makes it innovative is how the schools increase parent involvement. Examples include written contracts between parents and schools requiring the parents to volunteer at the school for certain hours (Bifulco & Ladd, 2006), increasing parents' self-efficacy by offering wrap-around services (Smith et al., 2011), and state-required representation on the school's governing board (Butler, 2008).

Parental participation in Georgia charter schools is required by the State in varying levels. According to the Georgia Charter Schools Act of 1998, each school in a charter system is required to include parents in its governing council while this is not required for start-up charter schools. Parents are also empowered to request that the state board terminate the charter contract if the termination is agreed to in a vote by a majority of parents. In addition, local school systems are required to seek approval by a majority of parents and guardians during the charter application process, as is the case for start-up charter schools during the renewal process (Georgia Charter School Act, 1998, Supp. 2011).

Impact of parent involvement on academic achievement in charter and traditional school settings has been highlighted by many studies. Zimmer and Buddin, (2007) demonstrates a substantial positive impact of parental involvement on academic achievement at all school levels within both charter and TPS settings, which aligns with major studies including Jeynes (2012) and Hill and Tyson (2009), both of which are meta-analysis involving over 50 studies each.

With regard to innovation, critics of charter schools argue that implementation of innovation in charter schools is limited to certain areas or does not even exist in some settings including principal hiring practices, school disciplinary practices, summer school programs, non-traditional learning opportunities such as work-based learning and service learning, and teacher influence on staffing (Cannata & Engel, 2011; Preston et al., 2012; Zimmer & Buddin, 2007). Another criticism is that charter school leaders adopt similar or identical administrative structures as those of TPSs and that charter schools' teacher compensation plans mirror the incentives used by TPSs despite a higher level of autonomy and less restrictions that apply to charter schools (Gross, 2011).

Flexibility and Autonomy in Charter Schools

School autonomy was introduced in the American public education system in the early 1930s (Watras, 2006), and has since been implemented through a variety of site-based management initiatives. As an innovation, autonomy transfers decision-making about the ways schooling is carried out to those who are most directly affected (Hill & Bonan, 1991). The notion of school autonomy in education emerged as a belief that greater school autonomy could improve school performance (Chubb & Moe, 1990). As a result, many state and local education agencies have adopted and implemented autonomy initiatives in an effort to enable schools to develop and implement approaches that better address the needs of their own communities. By the early 1980s, approximately 60% of school districts with enrollments of 50,000 or over adopted some form of school autonomy initiatives (Van Langen & Dekkers, 2001), including school-based management, portfolio management strategies, pilot autonomous schools, district-run charter schools, independent charter schools, and charter systems (Dillon, 2011). All of these initiatives were aimed at fostering autonomy within traditional public schools except in the case of independent charter schools that exist as autonomous schools outside school districts.

Because researchers have defined school autonomy from various perspectives, there is no agreed-upon, universal definition of autonomy (Finnigan, 2007). Although, as with the term "innovation", there is a great variation in the meanings of autonomy in charter school research, the common understanding of autonomy is the individual schools' ability to make decisions about budgeting, staffing, and educational programs (Bulkley & Fisler, 2002). Similarly, Brinson, and Rosch (2010) identified four broad areas of autonomy to be granted to charters: defining and implementing a vision and culture, choosing and implementing an instructional program, making staffing decisions, and controlling governance and finance.

Since the inception of the nation's first charter school law in Minnesota in 1991, autonomy has been one of the key tenets of charter school legislation across the nation. Charter laws in 14 states, which constitute only 44% of the charter school laws across the nation, cite increased school-level autonomy as a key component in the legislation (Wohlstetter, Smith, & Farrell, 2013). For example, Tennessee's charter school law states that one of the foundational purposes for charter schools is to "provide greater decision making authority to schools and teachers in exchange for greater responsibility for student performance" (Tennessee Charter Schools Act of 2002, 2014, p. 2). Similarly, the legislative intent for Georgia's charter school law emphasizes utilization of flexibility from the performance-based charter contract to increase student achievement through academic and organizational innovations (Georgia Charter School Act of 1998, O.C.G.A. § 20-2-2062, Supp. 2005). Basically, charter school theory is built upon the assumption that higher-level autonomy enables charter schools to implement innovative or unique instructional and organizational settings, in order to provide innovative educational options to parents and students that are not typically available in the traditional public schools (Kamienski, 2011). For example, an examination of the range of curricular, instructional, and student support strategies in 38 charter schools in ten cities in California, North Carolina and Texas, Christensen and Rainey (2009) found that 71% of charter schools tailored their educational programs to meet the needs of students who were at risk of academic failure and dropping out of school. While examining autonomy and its impact on charter schools' ability to achieve their legislative mission, it is necessary to review how it has been utilized by various levels of authority within the school, most notably by teachers, administration and governance (Christensen & Rainey, 2009).

A much-touted advantage of the increased autonomy enjoyed by charter schools is that it enables local educators who have greater proximity to the students to make better decisions re-

garding their education. The idea behind this innovation is that local educators have a more nuanced understanding of students' educational needs than district or state administrators. This in turn, creates potential for more efficient instructional and administrative practices and eventually results in increased student achievement. Therefore, charter school legislation in many states has emphasized increased opportunities for teachers to have influence over decision making so that they can better meet the needs of the student, and thereby improve student achievement (Gawlik, 2008). According to the analysis by Wohlstetter, Smith, and Farrell (2013), while not addressed in the Georgia's charter school statute, 78% of charter laws across the nation indicate increased teacher opportunities and autonomy as a legislative objective. For example, the California Charter Schools Act of 1992 suggests opportunities for teachers to be responsible for the learning program at the school site, similar to the provision in the Florida Charter School Statute that proposes new professional opportunities for teachers to take ownership of the learning at the school. Despite the legislative intents and purposes in many states, results from studies argue that this objective has not been fully realized in charter schools despite a higher-level of teacher influence in charter schools than TPS on school operations (Barghaus & Boe, 2011; Ni, 2012). Analysis from Barghaus and Boe (2011) revealed that 31% of charter school teachers reported that they significantly influenced school policies as opposed to 13% of TPS teachers. In addition, while not significantly different, percent of teachers indicating to have influence over curriculum related decisions was 50% in charter schools versus 42% in TPSs (Barghaus & Boe, 2011). Furthermore, charter and TPS teachers were equally likely to report having control over instructional techniques (Barghaus & Boe, 2011; Ni, 2012).

Studies examining the relationship between teacher autonomy and organizational efficiency of the schools reported inconclusive outcomes. According to Renzulli, Parrott, and Beat-

tie (2011), organizational models promoting autonomy produce higher levels of worker satisfaction. As a result, charter school teachers were more satisfied than their peers in TPSs due to increased autonomy for teachers. The study also found that increased autonomy creates a potential to ameliorate the negative impact of work attitudes. More specifically, white teachers' negative attitude toward black-dominated schools decreased when they taught in charter schools (Renzulli et al., 2011). In contrast, Ni (2012) asserted teachers perceived working conditions to be similar in terms of classroom autonomy, noting however that district-approved charter schools provided more supportive environment than charters granted by other organizations. Furthermore, Stuit and Smith (2010) argued that charter teachers experienced more dissatisfaction with working conditions, which resulted in higher level of teacher attrition, voluntary or involuntary, in start-up charter schools than those converted from traditional public schools (Stuit & Smith, 2010).

As concerns administrative autonomy more specifically that which was granted to principals, studies consistently reported that charter school principals experienced a higher level of autonomy than their counterparts in TPSs (Adamowki et al., 2007; Barghaus & Boe, 2011; Gawlik, 2008; Williamson, 2011). Interviews with 33 charter and TPS principals in five urban school districts, Adamowki et al. (2007) identified the following areas where charter school principals had higher levels of autonomy: staffing, faculty and staff assignment, resource allocation, and student discipline policies and procedures. Investigating personnel management policies and practices, Williamson (2011) concluded that charter school principals were more autonomous than TPS principals over staffing decisions in general and dismissing ineffective teachers in particular. In addition, Gawlik (2008) cited standards, curriculum, and professional development programs as areas of increased autonomy experienced by start-up charter school principals versus conversion charter schools and TPSs. Gawlik (2008) identified several factors impacting the level of a prin-

cipal's autonomy. Being male, Caucasian non-Hispanic, the number of years, and high percentage of Asian American students positively impact principal's influence, while being female, and operating in an urban setting with high percentage of African American and Latino students negatively impact principal's influence (Gawlik, 2008). Adamowki et al. (2007) identified teacher hiring and firing policies of the districts as the most restrictive areas due to the tenure laws and time-consuming due process required to dismiss ineffective teachers.

Despite the higher level of autonomy experienced by charter school principals as compared to their peers in TPS, Barghaus and Boe (2011) argue that a high level of autonomy has not been accomplished as envisioned in various charter legislation. This study analyzed the data from the restricted-use 2003-04 Schools and Staffing Survey conducted by the National Center for Education Statistics (NCES). According to the study, among charter school principals, 27% reported a high level of district influence, 32% reported considerable district influence, and 40% reported some district influence on the school operations as compared to 32%, 45%, and 23% respectively in TPSs (Barghaus & Boe, 2011).

Governance-level autonomy is one of the core principles of charter schools across the nation. According to the Butler & National Resource Center on Charter School Finance and Governance (2008), charter schools in 40 states and the District of Columbia are governed by school-level boards that carry out the responsibilities typically held by the local school boards. Therefore, the school-level governing body is responsible before the public for the operation of the charter school by the contract executed between the charter school board and its authorizing agency. Charter contracts specify waivers from local and state rules applicable to public schools and accountability measures for which the school is held accountable (NACSA, 2009). Even though the accountability measures are usually static, school autonomy is dynamic in nature and

is influenced by state laws, district policies and practices, which eventually result in varying level autonomy granted to schools (Finnigan, 2007). As a result, restrictions on school autonomy typically stem from two major sources: a.) state and district policies prescribing operation of charter school boards in terms of board operation and composition, and b.) limited flexibility from local and state rules, regulations, policies, and practices. According to the legislative review conducted by Wohlstetter, Smith, and Ferrel (2013), charter schools in 12 states require charter school boards to include certain types of people such as parents, teachers, and representatives from the authorizing agency. In the case of Georgia, the charter school statute does not stipulate any certain board structure and composition for start-up charter schools while requiring school level governance teams for system charter schools to include parents, teachers, administrators, and community members (Georgia Charter School Act of 1998, O.C.G.A. 20-2-2063, Supp. 2007).

In relation to the flexibilities afforded to charter schools through their contracts, the Georgia Charter School Act of 1998 allows a blanket waiver to be granted to start-up and system charter schools. According to O.C.G.A. § 20-2-2065, start-up charter schools and charter systems shall not be subject to the state or local rules, regulations, policies, and practices. However, the Georgia Charter School Act of 1998 does not allow the following provisions to be waived:

(a) the Charter Schools Act (O.C.G.A. § 20-2-2061 through §20-2-2071);

(b) the accountability assessment program (O.C.G.A. § 20-14-30 through §20-14-41);

(c) the Open Meetings Act (O.C.G.A. § 50-14-1 through §50-14-6) and the Open Records Act (O.C.G.A. § 50- 18-70 through § 50-18-79);

(d) federal, state, and local statutes, rules, regulations, and court orders relating to civil rights; special education; insurance; the protection of the physical health and safety of

students, employees, and visitors; conflicting interest transactions; and the prevention of unlawful conduct;

(e) laws relating to unlawful conduct in or near a public school;

(f) laws prohibiting the charging of tuition or fees to attend a public school, except as may be authorized by O.C.G.A. § 20-2-133;

(g) the reporting requirements of O.C.G.A. § 20-2-320; and

(h) the brief period of quiet reflection provision of O.C.G.A. § 20-2-1050.

Additionally, considerable variation exists in the level of autonomy charter schools experience depending upon the differences across the state charter laws, state and authorizer policies and practices. According to Brinson and Rosch (2010), state laws and regulations coupled with local district policies and procedures placed significant restrictions on charter schools. Finnigan (2007) demonstrated through surveys with charter school leaders, authorizers, state charter school coordinators and rich case study data that charter schools are not granted the autonomy the theory assumes. Finnigan et al. (2004) indicated that only one-third of charter schools automatically received waivers from state policies and regulations, and that charter authorizers dictated additional restrictions on school autonomy during the application, monitoring and renewal process. In the case of Georgia, not all school districts grant blanket waivers, although allowed by the state policy, but rather negotiate waivers with the petitioners on a case-by-case basis. For example, petitioners are required to identify waivers from all or a portion of the Title 20 provisions according to the Cobb County School District's Start-up Charter School Petition Rubric 2013-14 (Cobb County School District, 2014).

In the case of system charter schools in Georgia, approved charter systems are granted the blanket waiver, which is transferrable to each school within the charter system through the

school's governance councils (O.C.G.A. § 20-2-2065). The state law requires that charter systems must implement school level governance – a decision-making authority in personnel decisions, financial decisions, curriculum and instruction, resource allocation, school operations, and establishing and monitoring the achievement of the school goals (O.C.G.A. § 20-2-2062). The actual autonomy exercised by the school level governance is however left to the discretion of the system superintendent and local board of education since a charter system remains under the control and management of the local board of education (O.C.G.A. § 20-2-2065 (b)(2)). For example, the Fulton County Board of Education board meeting agenda for December 12, 2013 illustrates the process for school level governance councils to follow when requesting flexibilities from applicable laws (Fulton County Schools, 2013).

A 2012 NACSA guidance serving as a formative development tool for charter authorizers, the Principles for Quality Charter Authorizing recommends charter authorizers to uphold school autonomy in exchange for public accountability. Areas mentioned in the guidance include governing board independence from authorizer, personnel, school vision and culture, budgeting, instructional programing, design and use of time (NACSA, 2012). With respect to protecting autonomy, NAPSC Model Law 2009 suggests that state charter school laws a.) provide an automatic waiver from state or local rules, regulations, policies, and procedures, b.) allow an effective governing board to hold multiple charter contracts, which provides high-level of autonomy and minimize administrative restrictions to replicate successful programs and models, c.) offer alternative provisions for states to designate charter schools as its own LEA or part of a school district, d.) allow charter schools to contract with education service providers as long as the school's governing board retains autonomy to oversee the school's operation, and e.) allow charter schools to waive collective bargaining provisions (NAPCS, 2009).

Despite a great deal of effort by the state and national organizations for charter authorizers to establish clear, fair and effective criteria for oversight, renewal, nonrenewal, and revocation, charter schools continue to deal with infringements on their autonomy. Georgia charter school law has been found deficient in several reports issued by national organizations in relation to autonomy. With regards to the area of fiscally and legally autonomous schools, Georgia earned only six out of 16 points possible in the NAPCS 2014 Ranking of State Charter School Laws. Further explaining the rationale for this points assignments, the report cited limited inclusion of the model law's elements for fiscally and legally autonomous schools with independent governing boards (NAPCS, 2014). Similarly, the 2014 Charter School Law Score Card, issued by the Center for Education Reform (CER), cited Georgia charter schools' inability to be independent from districts' operational procedures that impact school autonomy negatively (CER, 2014). These findings are consistent with the findings by Brinson and Rosch (2010). While Georgia's state charter-law autonomy ranking was C+ in the range from A to D (A is the highest), the school level autonomy was indicated as even lower, C+ to D due to additional restrictions imposed by the districts (Brinson & Rosch, 2010).

Studies examining the relationship between school level autonomy and student achivement showed inconsistent results. Some studies argued school-level autonomy in charter schools did not translate into increased student achievement in math and reading (Zimmer & Buddin, 2007; Steinberg, 2014) while creating opportunities to implement organizational innovations (Zimmer & Buddin, 2007). In contrast, investigating student achivement results in relation to the school level autonomy in Boston's pilot schools, charter schools and traditional public schools, Abdulkadiroglu, Angrist, Dynarski, Kane, and Pathak (2011) reported significant positive impact of attending charter schools while the impact of pilot schools was small,

insignificant and sometimes even negative as compared to TPSs. Similar to charters, pilot schools were autonomous district schools, which were governed by their own governing councils in charge of budgets, staffing, curricula, and scheduling. (Abdulkadiroglu et al., 2011).

Accountability and Student Achievement in Charter Schools

Charter school laws across the nation placed special emphasis on increasing student achievement, a statement which appears in 84% of the charter school laws (Wohlstetter, Smith, & Farrell, 2013). By design charter schools are performance-based schools that are accountable for higher standards and student achievement is a stipulation for the renewal of the charter contracts. Therefore, student achievement produced by charter schools must be examined to measure the extent to which charter schools are reaching targeted outcomes to meet the state charter school requirements.

There are some challenges that researchers experienced in conducting research on this topic in the past. Researchers conducted studies employing a variety of research techniques with student level and school level data. Due to the variation in research methodologies and data utilized in the studies, state charter school policies, and the purpose of the study, studies yielded mixed results with limited generalizability. Selection-bias is another major factor contributing to differences in results from studies that seek to compare achievement differences by school type. Therefore, studies have used randomized assignments through lotteries or value-added models such as longitudinal analyses employing matching or fixed-effect strategies in an effort to minimize or eliminate selection-bias (Betts & Tang, 2014; Davis & Raymond, 2012).

Lottery-Based Studies. Several studies of charter school effectiveness have employed lottery-based methods to estimate the impact of attendance in charter schools where random lotteries were held to select students to be admitted to the schools (oversubscribed charter schools).

In some cases, studies have been conducted within certain sites and cities including Chicago (Hoxby & Rockoff, 2005), New York City (Dobbie & Fryer, 2011; Hoxby & Murarka, 2009), Boston (Abdulkadiroglu et al., 2011; Angrist, Pathak, & Walters, 2013) as others examined charter schools from multiple states (Clark, Gleason, Tuttle, Silverberg, & Mathematica Policy Research, 2011; Tuttle et al., 2013).

Abdulkadiroglu et al. (2011) assessed the causal effects of charter schools and pilot schools in Boston. There, pilot schools, like charter schools, are granted a higher level of autonomy than TPSs while still operating under the management of the Boston School District. The study used student-level data from a set of five middle schools and three high schools that employed random lotteries to identify students for admission, including students' race, ethnicity, sex, reduced-price lunch status, special education status, English-language learner status, town of residence, current school and test scores from the Massachusetts Comprehensive Assessment System database from the spring of 2002 to 2008. According to Abdulkadiroglu et al. (2011), charter schools improved minority achievement at the middle and high school level. Specifically, the black student group in Boston pilot schools scored about 0.7 and 0.8 standard deviations (SD) below the white student group in language arts and math respectively. In contrast, the black-white achievement gap in charter middle schools decreased by 0.4 SD in math and by roughly 0.7 SD in language arts. As far as the high school level is concerned, lottery-based estimate on the black-white achievement gap shrunk by 0.2 SD in both math and reading as compared to pilot schools. While finding a positive impact of charter school attendance on student learning, authors cautioned the readers from making generalizations due to the small number of oversubscribed charter schools with well-documented admission lotteries that were included in the study (Abdulkadiroglu, et al., 2011).

Examining a larger population with 17 middle schools and six high schools across Massachusetts compared to the data set used by Abdulkadiroglu et al. (2011), Angrist et al. (2013) revealed large achievement posted by urban charter schools with high rates of minorities and poverty while non-urban charter schools were largely ineffective posting negative impact for students from high-income socioeconomic background. Similarly, oversubscribed charter schools in New York City, which constituted 94% of all charter school students in 2005-06, generated large gains with 0.09 SD per year of treatment in math and 0.04 SD per year in reading (Hoxby & Murarka, 2009). These results are also consistent with a later study by Dobbie and Fryer (2011), which examined the impact of attending two particular charter schools located in the Harlem Children's Zone. The study suggested that attending these schools helped close the racial achievement gap in mathematics and English language arts at the elementary school level as well as the black-white achievement gap in math at the middle school level (Dobbie & Fryer, 2011).

Citing the limitations from single-state studies in terms of generalizability to a large and geographically diverse charter school population including urban and non-urban areas, Clark et al. (2011) examined lottery data from 36 middle schools across 15 states by monitoring the charter school lotteries to ensure that the resulting winner (treatment) and loser (control) groups were randomly identified. While reporting overall mixed results, the study revealed that urban charter schools had a large and positive impact on test scores with 0.21 SD in math and 0.12 SD in reading for each year spent in a charter school. Similarly, oversubscribed charter schools also produced learning gains that were 0.15 SD larger in math and 0.11 SD larger in reading than non-lottery schools. In contrast, charter schools serving higher achieving or more advantaged students produced a large and negative impact.

Furthering single-state, lottery-based studies, Tuttle et al. (2013) examined student outcomes from 41 KIPP charter middle schools operating in 13 states. This study used a hybrid approach to validate the research results – an experimental design using randomization through admission lotteries and a matched comparison group design with propensity score matching. The lottery-based analysis was conducted with a subset of 13 KIPP schools, whereas the matching approach was used with the full set of 41 KIPP schools. The authors found that the impact estimate produced by the two methods were similar. Specifically, the study showed that KIPP middle schools had a positive and statistically significant impact on student achievement across all subjects examined based on both lottery-based and matching methods. With three years of enrollment, the estimated impacts for math and reading are 0.36 SD and 0.21 SD respectively, which is equivalent to an improvement from the 44th to 58th percentile of the district's distribution in math and an improvement from the 46th percentile to 55th percentile in reading. The study also equated the improvement to 11 months of additional learning growth in math and eight months in reading (Tuttle et al., 2013). Furthering the results from Tuttle et al. (2013), Gleason et al. (2014) reported that after three years of enrollment at KIPP schools, KIPP provided about 90% of a year of extra learning in math and about two-thirds of an extra year in reading (Gleason et al., 2014).

Lottery-based studies have been regarded as a credible approach in eliminating the self-selection bias, which results in a high degree of internal validity (Betts & Tang, 2014). In lottery-based studies, lottery losers (control group) and winners (treatment group) of the lottery are expected to be good comparison groups in relation to observable characteristics, including past academic performance and demographics, as well as unobservable characteristics such as student motivation and parent support (Davis & Raymond, 2012; Fortson, Verbitsky-Savitz, Kopa, &

Gleason, 2012, Tuttle et al., 2013). However, researchers indicated the challenges and threats to validity associated with the lottery-based studies. First, despite similarities between the control and the treatment groups at the time of the lottery, subsequent attrition from both groups may cause differences in the follow-up sample unless the attrition process is also random. Such differential or selective attrition by the lottery results yields selection-bias (Abdulkadiroglu et al., 2011, Betts & Tang, 2014). Second, lottery-based studies can only be conducted in oversubscribed charter schools and well documented admission lotteries, and thus can potentially reduce the external validity of these studies, meaning that the results of lottery-based studies can only be generalized to a limited set of schools that have a long enough waiting list (Abdulkadiroglu et al., 2011; Betts & Tang, 2014; Tuttle, Gleason, & Clark, 2012). Finally, charter schools are required to hold random admission lotteries when applications exceed available slots at the school. Therefore, it takes only one application beyond the available spaces to trigger a lottery. In such cases, the size of the treatment group may be significantly larger than that of the control group, which can result in a problem in the estimation phase (Davis & Raymond, 2012; Tuttle, Gleason, & Clark, 2012).

Lottery-based studies, taken all together, produced inconclusive results. While single-state studies reported a positive impact of charter school attendance, multi-state studies found mixed results. The consistent finding in the studies is the positive impact of charter attendance for urban charter schools mostly serving students in poverty with low baseline test scores. Given the potential, weak external validity associated with lottery-based studies, researchers cautioned readers about generalizability of the study results.

Matching Studies. The matching approach is another strategy to reduce the self-selection problem. In studies where the impact of charter attendance is measured, the matching approach

can greatly reduce the self-selection bias if attendance of a student at a charter or a TPS is based upon all available observable characteristics. However, unobserved variables still remain a problem as is the case with the lottery-based studies (Davis & Raymond, 2012; Ni & Rorrer, 2012). With the matching strategy, members of the control group are matched with members of the treatment group who possess similar characteristics. Depending upon the study, members in the groups are students, or schools, or both are simultaneously taken under consideration. Two matching strategies that the researchers have employed most commonly are the virtual control record (VCR) and the propensity score matching (PCM) when measuring effectiveness of charter school attendance versus that of TPS (Betts & Tang, 2014).

Virtual Control Records. Developed by Abadie, Diamond, & Hainmueller (2007), the method virtual control record matches each charter school student with a student enrolling at a TPS that has students who switched to charter schools. VCR uses observable characteristics including demographic attributes, prior achievement results, and eligibility or participation in special support programs such as free/reduced lunch eligibility, English language learner status and special education status (Davis & Raymond, 2012). The advantage of VCR design over lottery-based or student fixed-effect studies is that it allows for a higher level of inclusion with regard to the proportion of charter school students in the study. The challenge associated with the VCR design is the lack of consistent test data at the lower elementary and high school level since prior achievement data at a TPS is one of the contributing variables in the matching process. As a result, VCR design would possibly underestimate the charter treatment effect for students who exclusively attended charter elementary schools (Davis & Raymond, 2012).

The Center for Research on Education Outcomes (CREDO) has conducted several studies on charter school performance by employing the VCR method. CREDO released its first re-

port in 2009, Multiple Choice: Charter School Performance in 16 States (Raymond, 2009). The second report expanded the first study to 27 states in 2013, examining the student learning gains posted by charter school students compared to that of equivalent students in TPS. The findings from the 2013 study revealed that only 25% of charter schools in reading and 29% in math outperformed their local TPS competitors. While this is an improvement since 2009, 31% of charter schools still underperformed their local TPS in math and 19% outperformed in reading (Cremata et al., 2013). The results from CREDO studies are further discussed in the section for national studies.

Propensity Score Matching. The key concept of PSM is to estimate the probability of being in the treatment group for both the treatment and the control group students based on the observable variables (Fortson et al., 2012). Therefore, to measure the impact of charter school attendance, the PSM matches charter school students with non-charter school students who have similar estimated probabilities of attending a charter school. As with other studies, PSM cannot completely eliminate the selection bias due to the unobservable contributors that are not controlled for such as student and parent motivation, which could cause an upward bias in estimating the effect of charter school attendance (Betts & Tang, 2014).

Studies that employed the PSM method mainly reported a positive impact of attending charter schools. A meta-analysis examining estimates generated from the PSM studies that investigated charter school effectiveness, Betts & Tang (2011) revealed that 60% of the estimates were positive for charter schools, and statistically significant. A few other PSM studies were conducted after Betts & Tang (2011) found similar results. Witte et al. (2010) revealed insignificant differences while Witte et al. (2011) and Witte et al. (2012) studied Arizona charter schools, and reported significant gains in both math and reading while Fortson, Verbitsky-Savitz, Kopa &

Gleason, (2012) yielded a positive but statistically insignificant impact of attending charter schools in math and reading.

Witte, Wolf, Dean, & Carlson (2010) assessed the effectiveness of charter schools in promoting student achievement growth and educational attainment. The data included results from the 2006-07 Wisconsin Knowledge and Concepts Examination (WKCE) for 2,295 students attending charter schools in grades 3-8 in math and reading. Controlling for prior achievement only and not for student characteristics or switching schools, the authors reported a significant gain with charter school students in math, which was a difference of 0.105 SD between charter and TPS students. Furthermore, the study reported 0.109 SD improvement for the students under the 25th percentile. No differences were reported in reading (Witte et al., 2010). The authors conducted a follow-up study based on three-year achievement data, and reported a significant positive impact of charter school attendance in both math and reading with more than 99% confidence after controlling for baseline achievement and student characteristics (Witte et al., 2011). The final follow-up study reported that students who attended charter schools over five years made significant achievement gains in math and reading as compared to their peers in TPSs (Witte et. al., 2012).

Fixed-effect Studies. Fixed-effect models reduce the self-selection bias by comparing achievement growth posted by a student during the years enrolled in a charter school to the growth for the same student in years enrolled in a TPS (Betts & Tang, 2014). However, this methodology has two primary weaknesses. First, not many students switch from TPS to charter schools at the elementary level, so it is hard to extrapolate results, which creates issues about external validity (Betts & Tang, 2014; Zimmer et al., 2012). Second, the student fixed-effect approach assumes that students' past achievement growths can predict future achievement growth.

Since students who transferred from charter schools to TPS or vice versa may have faced challenges in the year before their transfers, the fixed-effect approach could yield biased estimates (Betts & Tang, 2014; Zimmer et al., 2012).

A meta-analysis on the studies using fixed-effect models to examine charter school impact on student achievement, Betts & Tang (2011) reported an equal number of statistically significant positive or negative estimates of attending charter schools (that is approximately 25% each), while almost half of the studies in the analysis produced mixed results. Other fixed-effect studies that were not included in the meta-analysis also mirrored the findings from Betts and Tang (2011), reporting mixed results. Nicotera, Mendiburo, and Berends (2010) yielded positive significant gains in math but similar gains in reading for students who switched to charter schools and stayed in charter schools for one year. Examining charter schools in five cities Zimmer, Gill, Booker, Lavertu and Witte (2012) showed that the performance of charter schools was mixed in math and reading. Similarly, Clark, Gleason, Tuttle, and Silverberg (2011) found no evidence that, on average, attending charter schools had a positive impact on student achievement. The study reported a significant and positive impact of attending charter schools in large urban areas or those serving lower achieving or more disadvantaged students. In contrast, the average impact of charter schools in non-urban areas or those serving higher achieving or more advantaged students was large and negative.

Several studies employed multiple analytical methods to examine the validity of the results across different methods. Fortson et al. (2012) implemented experimental design (lottery-based) and non-experimental approaches (i.e. regression model, propensity score matching, full matching, and fixed-effect) to test whether non-experimental designs can mimic the findings from the experimental design. The study used the same dataset across all the methods, which was

restricted to two cohorts of students who applied to enter fifth, sixth, or seventh grade at 15 charter school cites during 2005-06 and 2006-07 school years. The experimental design using full sample revealed nearly identical average math scores (0.58 SD) and reading scores (0.51 SD) for both control (TPSs) and treatment groups (charter schools). Therefore, the estimates of charter school impact for math and reading are zero. However, using the subsample of students who were randomly selected to enter charter schools, the impact estimate was nearly identical in math, which was 0.48 SD for charter schools and TPSs. For reading, the impact estimate was significantly lower for charter schools than for TPSs (0.38 SD versus 0.52 SD) (Fortson et al., 2012).

In the PSM model, the lottery winners constituted the treatment group while the comparison group was composed of students who lost the lottery or who did not participate in the lottery. The PSM approach revealed a positive but statistically insignificant impact of charter schools on math and reading achievement (0.54 SD versus 0.49 SD for math; 0.47 SD versus 0.42 SD for reading). By contrast, the FE approach resulted in a negative but insignificant impact of charter schools on math (0.38 SD versus 0.43 SD) and reading (0.30 SD versus 0.33 SD) (Fortson et al., 2012).

Davis and Raymond (2012) also provided a comparison of estimates from the student-fixed model (FE) and the VCR model. According to the study, both methods generated highly similar results including identical sign and level of confidence for charter school impact when datasets for both methods contained the same charter school students, which is called a "restricted model". Authors further examined achievement differences between charter schools and TPSs with an unrestricted model in which the fixed-effect model included all students who switched from one school type to the other regardless of whether they had a VCR match, and the VCR

method included all students who had a VCR match regardless of whether they were school switchers. Overall, the unrestricted model revealed that charter school students posted lower growth in math than their counterparts in TPSs. For reading, the FE method yielded a negative and significant estimate for charter schools, where as the VCR produced a positive and significant estimate. Because of these outcomes, it can be concluded that students who were excluded from the FE model produced higher growth than those who were included.

Furthermore, the authors noted that these results are consistent with the larger pattern of VCR and FE studies where VCR estimates are more positive than FE estimates in favor of charter schools (Davis & Raymond, 2012). Mirroring these conclusions, Betts and Tang (2011) showed that approximately 54% of matching studies, excluding PSM, versus 15% of FE studies yielded a positive and significant impact of charter schools in reading. In math, the rates of studies with a positive and significant impact are 46% and 32% for VCR and FE respectively (Betts & Tang, 2011).

National Studies. There has been considerable controversy over charter schools and whether they generate increased student achievement due to the varying differences in research methods and the charter school landscape across the states. In an effort to reduce or eliminate the impact of such differences, researchers and research agencies employed national assessments including the National Assessment of Educational Progress (NAEP) or used existing results from the state assessments with a particular research method throughout the study (Cremata et al., 2013; Raymond, 2009) to measure achievements of charter school students against that of students attending traditional public schools.

National Assessment of Educational Progress. NAEP, which was established in 1969, is the largest, continuing national assessment administered by the National Center for Education

Statistics (NCES). Main NAEP assessments are administered with 4th-, 8th-, and 12th - grade students across the nation. While mathematics and reading assessments are conducted every two years, science and writing are assessed every four years. The most recent NAEP assessments in mathematics and reading were conducted in 2013 with nationally representative samples of over 376,000 4th grade students tested and 341,000 8th grade students tested (NCES, 2013). In addition to the main NAEP assessments, NAEP Long Term Trend (LTT) assessments have been administered to students at ages 9, 13, and 17 since 1971 for reading and 1973 for math. The most recent LTT assessment was given in 2012 to over 26,000 students across the nation in reading and math. Even though LTT and main NAEP both assess reading and mathematics, several differences exist between these two in term of the content assessed, frequency of the assessments and how the results are reported. Main NAEP assessments change about every decade while LTT assessments have remained unchanged. In addition, the main NAEP is administered every two years as opposed to the LTT being administered every four years (Beaton & Chromy, 2010).

The NCES conducted a pilot study of students attending charter schools as part of the 2003 NAEP assessment in reading and mathematics at the 4th grade level. The study included 3,296 students for reading and 3,238 students for math attending 150 charter schools and 6,764 TPSs across the nation. The U.S. Department of Education published the results from the charter school pilot study in its 2005 report, *The Nation's Report Card, America's Charter Schools*. The report illustrated the results by gender, race/ethnicity, eligibility for free/reduced-price lunch, and type of school location in addition to the overall results. According to the report, the difference between reading scores of charter school students and traditional public school students was not significant overall (charter = 212, TPS = 217) as reported on a 0-500 scale. However, significant differences have been observed when comparing students who shared common characteristics,

particularly students eligible for free/reduced-price lunch (charter = 195, TPS = 201) and female students (charter = 215, TPS = 220). Furthermore, the percentages of students performing at or above *Basic* and at or above *Proficient* were not significantly different either overall or by any group compared (NCES, 2004).

With regard to the math results, charter school students performed significantly lower than their peers in TPSs as a whole (charter = 228 versus TPS = 234). In addition to the overall significant difference, average scores for certain groups in charter schools were significantly lower, including male students (charter = 229 versus TPS = 235), female students (charter = 228 versus TPS = 233), students eligible for free/reduced-price lunch (charter = 216 versus TPS = 222), and students attending charter schools located in central cities (charter = 221 versus TPS= 227). Similarly, the percentages of students performing at or above *Basic* were also significantly different in mathematics for both groups (charter = 69% versus TPS = 76%) and certain groups including male students (charter = 69% versus TPS = 77%), female students (charter = 68% versus TPS = 75%), students who are eligible for free/reduced-price lunch (charter = 53% versus TPS = 62%), and students attending central city schools (charter = 58% versus TPS= 67%). As far as performance by race/ethnicity in math and reading, the study did not reveal any significant difference in the average scores and the percentages of students who scored at or above *Basic* and *Proficiency* level between charter schools and TPSs (NCES, 2004).

While the report illustrated the achievement differences between charter school students and their peers in TPSs based on the 2003 NAEP assessment at the 4th grade level, the reader must be cautious in interpreting the results and making general conclusions due to the limitations of the study including a low sample size and scope, specifically focusing on only 4th-grade assessment. Furthermore, the nature of the study only allowed for a snapshot of charter school per-

formance on a single assessment, which did not include gauging changes in the achievement gap (NCES, 2014). Expanding on the findings from the NCES (2005) and using the results from the charter school pilot study in 2003 NAEP assessment, Braun, Jenkins, Grigg and Tirre (2006) employed hierarchical linear modeling (HLM) to further analyze the results by charter schools' associations with the public school district (PSD). Braun et al. (2006) categorized charter schools as public school district (PSD)-affiliated and non-PSD-affiliated and took into account multiple student and/or school characteristics when examining achievement differences. The study estimated the mean NAEP reading scores for charter schools to be 5.2 points lower than that for TPSs, which was significant at an alpha level of .05. When school and student characteristics were included, the estimated difference was 3.3 points and still significant. The study looked into the mean differences by the charter school's affiliation with the school district. The study did not find a significant mean difference between PSD-affiliated charter schools and TPSs with or without student and school characteristics taken into account. However, significant mean differences were observed between non-PSD-affiliated charter schools and TPSs. The estimates for non-PSD-affiliated charter schools were all negative and significantly different before and after the adjustments for all student and school characteristics, -9.3 points and -4.2 points, respectively (Braun, Jenkins, Grigg, & Tirre, 2006).

In terms of math scores, the mean score of NAEP scores for charter schools was estimated to be significantly lower than that of TPSs before and after adjustments for all student and school characteristics, -5.8 points and -3.5 points, respectively. When the results were analyzed by the school's affiliation status with the PSDs, estimates were not significant between PSD-affiliated charter schools and TPSs. However, there were significant differences between non-

PSD-affiliated charter schools and the TPSs, ranging from -3.9 points to – 9.8 points depending upon the level of adjustments for school and student characteristics (Braun et al., 2006).

Loveless (2010) examined main NAEP and LTT results between 1990 and 2009 to assess whether or not converting a TPS to a charter was a real solution to turn around failing schools and concluded that test scores looked similar before and after the conversion. Specifically, changes in the average percentile score for conversion charter schools based on the state assessments were 0.3 in reading and -1.3 in math between 1986 (before conversion) and 2008 (after conversion) (Loveless, 2010).

Chodowsky and Ginsburg (2012) reviewed the 2011 NAEP results of 4th – and 8th grade students in math and reading, and the 2009 NAEP results for grades four, eight and twelve in science, and twelfth grade reading and math. Findings from the study at the national level were as follows:

- The average NAEP scores for traditional public schools (TPSs) were higher than that of charter schools for grades four, eight, and twelve in reading, math, and science.
- The growth from 2003 NAEP results for TPSs was significant while insignificant for charter schools due to small charter school sample sizes for grades four and eight in math and reading.
- Grade 12 math and reading scores for TPSs were significantly higher than charter schools in 2009, which was the only year the NAEP assessment was conducted at the 12th grade level.
- TPSs posted significantly higher scores in science at all levels tested than charter schools.

The authors further examined the assessment results for the subgroups across charter schools and TPSs, including white, black, Hispanic, Asian and Pacific Islander, students with disabilities,

English language learners, and low-income students. The findings for subgroups at the national level includes:

- Subgroups who performed significantly higher in TPSs than in charter schools in 2003/2005 NAEP assessments performed similarly in the 2011 NAEP assessment. These groups are low-income students in 4th grade reading and math; and black students and students with disabilities in 8th grade math.
- Hispanic students performed similarly across charter schools and TPSs in 2003/2005; however, they performed significantly higher in 4th grade reading and 8th grade math in charter schools than in TPSs in 2011.
- Asian students performed similarly across all subjects and groups in charter schools and TPSs in 2003/05. However, this group performed significantly better in TPSs than in charter schools in 2011, in 4th and 8th grade math.

Furthermore, NAEP reports on the performance for select large school districts in a report named the Trial Urban District Assessment (TUDA) and this assessment also includes Atlanta Public Schools (APS) in Georgia. Beginning in 2009, charter school results that have not been included in the school district's Adequate Yearly Progress (AYP) reports under NCLB are also excluded from the TUDA results (NCES, 2013). According to Chodowsky & Ginsburg (2012), charter school students within large urban school districts outperformed their peers in TPSs while underperforming at the national level in 2011 NAEP. The authors attributed this shift to the fact that NAEP results for TPSs contained a wide-range of schools, including high-performing suburban schools and that charter school enrollment was most concentrated in large urban districts. Specifically, six percent of 4th grade students and eight percent of 8th grade students within large school districts attended charter schools as opposed to 3% at each grade na-

tionally (Chodowsky & Ginsburg, 2012). Results from the 2011 NAEP for the APS showed that charter school students outperformed their peers in 4th and 8th grade math and reading, with statistically significant difference in all areas except 4th grade reading. Moreover, low-income students in APS charter schools outperformed their peers in TPSs in all areas, with a significant difference in 8th grade math (Chodowsky & Ginsburg, 2012).

National Charter School Study. The Center for Research of Education Outcomes (CREDO) released its first national study on charter school performance in 2009 entitled, *Multiple Choice: School Performance in 16 States.* The study included over 1.7 million students attending more than 2400 charter schools across the nation, which constituted more than 70% of the entire charter school population (Raymond, 2009). CREDO released its follow-up study in 2013, *National Charter School Study – 2013,* including 25 states, District of Columbia, and New York City Schools. Together, the participating states constituted over 95% of the charter schools and charter school students in the nation (Cremata et al., 2013). Both 2009 and 2013 studies employed the virtual control record (VCR) method to create a "virtual twin" attending a TPS for each charter school student who was represented in the data collected for the study. The data for the study consisted of student-level data including demographics, school enrollment, and test results from the state assessments in English Language/Arts and mathematics (Cremata et al., 2013).

The 2013 CREDO study aimed at answering one central question, "How did the academic growth of the charter school student compare to a similar student who attended TPSs?" Therefore, the study consisted of two separate analyses, Original 16-State Update and 27-State Analysis. The Original 16-State Update examined how student performance has changed over time in the 16 states covered in the 2009 CREDO study while the 27-State Analysis evaluated the impact of charter attendance on academic growth compared to academic growth the students would have

achieved had they not enrolled in charter schools. The study further analyzed the academic results for student subgroups and characteristics. The difference in growth was presented in terms of standard deviations, which was also converted to days of learning (Cremata et al., 2013).

Original 16-State Update. Covering the academic years 2008-2009 through 2010-11, the analysis was designed to uncover whether and how charter performance has changed since the original 2009 report, and whether the change was a result of improvement of the first charter schools (continuing charter schools) that were part of the original study or the performance of new schools (new charter schools). Furthermore, the analysis disclosed performance changes, if any, for the same student subgroups that were covered in the 2009 study in addition to overall charter school impact on student performance. The analysis revealed the following findings:

- In 2009, the impact of charter schools on overall learning gain in reading was significantly lower than that of TPSs by -.01 standard deviation (SD), which was equivalent to seven less days of learning. Contrary to 2009, the 2013 impact of charter schools on learning in reading was significantly higher than that of TPSs by .01 SD, which was equal to an additional seven days of learning. The study further discovered that the improvement came from the existing schools as the results from the new schools mirrored the 2009 finding, which was that students at new charter schools had significantly lower learning gains than in TPSs.
- With regard to the overall learning gains in math, the impact of charter schools was significantly lower than that of TPSs in both 2009 and 2013 (-.03 SD and -.01 SD, respectively). In terms of the number of learning days, the difference was equivalent to 22 fewer days in 2009 and seven fewer days in 2013. As far as achievement by charter type is concerned, both continuing charter schools and new charter schools underperformed TPSs by -.01 SD and -.03

SD respectively. Table 2 below illustrates the summary of findings regarding the charter school impact on learning gains by subgroup and subject:

Table 2

Charter Impact Changes Between 2009 and 2013 - Standard Deviation (Additional Days of Learning)

Subgroup	2009 Impact		2013 Impact	
	Reading	Math	Reading	Math
Black	-.01* (7)	-.01* (-7)	.01* (7)	.00 (0)
Hispanic	-.02* (-14)	-.02* (-14)	-.01* (7)	-.01* (-7)
Students in Poverty	.01* (7)	.01* (7)	.02* (14)	.03* (22)
ELLs	.05* (36)	.03* (22)	.06* (43)	.05* (36)
Special Education	.01* (7)	.01* (7)	.02* (14)	.02* (14)

* Significant difference at .01 level.

The study also examined the state level impact on learning, specifically addressing whether high-performing states in 2009 remained high-performing in 2013 and whether under-performing states improved their results. The study reported that 12 out of 16 states posted higher learning gains in 2013 than in 2009 in relation to reading scores, including Georgia. As far as learning gains in math are concerned all 16 states except Arkansas and Georgia either remained stable or posted slightly improved scores.

27-State Analysis. The 27-State Analysis provided findings, which included the overall impact of charter schools when all 27 states were all taken together, state-level findings, and charter school impact on learning by student subgroups. The study demonstrated the aggregate results for multiple time frames, from a one-year period (Spring 2010 - Spring 2011) to a five-year period (Spring 2006 – Spring 2011), with a one-year increment. The study presented the findings for the subgroups and states for the period of Spring 2008 to Spring 2011. The aggregate results showed a significant impact of charter school attendance on reading for all terms in-

cluding one-year to five-year periods. The learning gains in terms of number of days was five additional days for one- to three-year terms and seven days for four- and five-year terms. However, charter school attendance did not generate positive outcomes for math despite the improvement over the years between 2006 and 2011. Overall charter school impact was negative for all terms, significantly lower for the five- and four-year terms, and insignificant for one- to three-year terms.

Regarding the charter school impact by state for a three-year term (Spring 2008-Spring 2011), charter schools in 16 states out of 27 evaluated showed higher learning gains than TPSs in reading. Nonetheless, charter schools in eight states posted lower learning gains, and similar gains in the other three states. Specifically, Georgia charter schools posted 14 additional learning days (.02 SD), which was significant. With regard to math results, charter schools posted higher learning gains than TPSs in 12 states, lower learning gains in 13 states, and similar gains in two states. Particularly, results from Georgia charter schools showed 14 fewer days of learning in math (-.02 SD).

The study examined the school-level impact beyond overall and state-by-state findings through a comparison of actual school-level growth in charter schools to the growth students would have posted in their local TPSs during the term from Spring 2010 to Spring 2011. The analysis revealed that, of the charter schools studied, 25% posted significantly stronger growth, 56% posted similar growth, and 19% posted significantly lower growth than their TPS counterparts in reading. In math, 29% of charter schools posted significantly stronger growth, 40% posted similar growth, and 31% posted significantly lower growth than their TPS counterparts (pp. 56-59). In terms of charter school impact by grade span, charter elementary and middle schools had higher learning gains than their TPS counterparts in reading, (22 days and 14 days, respec-

tively) while learning gains were similar at the high school level in reading. Mirroring the reading results, charter elementary and middle schools outperformed TPSs by 14 and 36 days respectively. Math results were similar between charter and TPS at the high school level.

Furthering the findings from the Original 16-State Update, the 27-State Analysis reported the compound effect of living in poverty by subgroups. Table 3 below shows the summary of findings, which includes differences in days of learning and standard deviation where the standard deviation for each TPS group is set to zero:

Table 3

CREDO's 27-State Analysis by Subgroups

Subgroup	Reading		Math	
	SD	Days of Learning	SD	Days of Learning
Black Overall	.02**	14	.02*	14
Black in Poverty	.04**	29	.05**	36
Black Not in Poverty	.01	NR***	.01	NR***
Hispanic Overall	.00	NR***	-.01	NR***
Hispanic in Poverty	.02**	14	.03**	22
Hispanic Not in Poverty	-.01*	-7	-.04**	-29
Hispanic Non-ELLs	.01*	7	.01	NR***
Hispanic ELLs	.07**	50	.06**	43
White	-.02**	-14	-.07	-50
Asian	-.01	NR***	-.04*	-29
Students in Poverty	.02**	14	.03**	22
ELLs	.05**	36	.05**	36
Special Education Students	.01	NR***	.02**	14

*Significant difference at .05 level.
** Significant difference at .01 level.
*** Similar learning gains, so not specified.

Conclusion

The literature review conducted for this study centered on the key tenets of the legislative intent for the Georgia charter school law: (a) academic and organizational innovations, (b) autonomy and flexibility, and (c) student achievement. A thorough literature review revealed that

three major factors contributed to differences in the results: (a) differences in the definitions of the term studied, and (b) differences in the research design, and (c) political motivation. For example, Lubienski (2003) defined innovation as educational and administrative changes, where as Preston et al. (2012) added the dimension of relative prevalence, which considers a practice innovative if that particular practice is implemented in only one school in the district. Under this conservative definition, Preston et al. (2012) examined innovations in charter schools and concluded that charter schools did not fulfill their promise of innovation. In contrast, using a more liberal definition, Lubienski (2003) touted charter schools for employing organizational innovations quite frequently. Therefore, it is critical to read and interpret the results by knowing the conditions behind the study.

Another major contributing factor is the research design. The nature of the data available and the purpose of the study impact the choice of the statistical method that is employed for the study. Lottery-based and PSM studies were primarily employed to study an individual school as fixed-effect studies were commonly used in studies with larger samples such as statewide or multistate studies. Review of the studies showed that lottery-based and PSM studies were likely to produce positive impact of attending charter schools more than fixed-effect methods. Particularly, 17 estimates out of 30 in reading and 23 estimates out of 30 in math produced in PSM studies were positive and significant. Among the same studies, 12 estimates in reading and six estimates in math were insignificant. Moreover, among all 91 estimates of achievement results for math and 87 estimates for reading examined in the meta-analysis, Betts & Tang (2011) reported that lottery-based and PSM studies were likely to produce a positive impact of attending charter schools more than fixed-effect methods. Specifically, approximately 67% of PSM studies and 60% of lottery-based studies produced significantly positive charter school impact on reading

test scores, as opposed to 13% of fixed-effect studies. For math, 80% of PSM studies and 70% of lottery-based studies yielded a significantly positive charter school impact as opposed to 32% of fixed-effect studies.

Student achievement studies on charter school attendance are highly politicized and controversial. Vergari (2007) drew attention to the politics behind the charter school stating "for those who track research reports on charter schools, it is often the case that one need only examine the name of the author or sponsor of a study to predict its conclusions before reading it" (p. 30). Since studies on the charter school effectiveness are highly politicized, readers should consider researcher's affiliations when reading and interpreting results.

In addition, the literature review showed that very few studies examined student achievement in Georgia charter schools (Davis & Raymond, 2012; Chudowsky & Ginsburg, 2012; Cremata et al., 2013; Tuttle et al., 2013). Examining effectiveness of charter schools in 14 states including Georgia, Davis, & Raymond (2012) employed fixed-effect and VCR methods by using test scores from the school years 2004-2005 through 2007-2008 in grades one through eight. The study found significant negative impact of Georgia charter schools for math (-.088 SD in fixed-effect and -.017 SD in VCR) and mixed results for reading (-.058 SD in fixed effect and .005 SD in VCR). In contrast, the CREDO's 27-State Analysis used the results from the Criterion Referenced Competency Tests (CRCT), and End of Course Tests (EOCT) for the school years 2006-07 to 2010-11. Overall, the study found significant positive impact of Georgia charter schools in reading (.02 SD equated to 14 more days of learning) and significant negative impact in math (-.02 SD equated to 14 less days of learning) (Cremata et al., 2013).

Using the 2011 National Assessment of Educational Progress data, Chudowsky & Ginsburg (2012) investigated the charter school effectiveness in four large cities – Washington DC,

Atlanta, Chicago, and Milwaukee. The study revealed that charter schools in the City of Atlanta showed positive impact in math and reading for grades four and eight. Tuttle et al. (2013) studied the impact of the Knowledge Is Power Program model on student achievement, including 43 KIPP charter schools across the nation, of which four were from Georgia. The study used the methods of the propensity score matching and lottery-based impact estimates. Although reporting overall significant positive achievement gains in math and reading, the study did not provide the results specific to the Knowledge Is Power Program charter schools in Georgia.

The review of the literature also revealed the absence of studies that investigate the student achievement differences, if any, between start-up charter schools and charter system schools in Georgia. Consequently, this study fills the existing gap of knowledge, contributing to the policy debate surrounding charter schools and charter systems. Furthermore, employing the Georgia's current accountability measures in this study will increase the relevance of this study in the field of the education.

References

A Plus Education Reform Act. H.R. 1187, 1999-2000 Gen. Assem., Reg. Sess. (Ga. 2000)

Abadie, A., Diamond, A., & Hainmueller, J. (2007). Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American Statistical Association*, *105*(490).

Abdulkadiroğlu, A., Angrist, J. D., Dynarski, S. M., Kane, T. J., & Pathak, P. A. (2011). Accountability and Flexibility in Public Schools: Evidence from Boston's Charters And Pilots. *Quarterly Journal of Economics*, *126*(2), 699-748.

Adamowki, S., Therriault, S., Cavanna, A. P., American Institutes for Research, W. C., & Thomas B. Fordham Foundation, W. C. (2007). The Autonomy Gap: Barriers to Effective School Leadership. *Thomas B. Fordham Foundation & Institute*,

Angrist, J., Pathak, P., & Walters, C. (2013). Explaining Charter School Effectiveness. *American Economic Journal-Applied Economics*, *5*(4), 1-27.

Aud, S., Wilkinson-Flicker, S., Kristapovich, P., Rathbun, A., Wang, X., Zhang, J., & National Center for Education Statistics. (2013). The Condition of Education 2013. NCES 2013-037. *National Center for Education Statistics*,

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management decision*, *47*(8), 1323-1339.

Barghaus, K. M., & Boe, E. E. (2011). From Policy to Practice: Implementation of the Legislative Objectives of Charter Schools. American Journal Of Education, 118(1), 57-86.

Batdorff, M., Maloney, L., May, J., Doyle, D., & Hassel, B. (2010). Charter school funding: Inequity persists. *Ball State University*, *2010*.

Beaton, A. E., Chromy, J. R., & American Institutes for, R. (2010). NAEP Trends: Main NAEP vs. Long-Term Trend. *American Institutes for Research*,

Berends, M., Goldring, E., Stein, M., & Cravens, X. (2010). Instructional Conditions in Charter Schools and Students' Mathematics Achievement Gains. *American Journal Of Education*, *116*(3), 303-336.

Betts, J. R., Tang, Y., & University of Washington, C. (2011). The Effect of Charter Schools on Student Achievement: A Meta-Analysis of the Literature. *Center On Reinventing Public Education, University of Washington*,

Betts, J. R., & Tang, Y. E. (2014). A meta-analysis of the literature on the effect of charter schools on student achievement. *Seattle, WA: Center on Reinventing Public Education University of Washington.*

Bifulco, R., & Ladd, H. F. (2006). Institutional Change and Coproduction of Public Services: The Effect of Charter Schools on Parental Involvement. *Journal Of Public Administration Research & Theory*, *16*(4), 553-576.

Booker, K., Sass, T. R., Gill, B., & Zimmer, R. (2010). The Unknown World of Charter High Schools. Education Next, 10(2), 70-75.

Braun, H. I., Jenkins, F., & Grigg, W. S. (2006). *A closer look at charter schools using hierarchical linear modeling.* Washington, DC: National Center for Education Statistics, Institute of Education Sciences: National Assessment of Educational Progress,

Brinson, D., Rosch, J., Thomas B. Fordham, I., & Thomas B. Fordham, F. (2010). Charter School Autonomy: A Half-Broken Promise. *Thomas B. Fordham Institute*,

Budde, R., & Regional Laboratory for Educational Improvement of the Northeast & Islands, A. A. (1988). Education by Charter: Restructuring School Districts. Key to Long-Term Continuing Improvement in American Education.

Bulkley, K., & Fisler, J. (2003). A Decade of Charter Schools: From Theory to Practice. *Educational Policy*, *17*(3), 317-342.

Butler, E. A., & National Resource Center on Charter School Finance &, G. (2008). *Creating and Sustaining High-Quality Charter School Governing Boards. A Guide for State Policymakers*. National Resource Center on Charter School Finance and Governance.

California Charter Schools Act of 1992. Sections 47600 – 47664. Retrieved from http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=EDC&division=4.&title=2.&part=26.8.&chapter=1.&article=

Cannata, M., Engel, M., & Society for Research on Educational Effectiveness. (2011). Does Charter Status Determine Preferences? Comparing the Hiring Preferences of Charter and Traditional Public School Principals. *Society For Research On Educational Effectiveness*,

Center for Education Reform. (2014). *Charter School Law Rankings and Scorecard.* Retrieved from the Center for Education Reform website: https://www.edreform.com/2014/03/2014-charter-school-law-rankings-scorecard/

Center for Research on Education Outcomes (2013). *National Charter School Study*. Stanford University, Stanford, CA. Retrieved from: http://credo.stanford.edu/documents/NCSS%202013%20Final%20Draft.pdf

Charter System Act of 2007. S. 39, 2006-07 Gen. Assem., Reg. Sess. (Ga. 2007)

Christensen, J., & Rainey, L. (2009). *Custom Tailored: Trends In Charter School Educational Programs*. National Charter School Research Project, Center on Reinventing Public Education.

Chubb, J. E., & Moe, T. M. (1990). *Politics, markets, and America's schools / John E. Chubb and Terry M. Moe*. Washington, D.C.: Brookings Institution, c1990.

Chudowsky, N., Ginsburg, A., & National Assessment Governing, B. (2012). Who Attends Charter Schools and How Are Those Students Doing? Exploratory Analysis of NAEP Data. *National Assessment Governing Board*,

Clark, M. A., Gleason, P., Tuttle, C. C., Silverberg, M. K., & Mathematica Policy Research, I. (2011). Do Charter Schools Improve Student Achievement? Evidence from a National Randomized Study. Working Paper. *Mathematica Policy Research, Inc*,

Cobb County School District. (2014). Start-up Charter School Petition Rubric 2013-14. Retrieved from http://www.cobbk12.org/schools/charter_schools.aspx.

Crane, E. W., Huang, M., Barrat, V. X., & Regional Educational Laboratory West, (. (2011). Comparing Achievement Trends in Reading and Math across Arizona Public School Student Subgroups. REL Technical Brief. REL 2012-No. 019. *Regional Educational Laboratory West*,

Cremata, E., Davis, D., Dickey, K., Lawyer, K., Negassi, Y., Raymond, M. E., & Woodworth, J. L. (2013). National Charter School Study 2013. *Stanford, CA: Stanford University.*

Davis, D. H., & Raymond, M. E. (2012). Choices for studying choice: Assessing charter school effectiveness using two quasi-experimental methods. *Economics of Education Review, 31*(Special Issue: Charter Schools), 225-236. doi:10.1016/j.econedurev.2011.08.012

Dillon, E. (2011). The Road to Autonomy: Can Schools, Districts, and Central Offices Find their Way. *Education Sector*.

Dobbie, W., & Fryer, R. (2011). Are High-Quality Schools Enough to Increase Achievement Among the Poor? Evidence from the Harlem Children's Zone. *American Economic Journal-Applied Economics*, *3*(3), 158-187.

Finnigan, K. S. (2007). Charter School Autonomy. *Educational Policy*, *21*(3), 503.

Finnigan, K., Adelman, N., Anderson, L., Cotton, L., Donnelly, M. B., & Price, T. (2004). Evaluation of the Public Charter Schools Program: Final Report. PPSS-2004-08. *US Department of Education*.

Florida Charter School Statute. (2014). Section 1002.33. Retrieved from http://www.flsenate.gov/Laws/Statutes/2014/1002.33.

Fortson, K., Verbitsky-Savitz, N., Kopa, E., Gleason, P., & National Center for Education Evaluation and Regional Assistance. (2012). Using an Experimental Evaluation of Charter Schools to Test Whether Non-Experimental Comparison Group Methods Can Replicate Experimental Impact Estimates. NCEE 2012-4019. *National Center for Education Evaluation and Regional Assistance,*

Fulton County Schools Charter System Application. (2011). Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/FCS%20Charter%20System%20Application%20Complete%2012.1.11.pdf.

Fulton County Schools. (2013, December 12). Meeting Minutes. Retrieved on October 18, 2014, from http://www.boarddocs.com/ga/fcss/Board.nsf/Public.

Gawlik, M. A. (2008). Breaking Loose: Principal Autonomy in Charter and Public Schools. *Educational Policy, 22*(6), 783-804.

Georgia Charter School Act of 1998. S. 70, 1997-98 Gen. Assem., Reg. Sess. (Ga. 1998)

Georgia Charter System Act of 2007. S. 39, 2006-07 Gen. Assem., Reg. Sess. (Ga. 2007)

Georgia Department of Education. (2010). *History of Charters Granted and Terminated.* Available from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/default.aspx.

Georgia Department of Education. (2012). *Georgia Charter Schools and Charter Systems, 2012.*Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/Charter%20Schools%20in%20Georgia%20-%20Commission%20Presentation%20-%20as%20of%202013-01-29.pdf

Georgia Department of Education. (2013). *Chartering in Georgia 2012-13.* Available from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/Annual-Reports.aspx

Georgia Department of Education. (2014). *IE2, Charter, and School Systems - A Nuts and Bolts Comparison.* Retrieved from the Georgia Department of Education website: http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/School%20System%20Flexibility%20and%20Charter%20Schools%20in%20Georgia%20-%20September%2012%2c%202014%20-%20FINAL.pdf

Georgia Department of Education. (2014). *List of Georgia Charter Systems.* Retrieved from the Georgia Department of Education website: http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/default.aspx

Georgia Department of Education. (2014). *New and Closed Charter Schools and Charter Systems for 2013-14 School Year.* Retrieved from the Georgia Department of Education website: http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/New%20and%20Closed%20Charter%20School%20List%20for%202014-14%20-%20as%20of%202014-07-29.pdf

Georgia Department of Education. (2014). *Approved Charter Schools.* Retrieved from the Georgia Department of Education website: http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/Charter%20School%20List%20-%202014-15%20-%202014-09-23.pdf

Georgia State Board of Education. (2013, January 17). Board Meeting Minutes. Retrieved from https://eboard.eboardsolutions.com/Meetings/ViewMeetingOrder.aspx?S=1262&MID=28089.

Georgia Department of Education. (2014). *Charter School Application.* Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/Charter-Petition-Application.aspx

Georgia Department of Education. (n.d.). *Charter for Fulton County.* Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/Fulton%20County%20System.pdf.

Georgia's College and Career Ready Performance Index Data Calculation Guide. (2014). Retrieved from http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Documents/CCRPI%20Data%20Calculation%20Guide%2012.08.14.pdf.

Gleason, P., Clark, M., Tuttle, C. C., Dwoyer, E., & National Center for Education Evaluation and Regional Assistance. (2010). The Evaluation of Charter School Impacts: Final Report. NCEE 2010-4029. *National Center for Education Evaluation and Regional Assistance*.

Gleason, P. M., Tuttle, C. C., Gill, B., Nichols-Barrer, I., & Teh, B. (2014). Do KIPP Schools Boost Student Achievement?. *Education Finance and Policy*, *9*(1), 36-58.

Goldring, E., Cravens, X., & Vanderbilt University, N. C. (2007). Teacher's Academic Press for Learning in Charter and Traditional Public Schools. *National Center On School Choice, Vanderbilt University*,

Greenland, S., & O'Rourke, K. (2008). Meta Analysis. In K.J. Rothman, S. Greenland, T. Lash (Ed.) Modern Epidemiology (pp. 652).

Gross, B., & University of Washington, C. (2011). Inside Charter Schools: Unlocking Doors to Student Success. *Center On Reinventing Public Education, University Of Washington*,

Hassel, B. C. (1999). *The Charter School Challenge: Avoiding the Pitfalls, Fulfilling the Promise.* Washington, D.C.: Brookings Institution Press.

Hill, P. T., Bonan, J., & Rand Corp., S. g. (1991). Decentralization and Accountability in Public Education.

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, *45*(3), 740-763. doi:10.1037/a0015362

Honig, M., & Rainey, L. (2012). Autonomy and School Improvement: What Do We Know and Where Do We Go From Here?. Educational Policy, 26(4), 465-495.

Hoxby, C. M., & Rockoff, J. E. (2005). Findings from the City of Big Shoulders. *Education Next*, *5*(4), 52-58.

Hoxby, C. M., & Murarka, S. (2009). Charter schools in New York City: Who enrolls and how they affect their students' achievement (No. w14852). *National Bureau of Economic Research.*

H.R. 1200, 2001-2002 Gen. Assem., Reg. Sess. (Ga. 2002)

H.R. 881, 2007-2008 Gen. Assem., Reg. Sess. (Ga. 2008)

H.R. 797, 2011-2012 Gen. Assem., Reg. Sess. (Ga. 2012)

H.R. 1162, 2011-2012 Gen. Assem., Reg. Sess. (Ga. 2012)

Increased Flexibility for Local School Systems Act. H.R. 1209, 2007-2008 Gen. Assem., Reg. Sess. (Ga. 2008)

Jeynes, W. (2012). A Meta-Analysis of the Efficacy of Different Types of Parental Involvement Programs for Urban Students. *Urban Education*, *47*(4), 706-742.

Junge, E. M. (2012). *Zero Chance of Passage: The Pioneering Charter School Story.* Minnesota: Beaver's Pond Press.

Kamienski, A. (2011). Competition: Charter and Public Elementary Schools in Chicago. *Journal Of School Choice*, *5*(2), 161-181. doi:10.1080/15582159.2011.576573

Kolderie, T. (1990). *Beyond Choice to New Public Schools: Withdrawing the Exclusive Franchise in Public Education. Policy Report No. 8*.

Lake, R. J., & University of Washington, C. (2008). Hopes, Fears, & Reality: A Balanced Look at American Charter Schools in 2008. *Center On Reinventing Public Education, University of Washington,*

Lake, R. (2013). Hopes, Fears, and Reality: A Balanced Look at American Charter Schools in 2012. *Center on Reinventing Public Education*. *University of Washington*,

Lin, Z., Gardner, D. C., & Vogt, W. P. (2005). Charter Schools in an Arena of Competitive Educational Reforms: An Analysis of the 1999-2000 Schools and Staffing Survey. *Mid-Western Educational Researcher*, *18*(2), 2-15.

Loveless, T. (2010). The 2009 Brown Center Report on American Education: How Well Are American Students Learning? With Sections on NAEP Trends, the Persistence of School Test Scores, and Conversion Charter Schools. Volume II, Number 4. *Brookings Institution*.

Lubienski, C. (2003). Innovation in Education Markets: Theory and Evidence on the Impact of Competition and Choice in Charter Schools. *American Educational Research Journal, 40*(2), 395-443.

Lubienski, C., Crane, C., & Lubienski, S. (2008). What Do We Know about School Effectiveness? Academic Gains in Public and Private Schools. *Phi Delta Kappan*, *89*(9), 689-695.

Lubienski, C., & Weitzel, P. C. (2010). *Charter School Experiment: Expectations, Evidence, And Implications.* Cambridge, MA: Harvard Education Press

Maloney, C., Sheehan, D., Rainey, K., & Texas Center for Educational Research. (2011). Evaluation of New Texas Charter Schools: Final Report (2007-10). *Texas Center For Educational Research*,

National Alliance for Public Charter Schools. (2014). *Estimated Number of Public Charter Schools & Students, 2013-14.* Retrieved from National Alliance for Public Charter School Website: http://www.publiccharters.org/wp-content/uploads/2014/02/New-and-Closed-Report-February-20141.pdf.

National Alliance for Public Charter Schools. (2013). *The Public Charter Schools Dashboard*. Retrieved from http://dashboard.publiccharters.org/dashboard/students/page/growth/year/2013.

National Alliance for Public Charter Schools. (2014). *Health of Charter School Movement.* Retrieved from National Alliance for Public Charter School Website: http://www.publiccharters.org/wp-content/uploads/2014/09/health-of-the-movement-2014.pdf

National Alliance for Public Charter Schools. (2014). Measuring Up To The Model: A Ranking Of State Charter School Laws. *A New Model Law for Supporting the Growth If High-Quality Public Charter Schools.* Retrieved from NAPSC Website: http://www.publiccharters.org/wp-content/uploads/2014/01/StateRankings2014.pdf

National Association of Charter School Authorizers. (2009). Charter School Contracts. Retrieved from the NACSA website: http://www.qualitycharters.org/assets/files/images/stories/Charter_School_Contracts.pdf?q=images/stories/Charter_School_Contracts.pdf.

National Association of Charter School, A. (2012). Principles & Standards for Quality Charter School Authorizing. 2012 Edition. *National Association Of Charter School Authorizers*,

National Association of Charter School Authorizers. (2013). The State of Charter School Authorizing. Retrieved from the NACSA website: http://www.qualitycharters.org/publications-resources/annual-authorizer-survey.html

National Center for Educational Statistics (ED), W. D. (2004). The Nation's Report Card: America's Charter Schools. Results from the NAEP 2003 Pilot Study. National Assessment of Educational Progress. NCES 2005-456. *US Department of Education*,

National Center for Education Statistics. (2013). The Nation's Report Card: A First Look--2013 Mathematics and Reading Trial Urban District Assessment. NCES 2014-466. *National Center for Education Statistics*,

Ni, Y. (2012). Teacher Working Conditions in Charter Schools and Traditional Public Schools: A Comparative Study. *Teachers College Record*, *114*(3).

Ni, Y., & Arsen, D. (2011). School Choice Participation Rates: Which Districts are Pressured?. *Education Policy Analysis Archives*, *19*(29), 1-26.

Ni, Y., & Rorrer, A. K. (2012). Twice Considered: Charter Schools and Student Achievement in Utah. *Economics of Education Review*, 31(5), 835-849.

Nicotera, A., Mendiburo, M., Berends, M., & Vanderbilt University, N. (2010). Charter School Effects in an Urban School District: An Analysis of Student Achievement Gains in Indianapolis. *National Center On School Choice, Vanderbilt University*,

Opfer, V. (2001). Charter Schools and the Panoptic Effect of Accountability. *Education & Urban Society*, *33*(2), 201.

Preston, C., Goldring, E., Berends, M., & Cannata, M. (2012). School Innovation in District Context: Comparing Traditional Public Schools and Charter Schools. *Economics Of Education Review*, *31*(2), 318-330.

Raymond, M. (2009). Multiple Choice: Charter school performance in 16 states. *Center for Research on Education Outcomes (CREDO) Report*.

Renzulli, L. A., Parrott, H., & Beattie, I. R. (2011). Racial Mismatch and School Type: Teacher Satisfaction and Retention in Charter and Traditional Public Schools. *Sociology Of Education*, *84*(1), 23-48.

S. 610, 2005-2006 Gen. Assem., Reg. Sess. (Ga. 2006)

Secretary of State. (2012). *Georgia Election Results.* Retrieved from the Secretary of State Brian P. Kemp's website: http://results.enr.clarityelections.com/GA/42277/113204/en/summary.html

Smith, J., Wohlstetter, P., Kuzin, C., & De Pedro, K. (2011). Parent Involvement in Urban Charter Schools: New Strategies for Increasing Participation. School Community Journal, 21(1), 71-94.

State Charter School Commission. (2013, March 27). Meeting Minutes. Retrieved from https://scsc.georgia.gov/sites/scsc.georgia.gov/files/related_files/site_page/SCSC-Meeting-Minutes-March.pdf.

State Charter School Commission. (2013, April 24). Meeting Minutes. Retrieved from https://scsc.georgia.gov/sites/scsc.georgia.gov/files/related_files/site_page/April%202013%20Meeting%20Minutes.pdf.

State Charter School Commission. (n.d.). Approved Charter Contracts. Retrieved on October 10, 2014, from https://scsc.georgia.gov/approved-charter-contracts.

Steinberg, M. P. (2014). Does Greater Autonomy Improve School Performance? Evidence from a Regression Discontinuity Analysis in Chicago. *Education Finance And Policy*, *9*(1), 1-35.

Stuit, D., Smith, T. M., & Vanderbilt University, N. (2010). Teacher Turnover in Charter Schools. Research Brief. *National Center On School Choice, Vanderbilt University*,

Tennessee Public Charter Schools Act. (2002). Sections 49-13-101 – 49-13-134.

Triant, B. (2001). Autonomy and Innovation: How do Massachusetts Charter Schools Principals Use Their Freedom? Washington, DC: Thomas B. Fordham Foundation.

Tuttle, C., Gleason, P., & Clark, M. (2012). Using Lotteries to Evaluate Schools of Choice: Evidence from a National Study of Charter Schools. *Economics Of Education Review*, *31*(2), 237-253.

Tuttle, C., Gill, B., Gleason, P., Knechtel, V., Nichols-Barrer, I., Resch, A., & Mathematica Policy Research, I. c. (2013). KIPP Middle Schools: Impacts on Achievement and Other Outcomes. Final Report. *Mathematica Policy Research, Inc*,

U.S. Department of Education. (2014). *Charter School Program Nonregulatory Guidance.* Retrieved from https://www2.ed.gov/programs/charter/nonregulatory-guidance.html.

Van Langen, A., & Dekkers, H. (2001). Decentralization and Combating Educational Exclusion. *Comparative Education*, (3). 367.

Watras, J. (2006). The Eight-Year Study: From Evaluative Research to Demonstration Project, 1930-1940. Education Policy Analysis Archives, 14(21), 1-23.

Williamson, A. L. (2011). Assessing the Core and Dimensional Approaches: Human Resource Management in Public, Private, and Charter Schools. *Public Performance & Management Review*, *35*(2), 251-280.

Winters, M. A. (2012). Measuring the Effect of Charter Schools on Public School Student Achievement in an Urban Environment: Evidence from New York City. *Economics Of Education Review*, *31*(2), 293-301.

Witte, J. F., Wolf, P. J., Dean, A., Carlson, D., & University of Arkansas, S. (2010). Milwaukee Independent Charter Schools Study: Report on One Year of Student Growth. SCDP Milwaukee Evaluation. Report # 21--Version 1.1. *School Choice Demonstration Project*,

Witte, J. F., Wolf, P. J., Dean, A., Carlson, D., & University of Arkansas. (2011). Milwaukee Independent Charter Schools Study: Report on Two- and Three-Year Achievement Gains. SCDP Milwaukee Evaluation. Report # 25. *School Choice Demonstration Project*,

Witte, J. F., Wolf, P. J., Carlson, D., Dean, A., & University of Arkansas. (2012). Milwaukee Independent Charter Schools Study: Final Report on Four-Year Achievement Gains. SCDP Milwaukee Evaluation Report #31. *School Choice Demonstration Project*,

Wohlstetter, P., Smith, J., & Farrell, C. C. (2013). *Choices and Challenges: Charter School Performance in Perspective.* Cambridge, Massachusetts: Harvard Education Press.

Zimmer, R., Gill, B., Booker, K., Lavertu, S., & Witte, J. (2012). Examining Charter Student Achievement Effects across Seven States. *Economics of Education Review*, *31*(2), 213-224.

Zimmer, R. & Buddin, R., (2007) Getting Inside the Black Box: Examining How the Operation of Charter Schools Affects Performance, Peabody Journal of Education, 82:2-3, 231-273, DOI: 10.1080/01619560701312954

2 AN EXAMINATION OF STUDENT ACHIEVEMENT DIFFERENCES BETWEEN CHARTER SYSTEM SCHOOLS AND START-UP CHARTER SCHOOLS

Georgia adopted a charter school law in 1993 (Opfer, 2013), which authorized conversion of public schools to charter schools. Later, the charter school bill was amended through the Georgia Charter School Act of 1998 to allow for the establishment of start-up charter schools by "a local school, local board of education, private individual, private organization, or state or local public entity" (Georgia Charter School Act, 1998, p. 1). In 2007, the Georgia Charter School Act of 1998 was amended to provide legislation for school systems to become charter systems by entering into a contract with the State Board of Education. Through the contract, charter systems are provided with a higher level of autonomy in exchange for higher accountability (Georgia Charter Systems Act, 2007).

From the very beginning, the legislative intent of the Georgia Charter School Act of 1998, which governs start-up charter schools and charter systems, was "to increase student achievement through academic and organizational innovation . . . to utilize the flexibility of a performance based contract called a charter" (Georgia Charter School Act, 1998, p. 1). With this legislative intent in mind, charter school success would be measured by increased student achievement. Therefore, it is important for decision-makers including legislators, school and school system leaders, charter and parents to have a clear understanding of the student achievement differences, if any, between start-up and system charter schools. The absence of a study that illustrates such differences creates a risk of making uninformed decisions on the side of involved individuals.

Purpose of the Study

Consistent with the legislative intent of increasing student achievement, the primary purpose of this study is to investigate the extent to which Georgia start-up and charter system schools fulfill their legislative obligations of increasing student achievement. This study provides quantitative evidence through the method of propensity score matching for selecting the sample and a factorial ANOVA for analyzing data associated with the sample selected. This study fills the gap of empirical research on achievement differences within the charter sector in Georgia by school type.

Results from the analysis will: (a) reveal which type of charter school fulfills statutory obligations of increasing student achievement more effectively, (b) inform legislators about school choice options in order that they adopt new laws or revise current laws, (c) help leaders of charter systems decide whether to introduce or expand start-up charter school offerings in their district portfolios, and (d) help parents choose the best school option among those available.

Statement of the Problem

The Increased Flexibility for Local School Systems Act requires school systems to make a choice of an operational system, charter system, an IE2 system, or a status-quo (Increased Flexibility For Local School Systems Act, 2011). Only fifty-six school systems have finalized the decision by December 2014. The remaining 134 are still in the process of making the decision as of September 2014 (GADOE, 2014). Therefore, it is expected that the number of charter systems and charter system schools will continue to grow until all 180 school systems in Georgia finalize their decisions. Historical data on the Georgia system charter schools illustrates significant growth since the charter system bill was enacted in 2008. Included in the GADOE's list of charter systems, 265 system charter schools operating within 28 Georgia charter systems as of 2014-

15 school year. Similarly, the number of start-up charter schools, as featured in the 2014 GA-DOE Charter Schools Division's Annual Report, increased from fifty in 2008 to 87 with two charter schools closed in 2014 (GADOE, 2014). However, there are only four charter systems that have approved start-up charter schools as of the school year 2014-15. Only eleven start-up charter schools out of 87 serve students of such charter systems. Specifically, Fulton County School System has eight, Calhoun City Schools, Dublin City Schools, and Vidalia City Schools have one start-up charter school each during the school year 2014-15. Out of eleven, only two start-up charter schools were approved by the local systems after the systems changed their status to charter according to the GADOE Approved Charter Schools, 2014-15 and the List of Georgia Charter Systems (GADOE, 2014). The approval trend of start-up charter schools by the local boards of education unveiled the following problems:

1. A majority of charter systems do not have a start-up charter school in their portfolio of school options (i.e. 24 out of 28 charter systems as of 2014-15 school year).
2. Charter systems tend to approve less start-up charter schools than non-charter systems. None of the six start-up charter schools that were approved in 2014 were approved by either non-charter systems or the State Charter School Commission (GADOE New and Closed Charter Schools and Charter Systems, 2014). If the trend holds, more students and parents in Georgia will not have access to start-up charter schools in the future as the number of charter systems increase as a result of the stipulations from the Increased Flexibility for Local School System Act.

Significance of the Study

A growing body of research has emerged, examining charter school operations and student achievement in charter schools versus traditional public schools. Studies have used a variety

of data to analyze student achievement results in an effort to determine how school type impacts student achievement, including nationwide (Chudowsky & Ginsburg, 2012), statewide (Crane, Huang, & Barrat, 2011), and student-level data if available (Abdulkadiroglu, Angrist, Dynarski, Kane & Pathak, 2011). Student-level data has been utilized to follow individual students over a given period of time in an effort to examine student growth and achievement gap, and to detect any student achievement differences between different types of schools (Tuttle, Gleason, & Clark, 2012; Zimmer, Gill, Booker, Lavertu, & Witte, 2012). While most of the charter school studies have compared student achievement between charter schools and traditional public schools, very few studies attended to the achievement differences by type of charter schools. Furthermore, a through review of the literature for this study revealed that very few studies examined student achievement in Georgia charter schools (Davis & Raymond, 2012; Chudowsky & Ginsburg, 2012; Cremata et al., 2013; Tuttle et al., 2013).

The review of the literature also revealed the absence of studies that investigate the student achievement differences, if any, between start-up charter schools and charter system schools in Georgia. Consequently, this study fills the existing gap of knowledge, and contributes needed research to the policy debate surrounding charter schools and charter systems. Furthermore, this study is relevant and timely because it employs Georgia's current accountability measures.

Theoretical Framework

The guiding theoretical framework for this study is the Friedman's market-based reform theory. According to Friedman, freedom allows for consumer mobility and choice, and increased competition and choice opportunities drive innovation and improved efficiency in operation (Kamienski, 2011). The interaction between market forces and autonomy would force charter schools to innovate to offer higher quality education than traditional public schools (Goldring &

Cravens, 2008). In addition, market style schooling allows parents to choose schools for their children, and provides parents with greater opportunities for influencing school practices to meet the parents' demands (Chubb & Moe, 1990; Saiger, 2013). The parents' behavior and schools' policies and practices will ultimately change as a result of market-based education reforms. Parents will eventually select schools offering high quality education for their children to attend and low achieving schools will be forced to improve their organizational and instructional practices (Ni & Arsen, 2011). Since charter schools are funded according to their enrollment level, and are subject to the higher accountability standards, which is based largely on state assessment results, the market force will lead to increased student achievement to ensure the continued operation of the schools (Berends et al., 2010). Furthermore, Berends (2013) argues that increased autonomy granted to charter schools reduces bureaucratic and political control, which allows charter school educators to experiment with innovative instructional and organizational strategies to improve student achievement.

In contrast with market-based education theory, institutional theory is an alternative theory concerning the implications of school choice including charter schools. As opposed to market-based theory, institutional theory characterizes all schools including charter schools as institutions operating by conforming to norms shaped by the school's cultural environment defining legitimate schooling (Berends, 2015, Huerta & Zuckerman, 2009). Berends (2015) further claims that similar to TPSs, charter schools operate under institutional rules regulating instructional and organizational practices such as teacher qualifications, class size, and age-based grade configurations. Therefore, organizational structures and processes in charter schools and TPSs look more alike than different (Berends, 2015). Consequently, students attending charter schools are not

likely to have a different experience from their peers who attend TPSs due to similarities in schools overweighing differences in schools.

Both market-based education theory and institutional theory simultaneously apply to charter school settings even though they seem to be contradictory to one another. An example of implications of institutional theory in charter school settings is the charter schools' tendency to recruit certified teachers and teachers with education degrees albeit at a lower rate as compared to TPSs (81% versus 97% for certification, and 55% versus 63% for education degree) (Goff, Mavrogordato, & Goldring, 2012). Conversely, having been freed from the local and state's operational and financial regulations, charter schools find better opportunities to adjust class size and student-teacher ratio to increase student achievement, which eventually helps them compete in market-based environments. Studies reported that students who are taught in smaller classes posted higher test scores as a result of more individual attention from teachers (Merritt, Rimm-Kaufman, Berry, & Walkowiak, 2011; Shin & Raudenbush, 2011) and increased interaction between the students and teachers in smaller classes (Blatchford, Bassett, & Brown, 2011). Coupled with the small classroom size, low student teacher ratio helps yield more positive outcomes and helps close the achievement gap for struggling students (Schwartz, Schmitt, & Lose, 2012).

Methodology

The philosophical view of this study is objectivism, which is "the position that there is an objective method for ascertaining whether beliefs about the world are true … a method that tends to yield the same results when properly applied by different competent investigators to the same problem" (Audi, 2011, p. 263). The theoretical perspective used in the study is post-positivism. According to Creswell (2014), studies using post-positivist approaches, which are based on careful observation and measurement of an existing reality, examine causes that influence outcomes.

> A quantitative approach is one in which the investigator primarily uses post-positivist claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data (Creswell, 2014, p. 18).

Conforming to Creswell's definition of a quantitative study, this quantitative study tests specific hypotheses by analyzing scores from the 2014 CCRPI components. Comparing means of scores for charter system schools and start-up charter schools, this quantitative study is an observational study where random assignments of participants to groups is not possible. Randomization is the "gold standard" approach used for investigating the impact of a treatment since it allows for obtaining samples with equivalent baseline characteristics (Shadish, Cook, & Campbell, 2002). Since observational studies lack randomized assignments of participants to comparison and treatment groups, drawing causal inferences can be biased in observational studies (Guo & Frazer, 2014). If, in an observational study, two naturally occurring groups systematically differ about observed characteristics that are tied into the same outcome of interest, confounding effects are present (Austin, 2011; Beal & Kupzyk, 2014). Consequently, the estimate of the treatment will be biased, and a researcher must control for that bias to make an inference that observed differences in the outcome are a result of the treatment (Austin, 2011; Beal & Kupzyk, 2014).

Research Questions. The research question for the study is, "Does student achievement in elementary schools, middle schools, and high schools as measured by the components of CCRPI scores differ across the start-up charter schools and charter system schools?" The study will specifically answer the following guiding questions:

1. Does student achievement in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the achievement component of the 2014 CCRPI?
2. Does the student progress in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the progress component of the 2014 CCRPI?
3. Does closure of the student achievement gap in elementary schools, middle schools, and high schools differ between start-up charter schools and charter system schools as measured by the achievement gap component of the 2014 CCRPI?

***Null hypotheses*.** The following three null hypotheses were tested:

1. The means of achievement component scores are equal for start-up charter schools and charter system schools.
2. The means of progress component scores are equal for start-up charter schools and charter system schools.
3. The means of achievement gap component scores are equal for start-up charter schools and charter system schools.

***Alternative hypotheses*.** The following three are the alternative hypotheses for the study:

1. The means of achievement component scores are significantly different for start-up charter schools and charter system schools.
2. The means of progress component scores are significantly different for start-up charter schools and charter system schools.
3. The means of achievement gap component scores are significantly different for start-up charter schools and charter system schools.

Research Design. In this study, which is observational in nature, the propensity score matching (PSM) procedure was employed to select the sample by accounting for selection bias. Following the completion of the PSM procedure, the method of factorial analysis of variance (ANOVA) was performed to analyze the data obtained for this study. Including descriptive and inferential statistics, the factorial ANOVA design allows for an examination of independent and simultaneous effects of school type and school level on scores of CCRPI components.

Sample Selection. PSM allows a researcher to design and analyze an observational study in a way that demonstrates some of the characteristics of a randomized controlled trial (Austin, 2011). Specifically, the PSM presents an opportunity to effectively account for confounding bias due to observable differences between the treatment and comparison groups (Beal & Kupzyk, 2014; Dehejia & Wahba, 2002). Start-up charter schools and charter system schools possess differing values on observed characteristics, which impact the CCRPI scores. Consequently, confounding bias must be dealt with in the formation of treatment and comparison groups prior to assessment of the treatment effects. In addition, the PSM provides advantages of reduction of multidimensional covariates to a one-dimensional score, which facilitates the matching process, since units with different covariate values can have similar propensity scores (Guo & Frazer, 2014; Dehejia & Wahba, 2012). Furthermore, Imbens and Wooldridge (2009) argue that the PSM procedure is appropriate when the number of potential comparison units is much larger than the number of treatment units.

Due to the aforementioned reasons, the PSM procedure was found to be appropriate for this study, and was followed to select the sample based on the schools' observed characteristics. Such characteristics included (a) race (i.e. percent of white, black, Hispanic, and Asian students),

(b) percent of economically disadvantaged (ED) students, (c) percent of limited English proficient (LEP), (d) percent of students with disabilities (SWD), and (e) percent of gifted students. Several studies used these covariates to examine achievement differences between charter schools and TPSs (Berends, Goldring, Stein, & Cravens, 2010; Ferguson et al., 2011; Gleason, Tuttle, Gill, & Nicholas-Barrer, & Teh, 2014; Zimmer, Gill, Attridge, & Obenauf, 2014). These covariates were also used by the Georgia Department of Education to measure the effectiveness of Georgia's charter schools (CCRPI and Beating the Odds, 2014). The following steps were executed to complete the PSM procedure: (a) data instrumentation, (b) data collection, (c) calculating the propensity scores for each start-up charter school and charter system school, (d) matching based on the propensity scores, (e) balancing covariates to finalize the sample.

***Data Instrumentation*.** The College and Career Ready Performance Index (CCRPI) was first implemented in the 2011-12 school year. The CCRPI replaced the No Child Left Behind (NCLB) Adequate Yearly Progress (AYP) measurement after the U.S. Department of Education approved Georgia's application for a waiver from NCLB requirements. In an effort to better inform stakeholders about the performance of schools in a comprehensive way, the CCRPI measures schools and school districts on a 100-point scale rather than the pass/fail system previously in place under AYP. A CCRPI score consists of three main components: achievement, progress, and achievement gap. Every school can earn up to 60 points for achievement, 25 points for progress, and 15 points for achievement gap categories. In addition, schools have an opportunity to earn up to 10 bonus points toward the overall score, also called challenge points.

Assessment data are mainly used to calculate the score for each component of the CCRPI. The assessments utilized in the CCRPI calculations included End of Course Tests (EOCT), Criterion-Referenced Competency Tests (CRCT), Georgia High School Writing Test (GHSWT),

Georgia Alternate Assessment (GAA), Assessing Comprehension and Communication in English State to State for English Language Learners (ACCESS for ELLs) and Alternate ACCESS for ELLs. For every student who was enrolled in a course associated with one of the aforementioned assessments for 65% of the number of instructional days, assessment results from the test administrations during the school year and summer are included in the CCRPI calculations.

Achievement Scores. Achievement scores are generated from three areas: Content Mastery (40%), Post Elementary/Middle/High School Readiness (30%), and Graduation Rate/Predictor for High School Graduation (30%). Achievement indicators were developed for each school level separately (i.e. elementary school (K-5), middle school (6-8), and high school (9-12)) (Georgia's CCRPI Data Calculation Guide, 2015). The achievement scores indicators for each school level are further described in the Appendix C.

Progress Scores. The progress scores are based upon the Student Growth Percentiles (SGPs) for full academic year (FAY) students for each content area. The content areas considered at the high school level are 9th Grade Literature and Composition, American Literature and Composition, Coordinate Algebra, Analytic Geometry, Biology, Physical Science, US History and Economics. The content areas for elementary and middle school levels are English Language Arts, Math, Science, and Social Studies.

According to the Guide to the Georgia Student Growth Model, ranging from one to 99, SGPs are produced for individual students, and describe a student's growth in terms of how the student performed this year relative to other students with similar prior achievement from across the state. There are three SGP growth levels, low (1-34), typical (35-65), and high (66-99). Progress scores for individual schools are based on the percentage of FAY students who demonstrate typical or high growth in abovementioned assessments. The percentage is the ratio of the

total number of students who demonstrate typical or high level of growth to the total number of FAY students added all together in the abovementioned content areas. To determine the score points for individual schools, such percentage is multiplied by 25 (Georgia's CCRPI Data Calculation Guide, 2015).

Achievement Gap Scores. Achievement Gap scores are calculated based on the gap size and gap change. The scale scores of FAY students are standardized and converted to z-scores by using the state mean and state standard deviation. Gap size is the difference between the state mean of zero and the mean z score of the lowest quartile for each subject. Based on the differences found, schools are assigned a score ranging from zero to three. Table 4 displays the conversion from gap sizes to scores assigned to schools.

Table 4

Gap Size and Gap Score Conversion

Gap Size	Score
1.2 or greater	0
0.9 – 1.19	1
0.5 – 0.89	2
Less than 0.5	3

Gap change is the difference between the current year's gap size and the prior year's gap size. Table 5 displays the conversion between the gap changes and scores assigned to schools.

Table 5

Gap Change and Gap Score Conversion

Gap Change	Score
0.05 or greater	0
-0.04 – 0.04	1
-0.15 – 0.05	2
Less than -0.15	3

Once the scores for gap size and gap change are calculated for each content area, the higher of two scores is awarded to schools. Then the quotient of the sum of points earned to sum of points possible is multiplied by 15 (Georgia's CCRPI Data Calculation Guide, 2015).

Data Collection. All pieces of information and data required to create the sample and analyze the data are publicly available. The list below identifies the components of data and how they can be accessed:

- A list of charter systems and start-up charter schools that were in operation during the 2013-14 school year is available at the GADOE Charter Schools website, http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/default.aspx.
- The database for 2014 CCRPI scoring by components for all Georgia public schools is publicly available at the GADOE CCRPI website, which can be downloaded from http://www.gadoe.org/CCRPI/Pages/default.aspx.
- The database including the ethnic/racial distribution, gender distribution, participation level in the free and reduced price meal program, special education, ESOL, and gifted program for all Georgia public schools is publicly available at the Governor's Office of Student Achievement (GOSA) website, which can be downloaded from https://gosa.georgia.gov/downloadable-data. According to the GOSA website, this database is provided by the GADOE (GOSA, 2014).

Calculating the propensity scores. The central concept of propensity score is to estimate the conditional probability of a school being in the treatment group for both the treatment group and possible comparison group schools based on the observable data (Rosenbaum & Rubin, 1983). In this study, start-up charter schools constitute the treatment group while the comparison group consists of charter system schools. In calculating the propensity scores, a logistic regres-

sion model described by Rosenbaum & Rubin (1994), which is conditional on schools' observed characteristics, was used. Accordingly, the model for the propensity scores is:

$$\Pr(S_i) = \beta_0 + X_i\beta_k + \varepsilon_i \,,$$

where X is a vector of k observable characteristics of a school i predicting a probability of school i being a start-up charter school, S_i (1 = start-up charter school, 0 = charter system school). The estimated probability obtained from this model is the propensity score p for each school in the binned data, reflecting the conditional probability that the school is a start-up charter school.

To prepare the data for analysis, all start-up charter schools and charter system schools were stratified by type (i.e. start-up and charter system schools), and by the level (i.e. elementary, middle, and high school). This process created six bins to which each school was assigned and three separate data sets – one for each school level. The Georgia Department of Education's 2013 – 2014 and 2014 - 2015 Georgia Charter Schools and Charter Systems Annual Report indicated 87 start-up charter schools and 265 charter system schools in operation during the 2013-14 school year (GADOE, 2014). The list of charter systems and the number of schools in each charter systems is provided in the Appendix A.

Prior to performing the PSM procedure, schools with missing scores in any category of the Achievement, Progress, and Achievement Gap were excluded from the data set. In addition, schools offering unique grade-spans such as K-8, 6-12, or K-12 were included in multiple data sets based on the grade levels they offered. For example, KIPP South Fulton Academy offers grades Kindergarten through eight. Therefore, KIPP South Fulton Academy's CCRPI component scores for the elementary school were included in the dataset for the elementary school level and CCRPI component scores for the middle school were included in the middle school level. Upon completion of these two steps, the final datasets included 95 start-up charter schools and 256

charter system school that were considered for the PSM procedure. Table 6 displays the break down by the school level and the school type.

Table 6

The Number of Schools by School Level and School Type Included in the PSM Procedure

	Elementary School Level	Middle School Level	High School Level	Total
Start-Up Charter Schools	39	37	19	95
Charter System Schools	149	55	52	256
Total	188	92	71	351

Matching. After estimating the propensity scores for each start-up charter school and charter system school, the next step is to create a matched comparison group of charter system schools whose estimated propensity scores are similar to those of start-up charter schools (that is, the nearest neighbor matching). The nearest neighbor matching is based on a distance score ($d_{ij} = |p_i - p_j|$), calculated for each start-up charter school (*i*) with a charter system school (*j)* (Beal & Kupzyk, 2014). Next, each start-up charter school is matched to the charter system school that minimizes d_{ij}. Since larger samples help improve statistical precision (Guo & Frazer, 2015), each start-up charter school was matched with three charter system schools.

Another consideration in forming the matched sample is to decide whether matching is performed with replacement or without replacement. Since matching with replacement increases standard errors due to the design effects from weighting (Fortson, Verbitsky-Savitz, Kopa, & Gleason, 2012), matching without replacement was performed. In other words, a start-up charter school could be matched with multiple charter system schools while a charter system school was only matched with one start-up charter school. Matching without replacement also helps avoid violation of the independence-of-cases assumption (Beal & Kupzyk, 2014).

In addition, a nearest neighbor matching procedure with calipers is used in selecting the matched pairs. In the caliper matching, pairs of start-up charter schools and charter system schools are formed in a way that the difference between propensity scores is smaller than a pre-specified amount (Austin, 2011). Guo & Frazer (2014) suggests that the caliper size is set as $\varepsilon \leq .25\sigma_p$, where σ_p denotes standard deviation of the estimated propensity scores. In this study, the caliper size is set to $.15\sigma_p$ to increase close matches while still achieving the sample size needed. Both charter system schools and start-up charter schools that did not fall within the caliper match (.15 standard deviation) were excluded from the final match of schools.

A Priori Power Estimation was conducted with G*Power 3.1 software to determine the sample size (Faul, Ertfelder, Lang, & Buchner, 2007). The effect size in this study was .25, which is considered to be medium according to Cohen (1988). With an alpha = .05 and power = .80, the projected sample size needed for a 2x3 factorial ANOVA design is approximately 128. The propensity score matching procedure with .15 caliper and 1:3 matching without replacement yielded a sample of 139 schools matched, which yielded a power of .828. Therefore, the proposed sample size of 139 is more than sufficient to perform this study. The breakdown of schools included in the sample by school type and school level is presented in Table 7 as a result of the PSM procedure.

Table 7

The Number of Schools Included in the Sample for Data Analysis

	Elementary School Level	Middle School Level	High School Level	Total
Charter System Schools	44	24	25	93
Start-Up Charter Schools	23	12	11	46
Total	67	36	36	139

Balancing Covariates. Once the treatment group and comparison group have been formed, a *t*-test of the difference in group means between start-up charter schools and charter system schools is performed for each characteristic (covariates) included in the matching procedure. Covariates are considered balanced if none of the means of covariates for the treatment group are significantly different from the comparison group at a 95% confidence level. Tables 8 through 11 display the results of *t*-test of differences in group means between charter system schools and start-up charter schools for before and after the propensity score matching procedure. Even though there were statistically significant differences between group means of the charter system schools and start-up charter schools at all school levels prior to performing the propensity score matching procedure, those differences were all eliminated through the propensity school matching procedure. Therefore, all covariates are considered balanced for matched samples at all school levels. In other words, the PSM procedure yielded more similar groups, allowing for a more accurate estimate of treatment impact.

Table 8

Baseline Covariates for the Full Non-Experimental Sample and the Propensity Score Matched Sample (Percent): Elementary School Level

	Before Matching			After Matching		
	Charter System Schools (n=149)	Start-Up Charter Schools (n=39)	*p*-values of Mean Differences (2-tailed)	Charter System Schools (n=44)	Start-Up Charter Schools (n=23)	*p*-values of Mean Differences (2-tailed)
Asian	4.13 (9.05)	3.59 (9.11)	0.74	2.34 (6.26)	5.22 (11.6)	0.19
Black	27.9 (31.0)	56.0 (34.6)	0.00*	39.3 (36.4)	42.5 (31.3)	0.73
Hispanic	15.5 (16.8)	8.33 (15.6)	0.02*	13.6 (12.9)	11.5 (19.6)	0.61
White	49.0 (32.3)	28.6 (30.8)	0.00*	41.6 (33.5)	37.1 (31.6)	0.60
ED	61.6 (27.2)	59.6 (31.7)	0.69	64.7 (29.4)	57.2 (33.6)	0.35
SWD	10.8 (3.51)	6.33 (3.04)	0.00*	8.59 (2.10)	7.57 (2.79)	0.10
LEP	12.1 (14.3)	5.21 (10.7)	0.01*	9.59 (9.80)	8.13 (13.2)	0.61
Gifted	7.46 (4.87)	9.01 (7.68)	0.12	7.86 (6.12)	9.60 (7.76)	0.32

*Significant at alpha=.05.

Table 9

Baseline Covariates for the Full Non-Experimental Sample and the Propensity Score Matched Sample (Percent): Middle School Level

	Before Matching			After Matching		
	Charter System Schools (n=149)	Start-Up Charter Schools (n=39)	*p*-values of Mean Differences (2-tailed)	Charter System Schools (n=44)	Start-Up Charter Schools (n=23)	*p*-values of Mean Differences (2-tailed)
Asian	3.93 (8.18)	1.95 (3.38)	0.17	2.75 (4.73)	1.17 (1.40)	0.27
Black	27.0 (30.3)	64.5 (33.8)	0.00*	37.8 (33.6)	45.9 (36.6)	0.51
Hispanic	11.6 (10.9)	7.70 (15.1)	0.15	13.0 (13.7)	5.33 (5.19)	0.07
White	54.5 (30.6)	22.9 (29.7)	0.00*	43.8 (32.0)	44.8 (34.8)	0.93
ED	58.7 (23.1)	65.6 (29.1)	0.21	57.5 (25.3)	66.8 (27.0)	0.32
SWD	12.5 (3.62)	7.01 (3.50)	0.00*	10.2 (1.85)	10.2 (2.88)	1.00
LEP	4.11 (4.80)	3.24 (7.65)	0.50	4.46 (6.32)	1.42 (2.57)	0.12
Gifted	17.3 (11.7)	11.8 (10.0)	0.02*	16.6 (12.3)	13.4 (12.3)	0.47

*Significant at alpha=.05.

Table 10

Baseline Covariates for the Full Non-Experimental Sample and the Propensity Score Matched Sample (Percent): High School Level

	Before Matching			After Matching		
	Charter System Schools (n=149)	Start-Up Charter Schools (n=39)	*p*-values of Mean Differences (2-tailed)	Charter System Schools (n=44)	Start-Up Charter Schools (n=23)	*p*-values of Mean Differences (2-tailed)
Asian	3.37 (7.66)	4.21 (9.73)	0.70	1.20 (1.47)	4.63 (12.2)	0.17
Black	26.4 (30.1)	47.5 (34.6)	0.01*	38.6 (34.1)	45.6 (39.0)	0.59
Hispanic	10.9 (12.2)	7.42 (9.92)	0.27	9.16 (8.81)	8.64 (12.8)	0.89
White	56.3 (30.4)	38.3 (32.0)	0.03*	48.3 (31.3)	39.1 (34.0)	0.43
ED	52.7 (22.2)	60.1 (30.3)	0.27	60.8 (18.4)	54.3 (28.7)	0.42
SWD	10.9 (3.51)	8.56 (6.05)	0.05	11.0 (4.04)	10.1 (7.02)	0.62
LEP	2.69 (4.08)	1.68 (3.65)	0.35	1.72 (2.07)	1.82 (4.42)	0.93
Gifted	14.6 (11.4)	9.68 (17.1)	0.17	10.1 (7.12)	12.4 (21.2)	0.63

*Significant at alpha=.05.

Table 11

Score Means Before and After PSM: Charter System Schools vs. Start-Up Charter Schools

		Before Matching			After Matching		
		Charter System Schools	Start-Up Charter Schools	Mean Differences	Charter System Schools	Start-Up Charter Schools	Mean Differences
Elem. School Level	Achievement	48.68	45.49	3.19*	47.20	47.10	0.10
	Progress	16.16	15.39	0.77	16.36	15.58	0.78
	Achievement Gap	8.61	7.37	1.24	8.77	7.63	1.14
Middle School Level	Achievement	49.65	48.89	0.76	49.06	48.30	0.76
	Progress	16.15	15.79	0.36	16.25	14.70	1.55*
	Achievement Gap	8.40	8.69	-0.29	8.38	7.39	0.99
High School Level	Achievement	44.43	36.86	7.57*	42.27	38.01	4.26
	Progress	15.46	14.98	-0.48	15.18	14.99	0.19
	Achievement Gap	8.60	7.83	0.77	7.85	7.76	0.09

*Significant at alpha=.05.

Data Analysis. Following the completion of the PSM procedure, the method of factorial analysis of variance (ANOVA) was performed to analyze the data obtained for this study due to advantages ANOVA offers. First, it leads to a more powerful test by allowing the researcher to control the Type I error that may occur by running several independent *t* tests (Stevens, 2008). Second, the factorial ANOVA design enables the researcher to investigate whether there is an interaction effect between two independent variables. An interaction effect occurs when the effect of one independent variable on the dependent variable varies by the level of the other dependent variable (Stevens, 2008). Stated another way for the purpose of this study, the factorial ANOVA will reveal whether the effect of school level on the CCRPI scores is different for charter system schools and start-up charter schools. Finally, the factorial ANOVA design requires fewer objects compared to one-way ANOVA and *t* test designs (Stevens, 2008).

Initially, a factorial ANOVA must meet the following requirements: (a) there is only one dependent variable that is measured at a continuous level, (b) there are two independent variables where each independent variable has two or more categorical independent groups, and (c) inde-

pendence of observation must occur (Stevens, 2008). In the factorial ANOVA model for this study, the continuous dependent variable is the CCRPI scores assigned to schools, and the two independent variables with categorical groups are school type (i.e. charter system schools and start-up charter schools) and school level (i.e. elementary, middle, and high school level). Therefore, the factorial ANOVA for this study is a 2 X 3 design, which will explain the level of significance of (a) the main effect for school type, (b) the main effect for school level, and (c) the interaction effect between school type and school level. Since a CCRPI score has three components – achievement, progress, and achievement gap, the factorial ANOVA procedure is performed for each component separately.

The assumption of independence of observation is also met since there is no relationship between schools in each group or between the groups themselves. That is, each school is assigned to one group only, and the CCRPI score of a school is not impacted by the CCRPI score of another school. A factorial ANOVA design requires an additional set of assumptions to be met. These assumptions are normality in each group and homogeneity of variances. The factorial ANOVA assumes that the data in each group is normally distributed (Stevens, 2007). Table 12 illustrates the results for the normality tests as measured by the Shapiro-Wilk test.

Table 12

Shapiro-Wilk Test of Normality (p – values)

		CCPRI Components		
School Level	School Type	Achievement	Progress	Achievement Gap
Elementary Schools	Charter System Schools	.248	.001	.016
	Start-Up Charter Schools	.454	.259	.305
Middle Schools	Charter System Schools	.604	.491	.559
	Start-Up Charter Schools	.870	.447	.282
High Schools	Charter System Schools	.002	.397	.672
	Start-Up Charter Schools	.664	.060	.834

As the majority of the groups meet the normality assumption, charter system elementary schools in the areas of progress and achievement gap, and charter system high schools in the achievement area failed to meet the normality assumption according to the Table 12. However, the factorial ANOVA is robust against non-normality since the type I error rate is only slightly affected by non-normality (Glass, Peckham, & Sanders, 1972; Stevens, 2008).

Results

The factorial ANOVA procedure for this study was performed using SPSS statistical software. The results were displayed in the summary tables, which included the sum of squares, degrees of freedom, mean square, F value, and p- value in addition to the partial eta squared (η^2) computed by SPSS. For the purpose of consistency, the results are displayed with the Cohen's *d* by using the conversion methods provided by Cohen (1988), which corresponds partial eta-squared (η_p^2) = .01 (*d* = .201) to a small effect size, η_p^2 = .06 (*d* = .505) to a medium effect size, and η_p^2 = .14 (*d* = .807) to a large effect size. Cohen (1988) also argues that .80 serve as a desired power in the absence of another basis for a choice. In addition, due to the unbalanced nature of the factorial ANOVA design for this study, a Type III Sum of Squares method was used as suggested by Stevens (2007). An effect with a p- value less than .05 was considered significant.

Achievement Scores. Each elementary, middle and high school is assigned an achievement score between zero and 60. The question was whether 2014 achievement scores for charter system schools differed from those for start-up charter schools as reported by the Georgia Department of Education. A 2x3 factorial ANOVA was conducted to test the following hypotheses:

H_0: The means of achievement component scores are equal for start-up charter schools and charter system schools (H_0: $\mu_1 = \mu_2$).

H_A: The means of achievement scores are statistically significantly different for start-up charter schools and charter system schools (H_A: $\mu_1 \neq \mu_2$).

The assumption of homogeneity of variances was tenable, as assessed by Levene's test for equality of variances, $p = .138$. The main effect of school type yielded an F ratio of $F(1,133) = 1.39$, $p = .24$, $d = .201$ indicating that the mean score was not significantly higher for the charter system schools ($M = 46.4$, $SD = 7.48$) than for start-up charter schools ($M = 45.3$, $SD = 9.46$). Thus, the null hypothesis is accepted. The main effect of school level yielded an F ratio of $F(2,133) = 11.58$, $p < .05$, $d = .840$ indicating that at least one of the means is significantly different from others. The Post Hoc LSD test revealed a significantly lower mean score for the high school level ($M = 40.9$, $SD = 8.87$) than for the middle school level ($M = 48.8$, $SD = 6.52$) and the elementary school level ($M = 47.2$, $SD = 7.46$). However, the mean score is not significantly different for the elementary school level ($M = 47.2$, $SD = 7.46$) than for the middle school level ($M = 48.8$, $SD = 6.52$). The interaction effect between the school type and the school level was not significant, $F(2,133) = .78$, $p = .46$, $d = .220$.

Table 13

ANOVA Table – Achievement Scores

Dependent Variable: Achievement Scores - 2014

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1429.346[a]	5	285.869	4.890	.000
Intercept	229583.120	1	229583.120	3927.301	.000
School Type	81.482	1	81.482	1.394	.240
School Level	1354.250	2	677.125	11.583	.000
School Type * School Level	91.204	2	45.602	.780	.460
Error	7774.946	133	58.458		
Total	303144.320	139			
Corrected Total	9204.291	138			

a. R Squared = .155 (Adjusted R Squared = .124)

The results described above suggested that there was no influence of school type on achievement scores. In other words, achievement scores are not impacted by school type (i.e. start-up charter schools versus charter system schools). Additionally, the interaction effect between school type and school level is not significant, which indicates that the effect of school level on the achievement scores does not differ between charter system schools and start-up charter schools.

Table 14 shows the descriptive statistics and confidence intervals of the achievement scores for the charter system schools and start-up charter schools included in the sample. Each confidence interval indicates a range in which 95% of the samples taken from the population repeatedly would include the population mean. Stated differently, there is a 95% chance that each confidence interval contains respective true population mean. For example, the true mean of achievement scores for charter system elementary schools falls within the range of [44.9, 49.5].

Table 14

Descriptive Statistics and Confidence Intervals for Interaction Between School Type and School Level: Achievement Scores

	Charter System Schools		Start-Up Charter Schools	
School Level	*M* (*SD*)	95% CI	*M* (*SD*)	95% CI
Elementary School Level	47.2 (7.39)	[44.9, 49.5]	47.1 (7.77)	[43.9, 50.2]
Middle School Level	49.1 (6.40)	[45.9, 52.1]	48.3 (7.01)	[43.9, 52.7]
High School Level	42.3 (7.15)	[39.2, 45.3]	38.0 (11.78)	[33.4, 42.6]

Progress Scores. Each school is assigned a progress score between zero and 25. The question was whether 2014 progress scores for charter system schools differed from those for start-up charter schools as reported by the Georgia Department of Education. A 2x3 factorial ANOVA was conducted to test the following hypotheses:

H_0: The means of progress scores are equal for start-up charter schools and charter system schools (H_0: $\mu_1 = \mu_2$).

H_A: The means of progress scores are statistically significantly different for start-up charter schools and charter system schools (H_A: $\mu_1 \neq \mu_2$).

The assumption of homogeneity of variances was tenable, as measured by Levene's test for equality of variances, $p = .27$. Table 3 shows the result of the factorial ANOVA for the progress component of the CCRPI. Neither the school type, $F(1,133) = 3.83$, $p = .052$, $d = .340$, nor the school level, $F(2,133) = 1.63$, $p = .20$, $d = .314$, had a statistically significantly impact on the progress scores. Consequently, the null hypothesis is accepted. The interaction effect between the school type and the school level was also not significant, $F(2,133) = .71$, $p = .49$, $d = .211$.

Table 15

ANOVA Table – Progress Scores

Dependent Variable: Progress - 2014

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	50.692[a]	5	10.138	1.971	.087
Intercept	26884.3	1	26884.3	5226.79	.000
School Type	19.713	1	19.713	3.833	.052
School Level	16.749	2	8.374	1.628	.200
School Type * School Level	7.321	2	3.661	.712	.493
Error	684.095	133	5.144		
Total	35204.5	139			
Corrected Total	734.787	138			

a. R Squared = .069 (Adjusted R Squared = .034)

The results illustrated above indicates that there was no influence of school type on progress scores. Stated another way, progress scores are not impacted by being a start-up charter school or a charter system school. Additionally, the interaction effect between school type and school level is not significant, which suggests that the effect of school level on the progress

scores is not different for charter system schools and start-up charter schools. Table 16 shows the descriptive statistics and confidence intervals of the achievement scores for the charter system schools and start-up charter schools included in the sample.

Table 16

Descriptive Statistics and Confidence Intervals for Interaction Between School Type and School Level: Progress Scores

	Charter System Schools		Start-Up Charter Schools	
School Level	*M* (*SD*)	95% CI	*M* (*SD*)	95% CI
Elementary School Level	16.4 (2.65)	[15.7, 17.0]	15.6 (2.15)	[14.6, 16.5]
Middle School Level	16.3 (1.65)	[15.3, 17.2]	14.7 (1.95)	[13.4, 16.0]
High School Level	15.2 (1.89)	[14.3, 16.1]	15.0 (3.00)	[13.6, 16.3]

Achievement Gap Scores. Each school is assigned an achievement gap score between zero and 15. The question was whether 2014 achievement gap scores for charter system schools differed from those for start-up charter schools as reported by the Georgia Department of Education. A 2x3 factorial ANOVA was conducted to test the following hypotheses:

H_0: The means of achievement gap scores are equal for start-up charter schools and charter system schools (H_0: $\mu_1 = \mu_2$).

H_A: The means of achievement gap scores are statistically significantly different for start-up charter schools and charter system schools (H_A: $\mu_1 \neq \mu_2$).

The assumption of homogeneity of variances was tenable, as assessed by Levene's test for equality of variances, $p = .52$. Table 5 shows the result of the factorial ANOVA for the Achievement Gap component of the CCRPI. The factorial ANOVA revealed no significant main effect for school type ($F(1,133) = .92$, $p = .34$, $d = .168$), indicating that the mean score for overall charter system schools ($M = 8.42$, $SD = 4.07$) is not significantly higher than that of overall start-up charter schools ($M = 7.60$, $SD = 3.93$). Consequently, the null hypothesis is accepted.

The main effect for school level is also not significant ($F(2,133) = .12$, $p = .89$, $d = .090$). The interaction effect between the school type and the school level is not significant ($F(2,133) = .17$, $p = .84$, $d = .110$).

Table 17

ANOVA Table – Achievement Gap Scores

Dependent Variable: Achievement Gap - 2014

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	35.328[a]	5	7.066	.425	.830
Intercept	7086.24	1	7086.24	426.658	.000
School Type	15.343	1	15.343	.924	.338
School Level	4.025	2	2.012	.121	.886
School Type * School Level	5.756	2	2.878	.173	.841
Error	2208.96	133	16.609		
Total	11476.2	139			
Corrected Total	2244.29	138			

a. R Squared = .016 (Adjusted R Squared = -.021)

The results explained above showed that there was no influence of school type on achievement gap scores. Put differently, achievement gap scores are not linked to school type – whether it is a start-up charter school or a charter system school. Also, the interaction effect between school type and school level is not significant, which shows that the effect of school level on the achievement gap scores is not different for charter system schools and start-up charter schools. Table 18 displays the descriptive statistics with the confidence intervals of the achievement gap scores by school type for schools included in the sample. A 95% confidence interval indicates that a reader can be 95% sure that the interval calculated contains the true mean of the respective population.

Table 18

Descriptive Statistics and Confidence Intervals for Interaction Between School Type and School Level: Achievement Gap Scores

	Charter System Schools		Start-Up Charter Schools	
School Level	*M* (*SD*)	95% CI	*M* (*SD*)	95% CI
Elementary School Level	8.77 (4.42)	[7.56, 9.99]	7.63 (3.72)	[5.95, 9.31]
Middle School Level	8.38 (4.06)	[7.73, 10.02]	7.39 (4.49)	[5.07, 9.72]
High School Level	7.85 (3.50)	[6.24, 9.46]	7.76 (4.09)	[5.32, 10.19]

Discussion

The primary purpose of this study was to investigate the extent to which Georgia start-up charter schools and charter system schools fulfill their legislative obligations of increasing student achievement. This research assesses the impact of school type (charter system schools versus start-up charter schools) on student achievement as measured by the achievement, progress, and achievement gap scores in 2014 CCRPI calculation. A factorial ANOVA procedure was performed to find out whether or not significant differences existed between the mean scores for charter system schools and start-up charter schools. Results from the factorial ANOVA procedures did not reveal a statistically significant main effect for school type and interaction between school type and school level for any of the achievement, progress, and achievement gap scores. Consequently, the research failed to reject the null hypotheses that the means for charter system schools and start-up charter schools are equal.

This is the first study examining student achievement differences between charter system schools and start-up charter schools in Georgia. Since charter system schools were previously traditional public schools before becoming charter system schools, the literature review conducted on the student achievement differences mainly is concerned with the effectiveness of charter schools compared with that of TPSs. Findings from this study are somewhat consistent with

some of the earlier studies investigating student achievement differences between charter schools and traditional public schools by using PSM to select the sample.

Berends, Goldring, Stein, and Crevens (2010) conducted PSM at the student level to investigate achievement gains for students who attend charter schools compared with matched students in traditional public schools. Overall, the study did not reveal a statistically significant difference in the achievement gain between charter school students and their counterparts in TPSs. Furthermore, the charter school impact was not significant regardless of "enabling organizational conditions" and increased emphasis on student achievement. Similarly, another PSM study estimating the effects of charter management organizations (CMOs) on test score gains, Ferguson et al. (2011) reported positive but insignificant charter school impact in middle school level math and reading even after three years of attendance at charter schools. As far as the overall impact of charter schools in math, only 11 out of 22 charter schools examined produced significantly positive impacts, four charter schools performed similarly, and seven performed significantly worse. Similarly, ten charter schools out of 22 examined posted a significantly positive impact in reading, six charter schools yielded similar performance, and the other six performed significantly worse than their matched TPSs.

Contrary to the studies that yielded insignificant differences, a PSM study that assessed effectiveness of Milwaukee's start-up charter schools in promoting student achievement reported positive charter school impact on student achievement growth in both math and reading for students grades three through eighth. The study further discovered that the charter school impact becomes sizable starting the third year of a student's attendance at a charter school (Witte, Wolf, & Carlson, 2011). Furthermore, in a comprehensive meta-analysis examining estimates of charter school studies, Betts & Tang reported a high rate of positive and significant impact of charter

schools as reported by PSM studies. Particularly, 17 estimates out of 30 in reading and 23 estimates out of 30 in math computed in PSM studies were positive and significant. Among the same studies, 12 estimates in reading and six estimates in math were insignificant.

A possible reason for a failure to detect a statistically significant difference between the means for charter system schools and start-up charter schools, if any, could be attributed to the lack of matches within the caliper used in the PSM procedure, which resulted in a reduction of power. The sample size used for the study was 139, which produced a power of .828 based on the effect size of .25. The same sample size would have produced a power of .642 based on the effect size of .20. With an effect size of .20 and a power of .80, the required sample size would be 159. Since the larger sample size, the more power to detect the differences, the same study may be repeated in the future with the inclusion of more school systems becoming charter systems and more start-up charter schools in operation. In this study all 28 charter systems with 265 schools and all 87 start-up charter schools in operation during the school year 2013-14 as reported by the Georgia Department of Education were considered for the PSM procedure to select the sample.

Implications

This study contributes to the existing literature, the policy, and political dialog by examining achievement differences between start-up charter schools and charter system schools. As policymakers need guidance from the research community, the findings from this study will have direct policy and practical implications in Georgia's current educational landscape and the nation. The first implication of this study is to inform district and state officials about charter schools in order that that they make educated decisions to authorize and/or renew existing charter school contracts. The legislative intent of the Georgia Charter School Law is "to increase student

achievement through academic and organizational innovation . . . to utilize the flexibility of a performance-based contract called a charter" (Georgia Charter School Act, 1998, p. 1). Guided by this legislative intent, the Georgia Department of Education requires charter schools to have equal or higher CCRPI scores than their districts and the state starting their second year of operation as a condition to renew the charter contract (Georgia Charter School Application, 2014). This study shows that start-up charter schools perform at a similar level to charter system schools. Therefore, results from this study do not strongly support the idea of mushrooming start-up charter schools in charter systems. It also urges charter system leaders to make strategic decisions about approving and renewing charter schools based on a comprehensive assessment of the district's needs.

The second implication is in the area of legislation. The fact that start-up charter schools already perform at a similar level to charter system schools may indicate a potential to perform at a higher level provided that the necessary legislative landscape regulating charter schools is in place. Therefore, policymakers and charter authorizers, which are in charge of conducting oversight on charter schools' operations, should identify the common areas of improvement among charter schools that impede a more effective operation of the schools. Subsequently, additional regulations to existing policies are needed to ensure that effective practices must be put in place, which will help yield higher student achievement. An example of such policies is the training requirements for charter school governing boards, which aims to improve governance practices. Lake (2007) indicates common issues within charter school governing boards, which includes "identifying and recruiting board members, delineating their roles and responsibilities, providing training and development, and setting structure for decision making" (p.23). Lake also offers mandatory board training as a solution to these challenges. In support of Lake (2007), Gewertz

(2008) indicates the absence of legislation that requires charter school boards to undertake mandatory training to ensure proper functioning of the board. Unfortunately, it must be noted that the bill addressing the training requirements for the members of the governing boards of charter schools in Georgia were not proposed until 2014. Eventually, the Georgia General Assembly amended the O.C.G.A. 20-2-2072 through the House Bill 405 in its 2013-14 legislative session requiring initial training for the boards of newly established charter schools and annual training thereafter.

Finally, this study pertains to the impact of school type on student achievement as measured by the CCRPI scores, which only measures particular items. Many other factors such as teacher quality and quality of instruction are also correlated with a broad range of student outcomes. Chetty, Friedman, and Rockoff (2014) found that high-efficient teachers increased the probability of college attendance and the quality of colleges student attend. With regards to the instructional quality, a variety of tools involving particular observable characteristics were used by researchers to capture the impact of such characteristics on student achievement. Examples include studies finding a positive relationship between test score gains and teachers' prior education and coursework in the field they teach (Telese, 2012), experience in classroom settings (Chetty et al., 2011), and content knowledge (Campbell et al., 2014). In contrast, an analysis of estimates from studies reported that possession of a graduate degree was not positively correlated with increased student achievement, with 86% being statistically not significant (Jacob, 2012).

Limitations and Future Considerations

There are a few limitations associated with the study. First, the variables used in the study are not exhaustive. There can be other variables excluded from the study, which can impact the sample selection and results from data analysis. In addition, the PSM procedure cannot control

unobservable variables that may also impact the final sample selected to be analyzed. Therefore, the PSM procedure is subject to selection bias, and the best possible matches may not be obtained (Guo & Frazer, 2014). For example, start-up charter schools and charter system schools in Georgia differ in governance and operational practices, including but not limited to school level autonomy, student admission, and funding mechanism (Georgia Charter School Act, 1998). Because it is beyond the scope of this study to measure the impact of these factors on student achievement and eventually on CCRPI scores, the extent to which the PSM procedure in this study controls for bias and yield reliable estimates of propensity scores is still a concern.

Second, sampling limitations exist due to schools' missing scores from one or more CCRPI components. These schools were not considered for the PSM procedure. Inclusion of these schools with complete data could have resulted in a larger dataset, which could generate more accurate results with a higher power. Third, this study uses 2014 CCRPI scores, which provides a snapshot of schools' performance. Longitudinal studies could provide meaningful insights in terms of school performance trends over time. Finally, this study does not make any distinction among start-up charter schools by the authorizer type. Georgia Charter School Commission and school districts are authorized to approve charter schools in Georgia. A further study is needed to examine achievement differences by charter school type as compared to TPSs and charter system schools.

Conclusions

Charter schools exist for a variety of reasons across the nation depending upon the unique needs of students, parents, districts, and states. Since start-up charter schools do not significantly underperform charter-system schools, results from this study provide evidence that justifies the existence of start-up charter schools. For example, from the perspective of students and parents,

charter schools with small enrollments provide an opportunity to meet the unique needs of particular students and parents by offering smaller classes and a smaller student-teacher ratio.

Similarly, districts and states can benefit from charter schools' unique ability to increase student achievement for particular groups of students. Using the state test data from 27 states, Cremata et al. (2013) reported positive charter school impact on math and reading test scores for African American students, students in poverty, English language learners, and special education students. In contrast, charter schools performed worse than traditional public school students in educating Hispanic and white students as measured by the reading and math scores on the state exams.

Beside the student achievement in charter schools, Gleason et al. (2010) also investigated the impact of charter schools on student behavior, student and parent satisfaction, and absences. Gleason et al. (2010) reported increased attendance, improved student behavior, and increased student and parent satisfaction in studied charter schools. Specifically, lottery winners who attended charter schools were 12 points out of 100 more likely to report satisfaction than were lottery losers. With regards to the parents, parents of lottery winners were 33 points more likely to rate their child's school as "excellent" than were parents of lottery losers (Gleason et al., 2010).

Charter schools also serve as laboratory schools where innovative, non-traditional instructional and organizational practices can be implemented as a result of increased autonomy and flexibility granted to and exercised by charter schools. This practice creates an opportunity for state and district officials to test and explore what works best to meet the needs of students. Effective practices can then be replicated in traditional public school settings. Charter schools also provide opportunities for researchers and policymakers to investigate the efficiency of existing local, state, and national policies in education. Depending upon the state's charter school law

and charter schools' contracts with their authorizers, examples of areas where charter schools can deviate from the district and state policies include but are not limited to school governance, curriculum and instruction, teacher and staff credentials and certification, human resources, facility, fiscal and financial management, student discipline, and student promotion and retention. With all these opportunities in consideration, a charter school's existence can be justified as long as it generates at least the same or a similar level of student achievement to their neighboring TPSs.

Finally, school districts must consider whether to approve and renew of a charter school by factoring in cost-effectiveness. According to the Charter School Funding Report commissioned by Ball State University, Georgia start-up charter schools earned 10.2% less funding per student as compared to district schools during the fiscal year 2007: to be exact, each Georgia start-up charter school earned $8,880 versus $9,892 that each traditional public school earned in average (Batdorff, Maloney, May, Doyle, & Hassel, 2010). While it is a judgment call and a matter of cost-benefit analysis, district and state officials can take one of two possible approaches in approving a new charter school and allowing continued operation of an existing charter school that is performing at a similar level to TPSs: (a) If the existence of a charter school jeopardizes the district's financial health, the district can consider not renewing the charter school's contract, and (b) if the district can absorb the cost incurred from the charter school's operation without sacrificing funding for other areas of the district's operation, it is worth keeping the charter school's doors open due to the abovementioned reasons. Rather than a one-sided approach, district and state officials must take a holistic approach to making decisions about the options they offer for all stakeholders.

References

Abdulkadiroglu, A., Angrist, J. D., Dynarski, S. M., Kane, T. J., & Pathak, P. A. (2011). Accountability and Flexibility in Public Schools: Evidence from Boston's Charters And Pilots. *Quarterly Journal Of Economics*, *126*(2), 699-748.

Audi, R. (2011). *Epistemology: A Contemporary Introduction to the Theory of Knowledge*. New York: Routledge.

Austin, P. C. (2011). An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behavioral Research*, *46*(3), 399-424.

Batdorff, M., Maloney, L., May, J., Doyle, D., & Hassel, B. (2010). Charter school funding: Inequity persists. *Ball State University*, *2010*.

Beal, S. J., & Kupzyk, K. A. (2014). An Introduction to Propensity Scores: What, When, and How. *Journal Of Early Adolescence*, *34*(1), 66-92. doi:10.1177/0272431613503215

Berends, M., Goldring, E., Stein, M., & Cravens, X. (2010). Instructional Conditions in Charter Schools and Students' Mathematics Achievement Gains. *American Journal Of Education*, *116*(3), 303-335.

Berends, M. (2015). Sociology and School Choice: What We Know After Two Decades of Charter Schools. *Annual Review of Sociology*, *41*(1), 159-180. doi:10.1146/annurev-soc-073014-112340

Betts, J. R., Tang, Y., & University of Washington, C. (2011). The Effect of Charter Schools on Student Achievement: A Meta-Analysis of the Literature. *Center On Reinventing Public Education, University Of Washington*,

Blatchford, P., Bassett, P., & Brown, P. (2011). Examining the Effect of Class Size on Classroom Engagement and Teacher-Pupil Interaction: Differences in Relation to Pupil Prior Attainment and Primary vs. Secondary Schools. *Learning And Instruction, 21*(6), 715-730.

Campbell, P. F., Nishio, M., Smith, T. M., Clark, L. M., Conant, D. L., Rust, A. H., & ... Choi, Y. (2014). The Relationship Between Teachers' Mathematical Content and Pedagogical Knowledge, Teachers' Perceptions, and Student Achievement. *Journal For Research In Mathematics Education*, *45*(4), 419-459.

Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schazenbach, D. W., & Yagan, D. (2011). How does your kindergarten classroom affect your earnings? Evidence from Project Star. *Quarterly Journal of Economics, 126*(4), 1593–1660.

Chetty, R., Friedman, J., & Rockoff, J. (2014). Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood. *American Economic Review, 104*(9), 2633-2679.

Chubb, J. E., & Moe, T. M. (1990). *Politics, markets, and America's schools.* Washington, D.C.: Brookings Institution.

Chudowsky, N., Ginsburg, A., & National Assessment Governing, B. (2012). Who Attends Charter Schools and How Are Those Students Doing? Exploratory Analysis of NAEP Data. *National Assessment Governing Board*,

Cohen, J. (1988). *Statistical power analysis for behavioral sciences (2nd ed.).* New York: Academic Press.

College and Career Ready Index and Beating the Odds. (2014). Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/default.aspx.

Crane, E. W., Huang, M., Barrat, V. X., & Regional Educational Laboratory West. (2011). Comparing Achievement Trends in Reading and Math across Arizona Public School Student Subgroups. REL Technical Brief. REL 2012-No. 019. *Regional Educational Laboratory West*,

Cremata, E., Davis, D., Dickey, K., Lawyer, K., Negassi, Y., Raymond, M., & Woodworth, J. (2013). National charter school study. *Center for Research on Education Outcomes, Stanford*.

Creswell, J. (2014). Research design: qualitative, quantitative, and mixed method approaches, Thousand Oaks, CA: Sage Publications.

Dehejia, R. H., & Wahba, S. (2002). Propensity Score-Matching Methods for Non-experimental Causal Studies. *The Review of Economics and Statistics*, (1). 151.

Davis, D. H., & Raymond, M. E. (2012). Choices for studying choice: Assessing charter school effectiveness using two quasi-experimental methods. *Economics Of Education Review*, *31*(Special Issue: Charter Schools), 225-236. doi:10.1016/j.econedurev.2011.08.012

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Fortson, K., Verbitsky-Savitz, N., Kopa, E., Gleason, P., & National Center for Education Evaluation and Regional Assistance. (2012). Using an Experimental Evaluation of Charter Schools to Test Whether Non-Experimental Comparison Group Methods Can Replicate Experimental Impact Estimates. NCEE 2012-4019. *National Center For Education Evaluation And Regional Assistance*,

Furgeson, J., Gill, B., Haimson, J., Killewald, A., McCullough, M., Nichols-Barrer, I., & ... Mathematica Policy Research, I. (2011). The National Study of Charter Management Organization (CMO) Effectiveness. Charter-School Management Organizations: Diverse Strategies and Diverse Student Impacts. *Mathematica Policy Research, Inc*,

Georgia's CCRPI Data Calculation Guide. (2015). Retrieved from http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Pages/default.aspx.

Georgia Charter School Application. (2014). Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/Charter-Petition-Application.aspx.

Georgia Charter School Act of 1998. S. 70, 1997-98 Gen. Assem., Reg. Sess. (Ga. 1998)

Georgia Charter System Act of 2007. S. 39, 2006-07 Gen. Assem., Reg. Sess. (Ga. 2007)

Gewertz, C. (2008). Many Charter Boards Seen as Unprepared. *Education Week*, *28*(3), S11-S13.

Glass, G. V., Peckham, P. D., & Sanders, J. R. (1972). Consequences of Failure to Meet Assumptions Underlying the Fixed Effects Analyses of Variance and Covariance. *Review of Educational Research*, (3). 237.

Gleason, P. M., Tuttle, C. C., Gill, B., Nichols-Barrer, I., & Teh, B. (2014). Do KIPP Schools Boost Student Achievement?. *Education Finance and Policy*, *9*(1), 36-58.

Goldring, E., & Cravens, X. (2008). Teachers' academic focus on learning in charter and traditional public schools. In M. Berends, M. G. Springer, & H. J. Walberg (Eds.), *Charter school outcomes* (pp. 39-60). New York: Taylor & Francis.

Goff, P., Mavrogordato, M., & Goldring, E. (2012). Instructional Leadership in Charter Schools: Is There an Organizational Effect or Are Leadership Practices the Result of Faculty

Characteristics and Preferences?. *Leadership & Policy In Schools, 11*(1), 1-25. doi:10.1080/15700763.2011.611923

Guide to the Georgia Student Growth Model. (2015). Retrieved from http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Documents/SGP%20Guide.pdf

Guo, S., & Fraser, M. W. (2014). *Propensity score analysis: Statistical methods and applications* (2nd ed.). Los Angeles, CA: Sage Publications.

Huerta, L. A., & Zuckerman, A. (2009). An Institutional Theory Analysis of Charter Schools: Addressing Institutional Challenges to Scale. *Peabody Journal Of Education*, *84*(3), 414-431.

Imbens, G. W., & Wooldridge, J. M. (2009). Recent Developments in the Econometrics of Program Evaluation. *Journal Of Economic Literature, 47*(1), 5-86. doi:10.1257/jel.47.1.5

Jacob, A. (2012). Examining the Relationship between Student Achievement and Observable Teacher Characteristics: Implications for School Leaders. *International Journal Of Educational Leadership Preparation, 7*(3),

Kamienski, A. a. (2011). Competition: Charter and Public Elementary Schools in Chicago. *Journal Of School Choice, 5*(2), 161-181. doi:10.1080/15582159.2011.576573

Lake, R. J., & University of Washington, C. (2007). Hopes, Fears, & Reality: A Balanced Look at American Charter Schools in 2007. *Center On Reinventing Public Education, University Of Washington*,

Merritt, E. G., Rimm-Kaufman, S. E., Berry, R. Q., Walkowiak, T. A., Larsen, R. A., & Society for Research on Educational Effectiveness. (2011). The Contribution of Mathematics In-

structional Quality and Class Size to Student Achievement for Third Grade Students from Low Income Families. *Society For Research On Educational Effectiveness*,

Ni, Y., & Arsen, D. (2011). School Choice Participation Rates: Which Districts are Pressured?. *Education Policy Analysis Archives, 19*(29), 1-26.

Opfer, V. (2001). Charter Schools and the Panoptic Effect of Accountability. *Education & Urban Society*, *33*(2), 201.

Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, (1). 41.

Saiger, A. (2013). Charter Schools, the Establishment Clause, and the Neoliberal Turn In Public Education. *Cardozo Law Review*, *34*(4), 1163-1225.

Schwartz, R. M., Schmitt, M. C., & Lose, M. K. (2012). Effects of Teacher-Student Ratio in Response to Intervention Approaches. *Elementary School Journal*, *112*(4), 547-567.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Shin, Y., & Raudenbush, S. W. (2011). The Causal Effect of Class Size on Academic Achievement: Multivariate Instrumental Variable Estimators with Data Missing at Random. *Journal Of Educational And Behavioral Statistics*, *36*(2), 154-185.

Stevens, J. (2008). *Intermediate statistics: A modern approach*. New York: Routledge.

Telese, J. A. (2012). Middle School Mathematics Teachers' Professional Development and Student Achievement. *Journal of Educational Research*, *105*(2), 102-111.

Tuttle, C. C., Gill, B., Gleason, P., Knechtel, V., Nichols-Barrer, I., Resch, A., & Mathematica Policy Research, I. (2013). KIPP Middle Schools: Impacts on Achievement and Other Outcomes. Final Report. *Mathematica Policy Research, Inc*,

Tuttle, C. C., Gleason, P., & Clark, M. (2012). Using lotteries to evaluate schools of choice: Evidence from a National Study of Charter Schools. *Economics of Education Review*, 31, 237–253.

Zimmer, R., Gill, B., Booker, K., Lavertu, S., & Witte, J. (2012). Examining Charter Student Achievement Effects across Seven States. *Economics Of Education Review*, *31*(2), 213-224.

Zimmer, R., Gill, B., Attridge, J., & Obenauf, K. (2014). Charter School Authorizers and Student Achievement. *Education Finance and Policy*, *9*(1), 59-85.

APPENDICES

Appendix A – Operational Definitions

The following definitions are extracted from § Official Code of Georgia 20-2-2062.

Charter – a performance based contract between a local board and a charter petitioner, the terms of which are approved by the local board and by the state board in the case of a local charter school, between the state board and a charter petitioner, the terms of which are approved by the state board in the case of a state chartered special school, or between a local board and the state board, the terms of which are approved by the state board in the case of a charter system.

Charter petitioner - a local school, local board of education, private individual, private organization, or state or local public entity that submits a petition for a charter.

Charter school – a public school that is operating under the terms of a charter.

Charter system – a local school system that is operating under the terms of a charter pursuant to O.C.G.A. §20-2-2063.2.

Conversion charter school – a charter school that existed as a traditional public school prior to becoming a charter school.

Governing board – a school level decision-making body at a charter school that is a party to the charter contract and is responsible for ensuring the implementation and compliance of the contract.

Governing council - a school-level council of parents, teachers, administrators, and others at a system charter school who are involved in school-level governance within a charter system.

Local board – a county or independent board of education exercising control and management of o a local system pursuant to Article VIII, Section V, Paragraph II of Georgia Constitution.

Start-up charter schools – a charter school that did not exist as a local school prior to becoming a charter school.

Charter system school – a school within a charter system.

Appendix B – List of Approved Charter Systems

The list of charter systems and the number of schools in each system are provided by the Georgia Department of Education in its District Flexibility and Charter Schools Division 2014-15 Annual Report.

Charter System	Number of Schools
Banks County	4
Barrow County Schools	15
Calhoun City Schools	4
Carrollton City Schools	4
Cartersville City Schools	4
City Schools of Decatur	8
Coffee County	12
Commerce City Schools	4
Dawson County Schools	7
Dublin City Schools	6
Floyd County Schools	19
Fulton County Schools	88
Gainesville City Schools	8
Gilmer County Schools	6
Glascock County Schools	1
Gordon County Schools	11
Haralson County	6
Hart County Schools	5
Lumpkin County School	5
Madison County Schools	7
Marietta City Schools	10
Morgan County Schools	3
Putnam County Schools	4
Stephens County Schools	6
Union County Schools	5
Vidalia City Schools	4
Warren County Schools	3
White County Schools	6

Appendix C – Achievement Score Indicators

The following indicators are listed in the GADOE's 2014 CCRPI Indicator List, which may be accessed at http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Documents/2014%20CCRPI%20Indicators%2004.01.14%20v2.pdf.

2014 College and Career Ready Performance Index, High School, Grades 9 - 12

- Content Mastery

1. Percent of students scoring at Meets or Exceeds on the Ninth Grade Literature End of Course Test (required participation rate ≥ 95%)
2. Percent of students scoring at Meets or Exceeds on the American Literature End of Course Test (required participation rate ≥ 95%)
3. Percent of students scoring at Meets or Exceeds on the Coordinate Algebra (required participation rate ≥ 95%)
4. Percent of students scoring at Meets or Exceeds on the Analytic Geometry/GPS Geometry/Mathematics II End of Course Test (required participation rate ≥ 95%)
5. Percent of students scoring at Meets or Exceeds on the Physical Science End of Course Test (required participation rate ≥ 95%)
6. Percent of students scoring at Meets or Exceeds on the Biology End of Course Test (required participation rate ≥ 95%)
7. Percent of students scoring at Meets or Exceeds on the US History End of Course Test (required participation rate ≥ 95%)
8. Percent of students scoring at Meets or Exceeds on the Economics End of Course Test (required participation rate ≥ 95%)

- Post High School Readiness

9. Percent of graduates completing a CTAE pathway, or an advanced academic pathway, or a fine arts pathway, or a world language pathway within their program of study
10. Percent of CTAE Pathway Completers earning a national industry recognized credential, or an IB Career-Related Certificate, or a passing score on a GaDOE recognized end of

pathway assessment (operational in 2014-2015)

11. Percent of graduates entering TCSG/USG not requiring remediation or learning support courses; or scoring program ready on the Compass; or scoring at least 22 out of 36 on the composite ACT; or scoring at least 1550 out of 2400 on the combined SAT; or scoring 3 or higher on two or more AP exams; or scoring 4 or higher on two or more IB exams

12. Percent of graduates earning high school credit(s) for accelerated enrollment via ACCEL, Dual HOPE Grant, Move On When Ready, Early College, Gateway to College, Advanced Placement courses, or International Baccalaureate courses

13. Percent of students scoring at Meets or Exceeds on the Georgia High School Writing Test

14. Percent of students achieving a Lexile measure greater than or equal to 1275 on the American Literature EOCT

15. Percent of EOCT assessments scoring at the Exceeds level

16. Student Attendance Rate (%)

- Graduation Rate

17. 4-Year Cohort Graduation Rate (%)

18. 5-Year Extended Cohort Graduation Rate (%)

2014 College and Career Ready Performance Index, Middle School, Grades 6 - 8

- Content Mastery

1. Percent of students scoring at Meets or Exceeds in ELA (required participation rate ≥ 95%)

2. Percent of students scoring at Meets or Exceeds in reading (required participation rate ≥ 95%)

3. Percent of students scoring at Meets or Exceeds in mathematics (required participation rate ≥ 95%)

4. Percent of students scoring at Meets or Exceeds in science (required participation rate ≥ 95%)

5. Percent of students scoring at Meets or Exceeds in social studies (required participation

rate ≥ 95%)

- Post Middle School Readiness

6. Percent of English Learners with positive movement from one Performance Band to a higher Performance Band as measured by the ACCESS for ELLs

7. Percent of Students With Disabilities served in general education environments greater than 80% of the school day

8. Percent of students scoring at Meets or Exceeds on the Grade Eight Writing Assessment (required participation rate ≥ 95%)

9. Percent of students in grade 8 achieving a Lexile measure equal to or greater than 1050

10. Percent of students completing 2 or more state defined career related assessments/inventories and a state defined Individual Graduation Plan by the end of grade 8

11. Student Attendance Rate (%)

- Predictor for High School Graduation

12. Percent of students in grade eight passing at least four courses in core content areas (ELA, mathematics, science, social studies) and scoring at Meets or Exceeds on all CRCT and required EOCT

13. Percent of CRCT assessments scoring at the Exceeds level (ELA, reading, mathematics, science, social studies)

2014 College and Career Ready Performance Index, Elementary School, Grades K - 5

- Content Mastery

1. Percent of students scoring at Meets or Exceeds in ELA (required participation rate ≥ 95%)

2. Percent of students scoring at Meets or Exceeds in reading (required participation rate ≥ 95%)

3. Percent of students scoring at Meets or Exceeds in mathematics (required participation rate ≥ 95%)

4. Percent of students scoring at Meets or Exceeds in science (required participation rate ≥ 95%)

5. Percent of students scoring at Meets or Exceeds in social studies (required participation

rate ≥ 95%)

- Post Elementary School Readiness

6. Percent of English Learners with positive movement from one Performance Band to a higher Performance Band as measured by the ACCESS for ELLs

7. Percent of Students With Disabilities served in general education environments greater than 80% of the school day

8. Percent of students scoring Meets or Exceeds on the Grade Five Writing Assessment (required participation rate ≥ 95%)

9. Percent of students in grade 3 achieving a Lexile measure equal to or greater than 650

10. Percent of students in grade 5 achieving a Lexile measure equal to or greater than 850

11. Percent of students in grades 1-5 completing the identified number of grade specific career awareness lessons aligned to Georgia's 17 Career Clusters

12. Student Attendance Rate (%)

- Predictor for High School Graduation

13. Percent of students in Grade 5 passing at least 5 courses in core content areas (ELA, reading, mathematics, science, social studies) and scoring at Meets or Exceeds on all CRCT

14. Percent of CRCT assessments scoring at the Exceeds level (ELA, reading, mathematics, science, social studies)