

DIFFERENCES IN GRADE 4 MATHEMATICS PERFORMANCE BETWEEN
TEXAS CHARTER ELEMENTARY SCHOOLS AND TRADITIONAL
ELEMENTARY SCHOOLS AS A FUNCTION OF ETHNICITY/RACE AND BY
POVERTY

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DEDICATION

This dissertation is dedicated to my family, without whom this could never have been possible. To my wonderfully supportive husband, Jeremy, and my amazing children, Caden, Karis, and Karlie, I wouldn't have been able to complete this journey without your support and encouragement. Each of them stepped up to take over the meals, dinners, and taxiing while I was in class or isolated in the house to write. I thank them for their constant inspiration, relentless reassurance, and unceasing love. I hope that I support them in all of their endeavors like they have supported me in this one.

ABSTRACT

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Purpose

The purpose of this journal-ready dissertation was to determine the degree to which differences were present in mathematics achievement between Grade 4 students enrolled in charter elementary schools and Grade 4 students enrolled in traditional elementary schools. In the first article, the extent to which differences existed in mathematics achievement between all Grade 4 students enrolled in charter elementary schools and traditional elementary schools in Texas was determined. In the second study, the degree to which differences were present in mathematics achievement between Grade 4 Black and Hispanic students enrolled in charter elementary schools and Black and Hispanic students enrolled in traditional elementary schools was addressed. In the third study, the extent to which differences were present in mathematics achievement in Grade 4 students who were economically disadvantaged and who were enrolled in charter elementary schools and students who were economically disadvantaged and who were enrolled in traditional elementary schools was examined. Specifically, the extent to which the differences in passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) were present in Grade 4 STAAR Mathematics between students enrolled in charter elementary schools and students enrolled in traditional elementary schools was determined. Additionally, three years of data were analyzed to determine if a trend in the levels of passing standards (i.e., Approaches Grade Level,

Meets Grade Level, and Masters Grade Level) in each school-type (i.e., charter and traditional) was present.

Method

A causal-comparative research design was present for all three studies. Archival data were collected for the 2015-2016, 2016-2017 and 2017-2018 school years obtained from the Texas Education Agency.

Findings

Grade 4 students in traditional schools meet the STAAR Mathematics performance indicators at statistically higher percentages than Grade 4 students enrolled in charter schools. Both charter school and traditional school performance in all indicators increased over the three years of data that were analyzed. Of note was that charter schools did not have better performance than traditional schools. Results for all three school years were commensurate with the existing research literature. Implications for policy and for practice, as well as recommendations for future research, were provided.

Keywords: State of Texas Assessment of Academic Readiness Performance Standards; Student achievement; Charter schools; Traditional schools; Mathematics; Black students; Hispanic students; Economically disadvantaged

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CHAPTER I

INTRODUCTION

As public education in the United States and Texas has evolved over the last 60 years, legislation has been passed at both the federal and state level with intentions to guide schools on the quality of education. Public schools are required by federal statutes such as the Every Student Succeeds Act (2015) to demonstrate that all students are successful in the core subjects. In addition to such federal mandates, the State of Texas has implemented an accountability system based on academic achievement, student progress, and efforts to close achievement gaps between demographic groups (Texas Education Agency, 2018). Based on these state assessment data, ratings are assigned to each school campus and to each school district. These ratings can affect public perception and guide implementation of state or federal funding and interventions. As a result, student achievement is a high priority for school and district leaders.

Student achievement is influenced by many factors. One such factor that should be considered is the type of public school students attend. Students in Texas may attend the public elementary school in which they are zoned based on the location of their residence or they may attend a public charter school in which they follow the enrollment procedures of the individual charter school. Student enrollment at all public schools has increased by more than 14%, or more than 682,000 students, over the last 10 years. Student enrollment in the 2018-2019 school year in the State of Texas was 5,431,910 students (Texas Education Agency, 2018), with 5.8% of this total population enrolled in charter schools.

Across the five largest ethnic/racial groups in 2018-2019, Hispanic students made up the largest percentage of enrollment (61.5%) in open-enrollment charter schools. African American students made up 18% of the enrollment of Texas charter schools and White students made up almost 14% of the enrollment. Asian or multiracial students were the remaining 7% of charter school enrollment (Texas Education Agency, 2019a). Another factor that may influence student achievement is economic status. In the 2018-2019 school year, almost 70% of the students enrolled in open-enrollment charter schools in Texas were economically disadvantaged. School and district leaders remain responsible for all students, and it is important for all stakeholders to understand how school type (i.e., charter schools and traditional elementary schools) may affect student achievement.

Literature Review Search Procedures

For the purpose of this journal-ready dissertation, the literature regarding mathematics achievement of students in charter and traditional public schools, students in poverty, Black, and Hispanic students who were enrolled in either charter elementary schools or traditional public elementary schools was examined. Phrases that were used in the search for relevant literature were: *charter schools*, *student poverty*, *economically disadvantaged*, *Black students*, *Hispanic students*, and *academic achievement*.

Review of the Literature Regarding Charter Schools

In 1983, the National Commission of Excellence released a report called *A Nation at Risk*. Stated in the report was that students in the United States were performing poorly on international tests and warned the nation that it was going to be adversely affected by “a rising tide of mediocracy” (A Nation at Risk, 1983, p 113). The report

writers asserted that the U.S. public school system was flawed and used language that would ignite media attention in the Cold War era of the early 1980s. “If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war” (*A Nation at Risk*, 1983, p. 5). Within a month of releasing the report, the *Washington Post* alone carried 28 stories about the contents and recommendations of this report (Bracey, 2000). After the release of the findings within the report, the Commission called for major changes within the education system, including higher pay for teachers, rigorous curriculum standards, higher graduation requirements, and improved teacher training. Other recommendations included more time in the school day, increased science, mathematics and computer science courses, and more training for educators.

In the years after the report was released, many people spoke publicly for and against the contents of *A Nation at Risk*. In response to the notion that the educational system would hold America back from being competitive in the world market, historian, Haber and Cremin (1991), wrote,

To conclude that problems of international competitiveness can be solved by educational reform defined solely as school reform, is not merely utopian and millennialist, it is at best a foolish and at worst a crass effort to direct attention away from those truly responsible for doing something about the competitiveness and to lay the burden instead on the schools. It is a device that has been used repeatedly in the history of American education. (p. 414)

On the opposing side of the debate, Lou Gerstner, CEO of IBM, began an op-ed campaign in both the New York Times and Washington Post that criticized and warned

about the failing school system. He titled his first entry *Our Schools are Failing*. These op-ed articles continued to be published into the early 2000s, and additional high-profile school critics such as Secretary of Health and Human services, Tommy Thompson, former Senator John Glenn, and former Secretary of Education William Bennett penned op-eds in major newspapers across the country. Despite the critics of public education, several positive reports were written, but these reports were largely ignored, and some supporters claim intentionally suppressed from going public (Bracey, 2003).

The largest and most compelling of these reports was assembled in 1990 and was named the *Sandia Report*, published by Sandia National Laboratories in Albuquerque, New Mexico. As a result of the report, conclusions were made that any problems in the public education system did not add up to a systemic crisis in education as the issues were reported in *Nation at Risk*. When interviewed, Lee Bray, the former Vice President of Sandia and supervisor of the report engineers, suggested the report was suppressed (Bracey, 2000). Although eventually published in 1993 in the *Journal of Educational Research*, the Sandia Report did not receive the attention that the original *Nation at Risk* achieved.

In 2000, Bill Clinton's administration presented a program called Goals 2000, in which the federal government offered money to the states to set their own learning standards and assessments. Then, in 2001, the George W. Bush administration proposed an extensive federal legislation named the No Child Left Behind Act. This legislation was passed by lawmakers referencing the positive changes seen in Texas because of the reforms, specifically in state assessments. The No Child Left Behind Act (2001) brought greater attention and definition to the academic achievement of school children. This

emphasis on academic achievement required states and districts to analyze assessment data by demographic groups and sub-populations to find strengths and weaknesses in the educational system regarding reading and mathematics achievement.

This initiative was continued and extended in 2009, when the Obama administration put into effect a four-million-dollar grant to encourage state and local education agencies to initiate innovative change within public schools. This initiative, termed *Race to the Top*, consisted of four parts based around many of the ideas and propositions from the earlier national education programs. Grant recipients were encouraged to (a) adopt standards and assessments that prepare students to succeed in college and careers in a global economy; (b) create data systems that inform teachers and school administrators on ways to improve instruction and that measure student progress and academic achievement; (c) recruit, reward, and development quality teachers and administrators; and (d) turn around the nation's lowest performing schools. "States that do not have public charter laws or put artificial caps on the growth of charter schools will jeopardize their applications under the Race to the Top Fund," Arne Duncan, Secretary of Education said, according to a transcription released by the U.S. Department of Education.

Charter Schools Performance

A decade after the first charter school in the United States began operation, the professional literature was flooded with articles and research summaries (e.g., Betts & Tang, 2008; Clark, Gleason, Tuttle, & Silverberg, 2011; CREDO, 2009, 2013; Greene, Forster, & Winters, 2003) reporting on the effects, both positive and negative, of charter schools. Charter school supporters contended charter schools would expand the number and variety of school choice options available to parents and students (Hinojosa, 2009).

Supporters (e.g., Bifulco & Ladd, 2004; Hoxby & Rockoff, 2004) also believed charter schools would provide increased innovation, promote competition with traditional public schools, and increase academic achievement for all students. Those opponents of charter schools claimed that charter schools would result in increased segregation, reduce financial and human resources in traditional schools, and would not result in improvements in academic achievement (e.g., Bulkley & Fisler, 2003; Imberman, 2011).

Bifulco and Ladd (2004) evaluated the effect of North Carolina charter schools using approximately 6,000 Grade 4 through Grade 8 End-of-Grade reading and mathematics assessment results. An individual level panel data set was used to assess whether statistically significant differences were present in reading and mathematics between students enrolled in charter schools and students enrolled in traditional schools. The researchers concluded that the academic gains students made in charter schools were considerably smaller than the academic gains of students in traditional schools. Bifulco and Ladd (2006) replicated their study using 8,700 student scores and reported the same results.

Crane and Edwards (2007) analyzed California's charter school performance data from 183 charter elementary schools that served approximately 78,000 students and 4,965 traditional elementary schools that served approximately three million students. After the researchers controlled for differences in enrollment and student characteristics, they established that students enrolled in charter elementary schools scored about nine points lower on the state-mandated assessment, the Academic Performance Index, than students enrolled in traditional elementary schools.

Recent results from data analyzed from the Stanford Education Data Archive support the earlier studies previously mentioned. Han and Keefe (2020) documented the presence of a statistically significant difference in academic achievement in charter schools' reading and mathematics scores compared to traditional elementary schools. Students enrolled in traditional elementary schools scored slightly higher than did students who were enrolled in charter schools. This result was based on the average of all U.S. school assessment results between 2009-2015.

Orfield and Luce (2016) analyzed student performance in Chicago charter schools from the 2012-2013 and 2013-2014 school years. Orfield and Luce (2016) documented that students in Grades 3-8 in Chicago charter schools had lower reading and mathematics scores than their peers in traditional schools. The gap in achievement between students in charter schools and students in traditional schools in Chicago increased from the first year to the second year, suggesting that the achievement gaps increase over time.

Winters (2018) published the results of seven studies in which New York Charter Schools were analyzed. Researchers in five of the studies used a randomized field trial design, analyzing data on only students who entered the lottery to attend New York Charter schools. The reading and mathematics performance of students who were randomly granted entry into the Charter School system were compared to the reading and mathematics performance of those students who were randomly denied the opportunity to enroll in the Charter School system. Winters reported that on average, students attending a charter school scored higher in reading and mathematics they would have had they attended a traditional public school.

A second research design was used by The Center for Research on Educational Outcomes at Stanford University. The Center for Research on Educational Outcomes (2013) used a matching design that with a computer algorithm to compare the performance of each student attending a charter school with a similar student attending a traditional public school. They determined that 47.7% of the city's charter schools produced statistically significant gains in mathematics and reading compared to traditional public schools. Approximately one third of New York charter and traditional schools scored equally well, and 17% of the charter schools had a lower performance than that of traditional schools. In this study, charter schools were not outperforming traditional public elementary schools.

Penning and Slate (2011) analyzed literature and comparison data from multiple sources regarding charter school and traditional schools. The researchers reported that Texas charter schools served a high number of students of color in 2009, and that operating expenditures per pupil in charter schools were an average of \$1,000 lower than for a geographically matched traditional public school. The researchers also examined results gathered by Gronberg and Jansen (2005). Gronberg and Jansen (2005) compared charter schools and traditional schools in the early years of charter schools. Gronberg and Jansen (2005) analyzed student achievement data from the first eight years of academic, charter school data and concluded that at-risk students who attended charter schools have greater achievement gains than their matched peers at traditional public schools. In the same study, the researchers concluded that when comparing all students, Grades 5-8, enrolled in charter schools and all students enrolled in traditional public

schools, students who were enrolled in charter schools performed lower than that of their traditional schools' counterparts.

In a recent investigation in the state of interest for this article, Texas, Escalante and Slate (2017) compared the academic achievement of Grades 3, 4, and 5 students in charter elementary schools and traditional elementary schools. Data in their study were on 20,920 students, of which 19,589 students were enrolled in traditional schools and 1,331 students were enrolled in charter school campuses.

Using data from the state-mandated assessment, the State of Texas Assessment of Academic Readiness, Escalante and Slate (2017) established that students enrolled in traditional public schools had statistically significantly higher reading, writing, and science scores than students enrolled in charter elementary schools. Escalante and Slate (2017) documented that students in Grades 3 and 4 who attended traditional elementary schools had statistically significantly higher passing rates, 4.54% and 2.67%, respectively, than students in Grades 3 and 4 who were enrolled in charter schools. Grade 5 students in traditional and charter elementary schools had similar passing rates on the STAAR Reading test. Grade 4 students in traditional elementary schools and charter elementary schools, also had similar passing rates on the STAAR Writing test. Grade 5 students in traditional schools had a higher average passing rate on the STAAR Science, 6.02%, than Grade 5 students in charter schools.

According to the Texas Charter Authorizer Accountability Report for the 2016-2017 school year, Shield, Garland, Cannon, Booth, and Pham (2017) reported that State Board of Education-authorized charter school campuses had a higher percent (75%) of students meeting the Approaches Grade Level standard on the 2017 STAAR Reading

than their matched traditional school students (72%). The same school comparison yielded comparable percentage (76% for both) of students meeting the Approaches Grade Level standard on the 2017 STAAR Mathematics. When compared to traditional public schools, Independent School District-authorized charter schools had a comparable percentage (70% vs. 71%) of students achieving the Approaches Grade Level standard on the 2017 STAAR Reading; however, the ISD-authorized charter schools had a lower percentage (71%) of students achieving the Approaches Grade Level standard on the 2017 STAAR Mathematics than their matched traditional school campuses (76%). Students were matched based on several identifying criteria, demographics, economic status, geographical location, and district population. Approximately 71% of the students were able to be matched successfully to be included in this study.

Review of the Literature for Charter Schools and Black and Hispanic Students

Since the first legislation was passed in 1995 in Texas and the first 17 charter schools were opened in the fall of 1996 with an enrollment of 2,426, the Texas statewide charter school program has grown to 707 campuses serving 296,323 students accounting for 5.5% of the total Texas public school population. Charter schools are considered a part of the public school system. In Texas, four types of charter schools are present: (a) Home-rule School District Charters (no home-rule school district charters are present in Texas); (b) Campus or Campus Program Charters. These charter schools are authorized and overseen by independent school districts; (c) Open-enrollment Charters. Charter schools authorized by the Commissioner of Education (or the State Board of Education prior to 2013). Most of the charter schools in Texas fall under this category.; and, (d)

University or Junior College Charters. Charter Schools authorized by the Commissioner of Education and overseen by public colleges and universities within the state of Texas.

Texas Charter schools are funded through federal and state funds and some are funded through private grants. Charter Schools do not have to follow all the state laws put in place for traditional public schools, and this reduced legislation is meant to encourage more innovation and allow for more flexibility in the instructional setting. These 707 campuses have increased freedom not allowed by traditional public schools; however, students who attend charter schools must take the State of Texas Assessment of Academic Readiness (STAAR) test and are under the guidelines of the federal Every Student Succeeds Act and Texas House Bill 22 guidelines. The Every Student Succeeds Act (2015), Chapter VIII, required the “implementation of academic standards, assessments, or accountability systems; and how to meet the needs of disadvantaged students, children with disabilities, and English learners, the needs of low-performing schools, and other educational needs of students” (pp. 584). Whereas Texas House Bill 22 was a mandate for the commissioner to implement a system designed to improve student performance continuously and specifically to achieve the goals of eliminating achievement gaps based on race/ethnicity, and economic status. Furthermore, another requirement in the bill was the concept that whatever system is chosen to be implemented in Texas schools should ensure that Texas would become a national leader in preparing students for postsecondary success.

The Closing the Gaps domain in the State of Texas Accountability was applied to the system for the purpose of ensuring educational equity (Texas Education Agency, 2019a). All student ethnicity groups, students served in Special Education, students who

are mobile, English Language Learners, and students who are considered poor are included in this purpose. These student groups are measured by STAAR for achievement in mathematics, reading, writing, social studies, and science, and growth or progress in mathematics and reading. Other components of this accountability measure included: (a) English Learner Language proficiency status (b) graduation status; and (c) College, Career and Military Readiness status. Students are measured by how many students in the student group achieved at or above the Meets Grade Level standard (Texas Education Agency, 2020b). These indicators make up 30% of the whole accountability system for a school and for Texas districts. Both charter schools and traditional schools in Texas strive to perform well on Closing the Gaps.

Maloney and Mayer (2010) provided a historic perspective of the achievement gap that charter and traditional schools face.

The phrase “achievement gap” in education and political circles signifies the long term and steady score gap between white, Black and Hispanic/Latino youth on standardized tests. Using the National Assessment of Educational Progress and SAT Scores, researchers have shown that this gap, first recognized in the 1960s, fell by 20% to 40% (depending on the estimate) in the 1970s and 1980s, but then began widening in the late 1990s. (p. 333)

As a result of the widening of achievement between the demographic groups within schools, the 2000 Presidential election allowed for candidates to bring this issue to the forefront and to claim federal legislation was needed to close these gaps. With the election of President George W. Bush, the No Child Left Behind Act was passed, which mandated rigid accountability systems and the tracking of all demographic groups on

state mandated tests. The State of Texas's response to this mandate provided the foundation of the current STAAR Closing the Gaps domain in the Texas accountability system.

Despite the rapid growth of school choice and grants available to charter school start-ups, the effectiveness of charter schools on student achievement has not been established. Data on charter schools have been analyzed based on location, demographics, and through state and federal assessment results; however, the results vary from study to study. "Taken in the aggregate, the empirical evidence to date leads one to conclude that we do not have definitive knowledge about the impacts of public charter schools on students and existing schools" (Silvernail & Johnson, 2014, p. i). Study outcomes vary when academic achievement of students who attend charter schools and students who attend traditional schools are compared.

Chudowsky and Ginsburg (2012) analyzed data from the National Assessment of Educational Progress and concluded that charter school enrollment between 2003 and 2011 increased for all subgroups; however, the Black subgroup had the most dramatic increase. The percentage of Grade 4 Black students enrolled in charter schools increased from 4% in 2003 to 12% in 2011. Both nationally and in large cities, charter schools have a larger proportion of Black students than regular public schools. Although Chudowsky and Ginsburg discovered regular public schools had higher percentages of Hispanic students in Grade 4; however, in in Grade 8 the proportion of Hispanic students became larger even in traditional schools and charter schools. Chudowsky and Ginsburg analyzed the national data and concluded that in many charter schools that focus on Black or Hispanic students within large cities, students in these subgroups outperformed their

traditional school counterparts in several subject and grade level combinations. In large cities, Black students who were identified as low-income and who attended charter schools had a substantially higher achievement rate in Grade 4 mathematics than similar students attending traditional schools.

The National Center for Education Statistics in 2005, using the National Assessment of Educational Progress 2003 data, compared the achievement of students attending charter schools and students attending traditional schools. In Grade 4 mathematics, students who attended traditional elementary schools outperformed students who attended charter schools. However, when students were compared with students of similar racial/ethnic backgrounds, the Grade 4 mathematics performance of Black, Hispanic, and White students who were attending charter schools was not statistically significantly different than the performance of Black, Hispanic, and White students attending traditional schools.

Through a statewide study conducted in Georgia, Plucker, Makel, and Rapp (2007) examined student achievement in charter schools and traditional schools with similar demographics within close geographic proximity. Plucker et al. (2007) concluded that Black students generally experienced positive or neutral achievement in mathematics in traditional schools and negative achievement in mathematics in charter schools. Black students were more likely to move into the top 10% in traditional schools.

Local studies have been conducted to evaluate Texas charter schools. In the completion of the 2009-2010 academic year, the Texas Education Agency contracted with the State of Texas Education Research Center at Texas A&M University to conduct an evaluation of the public charter schools in Texas. Both secondary source data analysis

and survey evaluation were used in the evaluation (Taylor et al., 2011). No statistically significant differences were determined to exist between students' performance at charter schools and traditional public schools the Texas Assessment of Knowledge and Skills performance gains in mathematics or reading. Furthermore, statistically significant differences were not present for Hispanic students, students who were considered economically disadvantaged or for students identified with Limited English Proficiency. Students' overall performance at charter schools was comparable to students' performance at traditional schools (Taylor et al., 2011).

Penning and Slate (2011) examined the demographic and academic achievement of charter schools compared to traditional schools in Texas. The researchers reported that Texas serves a high number of students who are Black and Hispanic. In 2009, approximately 42% of Texas charter school students were Black, and 48% of Texas charter school students were Hispanic. Traditional public school enrollment in Texas at the time were 14% Black and 44% Hispanic. Penning and Slate (2011) also reported that more than 70% of students enrolled in charter schools met the criteria for being "at-risk" for dropping out of school, compared to only 41% in traditional schools. Penning and Slate (2011) concluded in combination with a study conducted by Gronberg and Jansen (2005), that academically Texas Charter schools did not perform significantly better than traditional public schools in Texas; however, charter schools showed greater academic growth compared to traditional public schools in Texas.

An investigation in which students from charter elementary schools were compared to students from traditional elementary schools was conducted by Escalante and Slate (2017). Escalante and Slate analyzed the degree to which differences were

present in the reading, writing, and science achievement of Grades 3, 4, and 5 students on the 2015 STAAR tests between charter elementary schools and traditional elementary schools. Escalante and Slate (2017) documented that students enrolled in traditional elementary schools had statistically significantly higher scores on all three content areas than did similar students who were enrolled in charter elementary schools. These results were consistent with Penning and Slate's (2011) study in which they established students enrolled in charter elementary schools did not perform better academically than the students enrolled in traditional elementary schools.

Montemayor (2017) conducted a quantitative, comparative analysis on the reading and mathematics performance of students in Grades 3, 4, and 5. Montemayor (2017) specifically analyzed the state-mandated assessments in reading and mathematics of students in South Texas in the 2015-2016 school year. Similar reading and mathematics test scores were present for students in charter elementary schools and traditional elementary schools. However, students in charter schools did not have higher reading and mathematics test scores than the students who were enrolled in traditional elementary schools.

Klammer and Slate (2018) analyzed the degree to which differences were present in mathematics achievement between Grade 3 students who were enrolled in charter elementary schools and Grade 3 students who were enrolled in traditional elementary schools in the State of Texas. Klammer and Slate analyzed STAAR data in two performance categories, Satisfactory Academic Performance and Advanced Academic Performance. Students who attended traditional schools in Grade 3 had a statistically significant higher passing rate in both performance categories.

Currently, all students in Texas who attend charter schools or traditional schools will take the current state assessment, the State of Texas Assessment of Academic Readiness (STAAR). The STAAR results are broken into performance categories by a cut score determined by the Texas Education Agency. The performance categories are: Master's Grade Level, Meets Grade Level, Approaches Grade Level, and Does Not Meet Grade Level.

Review of the Literature for Charter Schools and Students in Poverty

The adverse effects of poverty on student achievement has been well documented by researchers (e.g., Gregory, Skiba & Noguera, 2010, Ladd, 2012, Reardon, 2011). Poverty has strong detrimental effects on student academic performance (Claro, Paunesku, & Dweck, 2016). Students from low income families begin their school career lacking background experiences and beginning school behind in literacy skills (Wamba, 2010). Egalite (2016) listed family income as one of the four family background factors that can influence student achievement, citing that better income can secure better neighborhoods with high-quality schools. Furthermore, Reardon (2011) established that the relationship between family income and student academic achievement grew substantially stronger in the 1980s and 1990s in the United States. Regarding reading and mathematics specifically, Allington et al. (2010) reported that 77% of Grade 4 students who were not in poverty achieved above a basic level of reading proficiency, whereas only 46% of students in poverty (i.e., based upon receiving free/reduced lunch) had the same level of achievement. Other scholars, Friedman-Krauss and Raver (2015) and Goforth et al. (2014) have also established that poverty status is a strong predictor of lower mathematics scores. Children from low economic status homes experience

reduced academic achievement (Milne & Plourde, 2006). Inadequate medical and dental care, food insecurity, and family stress often endured in homes with low income are outside stressors that can have negative effects on student academic opportunity and achievement (Berliner, 2009).

The number of students enrolled in Texas schools for the 2017-2018 school year identified as being economically disadvantaged was 67.5% of the total student enrollment (Texas Education Agency, 2018). In the decade between the 2007-2008 and 2017-2018 school years, the percentage increase in the number of students who were economically disadvantaged was greater than the increase in the overall student population. The number of students in poverty increased by over one half million, or 23% in just this 10-year time period.

Regarding student economic status, the Texas Education Agency defines students as poor if the student is “coded eligible for free or reduced-price lunch or eligible for other public assistance” (Texas Education Agency, 2015, p. 10). The free and reduced lunch program indicator, which is a guideline set by The Department of Health and Human Service, is frequently used to designate students living in poverty. According to the Texas Education Agency 2017-2018 Pocket Edition of statistics, in 2017, 58.7% of the 5.3 million students who attend Texas schools were from low economic homes.

With the federal mandates of The Every Student Succeeds Act (2015), local education agencies and school campuses are expected to eliminate the achievement gap and to improve academic achievement of all ethnic/racial groups of students, as well as students in poverty.

To measure the academic achievement of students enrolled in Texas schools, children in Grades 3-12 take a yearly assessment, the State of Texas Assessment of Academic Readiness (STAAR). Beginning with the 2016-2017 school year, the STAAR provides not only a percent score and raw score of the number of questions students answer correctly, but it also provides a performance level for each student. These performance levels, defined by Texas Education Agency through Performance Level Descriptors, are descriptions of student achievement for each grade level and content area assessed. All students assessed are categorized as: *Approaches Grade Level*, *Meets Grade Level*, *Masters Grade Level*, or *Did Not Meet Grade Level*. The Performance Level Descriptors specifically describe the knowledge and skills that students typically demonstrate at each performance level and focus on the process skills of mathematics. The process skills are described by Texas Education Agency as the ways in which students are expected to engage in the mathematical content and use the mathematical skills in everyday life. They are not assessed in isolation but are applied when students use mathematics to solve problems, analyze mathematical relationships, and communicate mathematical ideas (Texas Education Agency, 2019b).

In addition to the performance standards, the Texas Accountability system has a Closing the Gap Domain. This Domain constitutes 30% of the total accountability for districts and schools. It measures performance of up to 14 student groups, including students considered poor, and measures against specified targets.

After more than 25 years since the first charter school, the debate about their efficacy and influence on student achievement continues. In the first years of charter schools, the debate centralized around predicted improvements in student achievement

based on the fundamental premises of charter schools (Epple, Romano, & Zimmer, 2016). Supporters of charter schools (e.g., Finn et al., 2000, Kolderie, 2004) thought that because of the greater freedom from state regulations, charter schools would be innovative and create competitive pressure on all schools to improve. In contrast, critics (e.g., Cobb & Glass, 1999, Fiske & Ladd, 2000; Frankenberg & Lee, 2003) of charter schools believed the charter schools would deplete public resources and fail to serve all populations, including students with lower-ability and students with special needs. With the number of students served by charter schools, it becomes important to analyze student achievement, especially for underrepresented demographic groups.

Earlier studies have had mixed results when researchers compared student mathematics achievement between students enrolled in charter schools and students enrolled in traditional schools. In 2005, researchers from the National Center for Educational Statistics used the National Assessment of Educational Progress data to compare mathematics achievement in charter schools and traditional elementary schools. Using 2003 data, Chudowsky and Ginsburg (2012) determined that charter school mathematics performance lagged behind that of traditional schools in Grade 4 mathematics.

Similarly, Clark, Gleason, Tuttle, and Silverberg (2011) conducted a study in which they analyzed student data from charter schools and traditional schools. In their investigation, they established that charter schools had negative effects on student mathematics performance. In contrast, Betts and Tang (2011) conducted a study in which they compared the academic effect of attending a charter elementary school and attending a traditional elementary school. Betts and Tang (2011) concluded charter

schools outperformed traditional schools in elementary mathematics. Chingo and West (2015) analyzed the effects of charter schools across Arizona, which had the largest proportion of students attending charter schools in the nation. The researchers reported that academic performance in all subject areas, in every grade level of charter schools was slightly less than traditional schools.

With reference to the state of interest in this article, Texas, researchers have compared student achievement between students who attend charter schools and students who attend traditional school. Sahin, Willson, and Capraro (2018) analyzed the performance of one of the largest charter school networks in the state, Harmony Public Schools, compared to the state's traditional schools. Sahlin et al. (2018) examined 2009-2011 student data from the Texas Assessment of Knowledge and Skills in reading, mathematics, and science. They documented that the charter school students performed statistically significantly better at Grade 9 and worse at Grade 11 than students enrolled in traditional schools. No statistically significant difference was determined for Grade 10 mathematics. For Grades 9 and 10 reading achievement, no statistically significant differences were documented between school types.

Montemayor (2017) analyzed reading and mathematics academic performance in charter schools and traditional schools in South Texas. Specifically, Montemayor (2017) analyzed data from 2015-2016 for students in Grades 3, 4, and 5 who were economically disadvantaged. No statistically significant differences were established in academic performance in the performance of students in poverty between charter schools and traditional schools on the Grade 3, 4, and 5 STAAR Reading and Mathematics tests.

In this same year, Escalante and Slate (2017) analyzed reading, writing, and science achievement of students in Grades 3, 4, and 5 on the 2015 STAAR tests. Specifically compared in their study were students enrolled in charter elementary schools and students enrolled in traditional elementary schools. Escalante and Slate (2017) documented that students enrolled in traditional elementary schools had statistically significantly higher scores on all three content areas than did students who were enrolled in charter elementary schools.

In an extension of Escalante and Slate's (2017) work, Klammer and Slate (2018) analyzed the degree to which differences were present in mathematics achievement between Grade 3 students who were enrolled in charter elementary schools and Grade 3 students who were enrolled in traditional elementary schools in Texas. Klammer and Slate (2018) analyzed STAAR data in two performance categories, Satisfactory Academic Performance and Advanced Academic Performance. They documented that Grade 3 students enrolled in traditional schools had statistically significant higher passing rates in both performance categories than students enrolled in charter schools.

Statement of the Problem

Since the first legislation was passed in 1995 in Texas and the first 17 charter schools were opened in the fall of 1996 with an enrollment of 2,426, the Texas statewide charter school program has grown to 707 campuses serving 296,323 students accounting for 5.5% of the total Texas public school population. The emergence of charter schools and their rapid growth has created choice for parents and students within the public education system. One possible draw to charter schools is that charter school leadership

teams and teachers can differentiate their instruction, population, and programs yet still provide education free to students.

Active parent engagement in their child's education is a contributing factor to student achievement (Wilder, 2014). Because school choice is primarily dependent on parents seeking and enrolling their child in the charter school, it would be likely that charter schools might have higher academic student achievement based on the parent involvement factor alone; however, this hypothesis may not be accurate. Many factors may play a role in student achievement in a charter school and it is imperative that parents, policymakers, and educators have data with which to make informed decisions for students that facilitate and support increased academic achievement.

Now that charter schools have been in place for over two decades, the question of their effectiveness has been discussed by many educators. "The first question that policymakers ask about voucher and charter programs is whether they will improve or harm academic achievement" (Gill, Timpane, Ross, & Brewer, 2007, p. 71). Within the State of Texas's Accountability system, all public and state-funded charter schools are held to the same academic standards. The Texas Education Agency just recently closed the application process for the Generation 25 charter schools. More than 20 applications were filed to fund and open new charter schools (Texas Education Agency, 2020a). Analyzing the achievement of students who are poor, Black, and Hispanic and who are enrolled in charter schools will add to the literature of what is or is not working to provide greater opportunity and achievement levels for students.

Purpose of the Study

The purpose of this journal-ready dissertation was to determine the degree to which differences were present in mathematics achievement between Grade 4 students enrolled in charter elementary schools and Grade 4 students enrolled in traditional elementary schools. In the first article, the extent to which differences existed in mathematics achievement between all Grade 4 students enrolled in charter elementary schools and traditional elementary schools in Texas was determined. In the second study, the degree to which differences were present in mathematics achievement between Grade 4 Black and Hispanic students enrolled in charter elementary schools and Black and Hispanic students enrolled in traditional elementary schools was addressed. In the third study, the extent of the differences in mathematics achievement in Grade 4 students who were economically disadvantaged and were enrolled in charter elementary schools and students who were economically disadvantaged and who were enrolled in traditional elementary schools was examined. Specifically, the extent to which the differences in passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) were present in Grade 4 STAAR Mathematics between students enrolled in charter elementary schools and students enrolled in traditional elementary schools was determined. Additionally, three years of data was analyzed to determine if a trend in the levels of passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) in each school-type (i.e., charter and traditional) was present.

Significance of the Study

Despite the rapid growth of school choice and grants available to charter school start-ups, the effectiveness of charter schools on student achievement is not clear. “Taken in the aggregate, the empirical evidence to date leads one to conclude that we do not have definitive knowledge about the impacts of public charter schools on students and existing schools” (Silvernail & Johnson, 2014, p. i). Many of the research outcomes have been mixed. Many findings are positive results for charter school student achievement compared to student achievement in traditional schools, but other researchers (Betts & Tang, 2008; CREDO, 2009, 2013; Escalante & Slate, 2017) have reported mixed results in which students enrolled in traditional schools outperform students enrolled in charter schools.

As posted on the Texas Foundation School Program website in the 2019-2020 statewide charter school summary of finances document, over three billion dollars is estimated as the total state funding from the Foundation School Program and the Available School Fund. Funding for charter schools has increased with the growing advocacy of school choice. An example of this trend is the passing of House Bill 21, beginning in the 2018-2019 fiscal year, Texas public charter schools will collectively receive up to \$60 million annually to fund leasing and maintaining building and facilities (Swaby, 2017).

Although much time and resources have been allotted for the creation of charter schools, many of which attract Black and Hispanic students and students who come from low income homes, little research has been conducted to determine the extent to which differences might exist in the number of students who pass the Grade 4 STAAR

Mathematics test and at which performance standard who attend charter schools and the number of students who pass the Grade 4 STAAR Mathematics test and at which performance standard who attend traditional elementary schools. Because Grade 4 is the year before the Students Success Initiative, where students must pass the STAAR in Grade 5 to be promoted to Grade 6, these data can affect instructional practices within charter and traditional schools. Analyzing the passing standards of students who attend charter schools and traditional schools may also inform law and policymakers on the efficacy of charter schools to close the achievement gaps of historically low performing demographic groups. Furthermore, legislators and policymakers may be influenced to review the efficacy of charter schools in present form. The results from this study will be published and used to add to the existing literature on the subject of the performance of charter school students compared to traditional public school students.

Definition of Terms

The following terms, used in this study, are defined to assist the reader in understanding the context of this investigation.

Approaches Grade Level

Approaches Grade Level is a proficiency descriptor or performance indicator that describes how a student performed academically on the STAAR and predicts student academic success for the following year. An Approaches Grade level descriptor indicates the student showed some knowledge of the material but does not show an understanding of some of the most important concepts of the grade level content. This indicator is still passing, but it is likely that the student will need additional assistance in the next grade level (ETS, 2017, p. 1)

Black

A person of Black ethnicity is defined as a person having origins in any of the Black racial groups of Africa (Texas Education Agency Appendix F, 2016a, p. 5)

Charter Schools

Charter schools are defined by the Texas Education Agency as a type of public schools. The Texas Legislature authorized the establishment of charter schools in 1995. Some of the first charters have been in operation since Fall 1996. Four types of charter schools are present in Texas:

1. Subchapter B Home-rule School District Charters - No home-rule school district charters exist in Texas at this time.
2. Subchapter C Campus or Campus Program Charters - Independent school districts authorize and oversee these charters.
3. Subchapter D Open-enrollment Charters - Most charters in Texas fall under this category. The commissioner authorizes these charters. Before SB 2 passed in 2013, the State Board of Education (SBOE) was the authorizer.
4. Subchapter E University or Junior College Charters - The commissioner authorizes Subchapter E charters. Eligible entities include public colleges and universities.

Charter schools are subject to fewer state laws than other public schools; however, the state monitors and accredits charter schools just as the state accredits school districts (Texas Education Agency, Charter Schools, 2020a, para. 1). The reduced legislation encourages more innovation and allows more flexibility, though state law does require fiscal and academic accountability from charter schools.

Hispanic

A person of Hispanic ethnicity is defined as a person of Cuban, Mexican, Puerto Rican, South or Central American, other Spanish culture or origin, regardless of race (Texas Education Agency Appendix F, 2016a, p. 5).

Masters Grade Level

Masters Grade Level is a proficiency descriptor or performance indicator that describes how a student performed academically on the STAAR and predicts student academic success for the following year. A Masters Grade Level performance descriptor indicates that the student showed a strong understanding of the grade level and content material and is well prepared for success in the next grade level (ETS, 2017, p. 1).

Meets Grade Level

Meets Grade Level is a proficiency descriptor or performance indicator that describes how a student performed academically on the STAAR and predicts student academic success for the following year. A Meets Grade Level performance descriptor indicates that a student showed a good understanding of the grade level and content material and is prepared for the next grade level. (ETS, 2017, p. 1).

Poor

In this study, the term economically disadvantaged, or poor, refers to students who are “eligible for free or reduced-price lunch or eligible for other public assistance” (Texas Education Agency, Glossary for the Texas Academic Performance Report, 2015, p. 10). Students who are economically disadvantaged qualify for free or reduced lunch under the National School Lunch and Child Nutrition Program. Generally, this term

indicates the student's household income level is based on 130% (free) and 185% (reduced) of the federal poverty guidelines (U.S. Department of Education, 2012, p. 2).

Public Education Information Management System

The Public Education Information Management System is the data management system of the Texas Education Agency and contains information regarding student demographic, academic performance, financial, personnel, and organizational information of public schools (Public Education Information Management System - Overview, 2017, para. 1).

Traditional Schools

Traditional public schools are schools that follow state and federal guidelines. They operate with the help of tax dollars and are divided into grades and governed by school districts (My Texas Public School, 2020).

State of Texas Assessment of Academic Readiness (STAAR)

The STAAR tests are a series of state-mandated standardized tests given to Texas public school students in Grades 3-8 and students enrolled in five specific high school courses. First administered in the spring of 2012, the STAAR is based on the state's curriculum standards called the Texas Essential Knowledge and Skills (Texas Education Agency, Glossary of Acronyms, 2017c, p. 10)

STAAR Performance Level Descriptors

Students taking the STAAR assessment are given a performance level descriptor to serve as a snapshot of their academic characteristics. Performance level descriptors are statements that describe the specific knowledge and skills students typically demonstrate

at each performance level. The performance levels are: Approaches Grade Level, Meets Grade Level, and Masters Grade Level.

Student Success Initiative (SSI)

Student Success Initiative (SSI) is the grade-advancement requirement enacted by the 76th Legislature in 1999 that require students to demonstrate proficiency on the reading and mathematics assessments in Grades 5 and 8 (Texas Education Agency, Comprehensive Glossary, 2019, p. 4)

Delimitations

The three studies in this journal-ready dissertation are delimited to charter schools and traditional public elementary schools in Texas. Of particular interest in this journal-ready dissertation is the extent to which differences were present between charter elementary schools and traditional elementary schools in the mathematics academic achievement of their total student enrollment, their students in poverty, and Black and Hispanic students on the STAAR Mathematics assessment. Three school years of data (i.e., 2015-2016, 2016-2017, and 2017-2018) were analyzed. As such, the extent which the findings are generalizable to charter school and traditional public schools is not known.

Limitations

In this journal-ready dissertation, the STAAR Mathematics performance of Grade 4 students was compared between charter elementary schools and traditional public elementary schools. One of the limitations was the school variables of economic status and ethnicity/race were self-reported by each school to the state. As such, inaccurate discrepancies in reporting to the state could have occurred. Because audits are routinely

conducted by the Texas Education Agency, inaccuracies in data reporting were believed to be minimal. A second limitation involved the fact that only quantitative data was used to measure the academic achievement of the Grade 4 students whose data were analyzed in this journal-ready dissertation. A third limitation involves the use of archival data. In causal-comparative studies in which archival data are analyzed, no determination of a cause-effect relationship can be made. Accordingly, other variables other than school type could have contributed contributing to any differences that were obtained in mathematics achievement of students in poverty, Black, and Hispanic students. A fourth limitation is that only Texas student scores on the Grade 4 STAAR Mathematics test were analyzed.

Assumptions

For this journal-ready dissertation, the assumption was made that the achievement data for students in charter and non-charter schools, students in poverty, Black, and Hispanic students in the Public Education Information Management System were accurately reported. Additionally, the consistency in which charter schools and traditional public schools in Texas collect and report student data to the Texas Education Agency was assumed to be accurate and consistent statewide. Another assumption was that students in poverty were appropriately identified. Consequently, any modifications to these assumptions could have resulted in inaccurate data and contradictory findings.

Procedures

Upon approval from the doctoral dissertation committee, a request was submitted to the Sam Houston State University Institutional Review Board to conduct the study. On receiving approval from the Institutional Review Board, the STAAR Grade 4

Mathematics 2015-2016, 2016-2017, and 2017-2018 archival data were analyzed. The dataset was downloaded from the Texas Education Agency after a Public Information Request was submitted and fulfilled.

Organization of the Study

In this journal-ready dissertation, three research investigations were conducted. In the first study, the research questions addressed were related to the differences in charter elementary schools and traditional elementary schools' Grade 4 Mathematics achievement. In the second study, the degree to which Grade 4 mathematics achievement differed between charter elementary schools and traditional elementary schools by demographics was addressed. In the final study, the focus was on the extent to which charter elementary schools and traditional elementary schools Grade 4 mathematics achievement differed between students who were economically disadvantaged.

This journal-ready dissertation consists of five chapters. Included in Chapter I are the background of the study, statement of the problem, purpose of the study, significance of the study, definition of terms, delimitations, limitations, assumptions, and outline of the journal-ready dissertation. In Chapter II, the emphasis on the difference between charter elementary schools and traditional elementary schools in STAAR Grade 4 Mathematics achievement was examined. In Chapter III, the extent to which charter and traditional elementary schools Grade 4 STAAR Mathematics achievement among Black and Hispanic students differed was presented in the second journal-ready article. In Chapter IV the difference between Grade 4 STAAR Mathematics achievement between charter elementary school and traditional elementary school students who were economically disadvantaged was the focus of the third journal-ready article. Finally, in

Chapter V, results from all three articles are summarized. Implications for policy and for practice across the three articles are presented, as well as recommendations for future research.

CHAPTER II

DIFFERENCES BETWEEN TEXAS CHARTER ELEMENTARY SCHOOLS AND TRADITIONAL ELEMENTARY SCHOOLS IN THEIR GRADE 4 MATHEMATICS PERFORMANCE STANDARDS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

In this statewide, multiyear analysis, the extent to which differences were present in mathematics achievement of Grade 4 students by school type (i.e., traditional or charter) was determined. Specifically examined was the relationship of performance to the three State of Texas Assessment of Academic Readiness (STAAR) Mathematics Performance Indicators for Grade 4 students in the 2015-2016 through the 2017-2018 school years. Statistical analyses revealed the presence of statistically significant differences in mathematics achievement as a function of school type. In every instance, Grade 4 students who were enrolled in charter schools did not perform as well as Grade 4 students who were enrolled in traditional schools. Results were consistent across all three school years and across all three STAAR Mathematics Performance Indicators. Considering the substantial increase in both the number of charter schools in Texas and the number of charter school students and the poor performance of charter schools, these findings are cause for concern. Implications of these findings and recommendations for future research are discussed.

Keywords: Charter schools, Traditional schools, Texas, Grade 4, STAAR, Mathematics, Performance indicators, Approaches grade level, Meets grade level, Masters grade level

DIFFERENCES BETWEEN TEXAS CHARTER ELEMENTARY SCHOOLS AND TRADITIONAL ELEMENTARY SCHOOLS IN THEIR GRADE 4 MATHEMATICS PERFORMANCE STANDARDS

A decade after the inauguration of the first charter school in the United States began operation, the professional literature is replete with research articles about the effects, both positive and negative, of charter schools (Betts & Tang, 2011; Clark, Gleason, Tuttle, & Silverberg, 2011; Center for Research on Education Outcomes, 2009, 2013; Green, Forster, & Winters, 2003). Charter school supporter, Hinojosa (2009) contended that charter schools would expand the number and variety of school choice options available to parents and students. Charter school supporters (Bifulco & Ladd, 2004; Hoxby & Rockoff, 2004) also contend that charter schools would provide increased innovation, promote competition with traditional public schools, and increase academic achievement for students. In contrast, however, opponents (e.g., Bulkley & Fisler, 2003; Imberman, 2011) of charter schools claim that charter schools would result in increased segregation, reduce financial and human resources in traditional schools, and would not lead to statistically significant improvements in academic achievement. In the midst of the national charter school efficacy controversy, several research analyses were conducted to determine the efficacy of charter schools.

Bifulco and Ladd (2004) examined the effects of North Carolina charter schools using approximately 6,000 Grade 4 through Grade 8 End-of-Grade reading and mathematics assessment results. Reading and mathematics test data were compared for students enrolled in charter schools and for students enrolled in traditional schools. Results were that the academic gains students made in charter schools were considerably

less than the academic gains made by students in traditional schools. The Bifulco and Ladd (2004) study was replicated by Bifulco and Ladd in 2006 using 8,700 student scores. Bifulco and Ladd (2006) established the same results. Students in traditional schools made greater academic gains than their peers in charter schools. This result was similar to a study performed a year later in California.

Crane and Edwards (2007) analyzed California's charter school performance data from 183 charter elementary schools that served approximately 78,000 students and 4,965 traditional elementary schools that served approximately three million students. After the researchers controlled for differences in enrollment and student characteristics, they established that students enrolled in charter elementary schools scored about nine points lower than their peers in traditional elementary schools on the California state-mandated assessment. This outcome was supported in a later study by Orfield and Luce (2016).

Orfield and Luce (2016) examined student performance in Chicago charter schools by analyzing data from the 2012-2013 and 2013-2014 school year, including scores from the state assessment, graduation rates, and ACT scores. Orfield and Luce (2016) documented that students in Grades 3-8 in Chicago charter schools had lower reading and mathematics scores than their peers in traditional schools. The gap in achievement between students in charter schools and students in traditional schools in Chicago increased from the first year to the second year.

Winters (2018) published the results of seven studies in which New York charter schools were analyzed. In five of the studies, a randomized field trial design was used, in which data on only students who entered the lottery to attend New York Charter schools

were analyzed. Data on students who were randomly granted entry into the Charter School system were compared to data on students who were randomly denied the opportunity to enroll in the Charter School system. Winters (2018) determined that on average, students attending a charter school scored higher in mathematics and English language arts than they would have had they attended a traditional public school.

Similarly, the Center for Research on Educational Outcomes (2017) used a matching design to compare the performance of each student attending a charter school with a similar student attending a traditional public school in New York City. The Center for Research on Educational Outcomes researchers documented that 47.7% of the city's charter schools produced statistically significant gains in mathematics and reading compared to traditional public schools. Approximately one third of New York charter and traditional schools scored equally well, and 17% of the charter schools scored worse than traditional schools.

With respect to the state of interest for this article, the 75th Texas Legislature passed state laws to authorize the creation of charter schools in 1995. According to the 2016-2017 Charter Authorizer Accountability Report, "The goal of this legislation was to increase innovation in teaching methods, improve student learning, increase options for students and families within the public school system, and create professional opportunities which attract new teachers to the public school system" (p. 2). The 83rd Legislature, in 2013, after the Senate passed Senate Bill 2, added legislation to the TEC that required a report on the performance of open enrollment charter school campuses with results compared to the matched traditional public school campuses. Currently in Texas, children attending traditional and charter public schools in Grades 3-12 are

assessed yearly with the state-mandated State of Texas Assessment of Academic Readiness (STAAR). The STAAR results reported by the Texas Education Agency provide not only a percentage score, but also provide a passing standard for each student in Grade 4 through Grade 8. The passing standards “relate levels of test performance to the expectations defined in the state-mandated curriculum standards known as the Texas Essential Knowledge and Skills (TEKS)” [Texas Education Agency, 2020, p. 1]. Cut scores are determined by Texas Education Agency to distinguish students’ performance level or performance category. All students who participate in the STAAR assessment receive a performance level rating for each exam taken. The STAAR performance levels are: Does Not Meet Grade Level, Approaches Grade Level, Meets Grade Level, and Masters Grade Level.

According to the Charter Authorizer Accountability Report for the 2016-2017 school year, Shield, Garland, Cannon, Booth, and Pham (2017) documented that SBOE-authorized charter school campuses had a higher percent (75%) of students meeting the Approaches Grade Level standard on the 2017 STAAR Reading exam than their matched traditional school students (72%). The same school comparison yielded comparable percentage (76% for both) of students meeting the Approaches Grade Level standard on the 2017 STAAR Mathematics test. When compared to traditional public schools, ISD-authorized charter schools had a comparable percentage (70% vs. 71%) of students achieving the Approaches Grade Level standard on the 2017 STAAR Reading test; however, the ISD-authorized charter schools had a lower percentage (71%) of students achieving the Approaches Grade Level standard on the 2017 STAAR Mathematics exam than their matched traditional school campuses (76%). Students were matched based on

several identifying criteria, demographics, economic status, geographical location, and district population. Approximately 71% of the students were able to be matched successfully to be included in this study.

Several researchers, Penning and Slate (2011), Escalante and Slate (2017), and Klammer and Slate (2018) have compared the academic performance of various groups of Texas students between charter schools and in traditional schools. These groups of researchers have analyzed state-mandated test scores in the areas of reading, writing, science, and mathematics passing rates. In the first of these three investigations, Penning and Slate (2011) compared the demographic characteristics of students enrolled in charter schools to the demographic characteristics of students enrolled in traditional schools as well as addressing the academic achievement of students enrolled in these two school types in Texas. They established that, in 2009, approximately 42% of Texas charter school students were Black and 48% of Texas charter school students were Hispanic. At the same time, traditional public school enrollment in Texas at the time consisted of 14% Black students and 44% Hispanic students. Penning and Slate (2011) also determined that more than 70% of students enrolled in charter schools met the criteria for being “at-risk” for dropping out of school, compared to only 41% in traditional schools. With respect to academic performance, Penning and Slate (2011) documented that students enrolled in Texas charter schools did not perform better than traditional public schools in Texas; however, students enrolled in charter schools showed greater academic growth compared to students enrolled in traditional public schools in Texas.

In a more recent investigation, Escalante and Slate (2017) analyzed the academic achievement of Grades 3, 4, and 5 students between charter elementary schools and

traditional elementary schools in Texas. Using data from the state-mandated assessments, the STAAR tests on 20,920 students, of which 19,589 students were enrolled in traditional schools and 1,331 students were enrolled in charter school campuses, the researchers documented that students enrolled in traditional public schools had statistically significantly higher reading, mathematics, writing, and science scores than students enrolled in charter elementary schools. Escalante and Slate (2017) established that students in Grades 3 and 4 enrolled in traditional elementary schools had statistically significantly higher passing rates, 4.54% and 2.67%, respectively, on the STAAR Reading test than students in Grades 3 and 4 who were enrolled in charter schools. Grade 5 students in traditional and charter elementary schools had similar passing rates on the STAAR Reading test. Grade 4 students in traditional elementary schools and charter elementary schools, also had similar passing rates on the STAAR Writing test. Grade 5 students in traditional schools had a higher average passing rate on the STAAR Science, 6.02%, than Grade 5 students in charter schools.

In a more recent investigation, Klammer and Slate (2018) analyzed the degree to which differences were present in mathematics achievement between Grade 3 students who were enrolled in charter elementary schools and Grade 3 students who were enrolled in traditional elementary schools in the State of Texas. Klammer and Slate (2018) analyzed 2015-2016 STAAR data in two performance categories, Satisfactory Academic Performance and Advanced Academic Performance. In their study, students who were enrolled in traditional schools in Grade 3 had statistically significant higher passing rates in both performance categories than their peers who were enrolled in charter schools. As

such, student performance in these three Texas investigations was determined to be statistically significantly better in traditional public schools than in charter schools.

Statement of the Problem

The emergence of charter schools and their rapid growth has created choice for parents and students within the public education system. One possible appeal of charter schools is that charter school leadership teams and teachers can differentiate their instruction, population, and programs and offer students a free education. Because students may voluntarily attend charter schools and have the option of returning to their designated public school, charter schools are a viable competitor of traditional public schools.

Since the first legislation was passed in 1995 in Texas and the first 17 charter schools were opened in the fall of 1996 with an enrollment of 2,426, the Texas statewide charter school program has grown to 707 campuses serving 296,323 students accounting for 5.5% of the total Texas public school population. Charter schools have become a heated political topic among individuals who urge legislatures to promote and support school choice. Supporters of charter schools believe that because charter schools have more autonomy, charter schools can better utilize innovative and creative ways to meet their individual student population's needs.

Active parent engagement in their child's education is a contributing factor to student achievement (Wilder, 2014). Because school choice is primarily dependent on parent's seeking and enrolling their child in the charter school, it would be likely that charter schools might have higher academic student achievement based on the parent involvement factor alone; however, this assumption may not be true. Many factors may

play a role in student achievement in a charter school and it is imperative that parents, policymakers, and educators have data with which to make informed decisions for students that facilitate, and support increased academic achievement.

Purpose of the Study

The purpose of this study was to determine the degree to which Grade 4 students enrolled in charter elementary schools differed in their mathematics performance from Grade 4 students enrolled in traditional elementary schools. Specifically addressed were the three grade level standards: Approaches Grade Level, Meets Grade Level, and Masters Grade Level. These analyses were conducted separately for three school years: 2015-2016, 2016-2017, and 2017-2018.

Significance of the Study

Despite the rapid growth of school choice and grants available to charter school start-ups, results are not consistent regarding the effectiveness of charter schools on student achievement. “Taken in the aggregate, the empirical evidence to date leads one to conclude that we do not have definitive knowledge about the impacts of public charter schools on students and existing schools” (Silvernail & Johnson, 2014, p. i). Many of the research outcomes have not been consistent. Many findings are positive results for charter school student achievement compared to student achievement in traditional schools, but other researchers (e.g., Betts & Tang, 2011; CREDO, 2009, 2013; Escalante & Slate, 2017) have documented that students enrolled in traditional schools outperform students enrolled in charter schools.

As posted on the Texas Foundation School Program website in the 2019-2020 statewide charter school summary of finances document, over three billion dollars is

estimated as the total state funding from the Foundation School Program and the Available School Fund. Funding for charter schools has increased with the growing advocacy of school choice. An example of this trend is the passing of House Bill 21, beginning in the 2018-2019 fiscal year, Texas public charter schools will collectively receive up to \$60 million annually to fund leasing and maintaining building and facilities (Swaby, 2017).

Although much time and resources have been allotted for the creation of charter schools, few research studies exist in which researchers have analyzed student academic achievement in charter schools under the new accountability system's passing descriptors in Texas. Instructors and school leaders may be able to use the result of this study to inform policy within charter and traditional schools as well as inform law and policymakers on the efficacy of charter schools.

Research Questions

The following overarching research question was addressed in this study: What is the difference in Grade 4 STAAR Mathematics achievement of elementary schools as a function of school-type (i.e., charter or traditional)? Sub-questions under this research question were: (a) What is the difference in the Grade 4 STAAR Mathematics Approaches Grade Level standard by school-type?; (b) What is the difference in the Grade 4 STAAR Mathematics Meets Grade Level standard by school type?; (c) What is the difference in the Grade 4 STAAR Mathematics Masters Grade Level standard by school type?; and (d) What trend is present in the Approaches Grade Level, Meets Grade Level, and Masters Grade Level standard? The first three research questions were addressed separately for each of three school years: 2015-2016, 2016-2017, and 2017-

2018, whereas the fourth research question involved comparisons across all three school years.

Method

Research Design

A non-experimental, causal, comparative research design (Creswell, 2014) was used for this study. Archival data were analyzed to examine the mathematics passing standards of elementary students who were enrolled either in charter elementary schools or traditional elementary schools in the 2015-2016, 2016-2017, and 2017-2018 school years. The independent variable involved in this research article was school type (i.e., charter elementary school or traditional elementary school), and the dependent variables were the Grade 4 STAAR Mathematics Approaches Grade Level standard, Grade 4 STAAR Mathematics Meets Grade Level standard, and the Grade 4 STAAR Mathematics Masters Grade Level standard for students in the 2015-2016, 2016-2017, and 2017-2018 school years. Because existing data were analyzed in this multi-year, empirical investigation, neither the independent variable of school type nor the dependent variables of the STAAR passing standards can be manipulated.

To score a rating of Approaches Grade Level, students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR. Students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR to achieve the Meets Grade Level performance indicator. Students were given a performance indicator of Did Not Meet Grade Level if their raw score was 16 questions correct or below ($\leq 64\%$ and $\leq$

59%) on the 2017 and 2018 administrations and 17 questions correct or below ($\leq 25\%$) on the 2019 administration of the STAAR.

A student who achieves the Masters Grade Level performance standard on Grade 4 STAAR Mathematics is described as being able to: “evaluate and justify the reasonableness of solutions to multi-step application problems involving addition, subtraction, multiplication, and division of whole numbers, and can analyze mathematical relationships to compare and solve problems involving fractions.” (Texas Education Agency, 2019). Students achieved a raw score of 29 questions correct (82% and 79%) on the 2017 and 2018 administrations and 28 questions correct (79%) on the 2019 administration of the STAAR to achieve the Masters Grade Level performance indicator.

Participants and Instrumentation

For the purpose of this study, archival data for the 2015-2016, 2016-2017, and 2017-2018 school years for elementary students who were enrolled in either charter elementary schools or in traditional elementary schools was requested from the Texas Education Agency. A Public Information Request form was previously submitted to and fulfilled by the Texas Education Agency Public Education Information Management System for these data. The STAAR Mathematics passing standards of Approaches Grade Level, Meets Grade Level, and Masters Grade Level during these school years were the specific data analyzed for this study. Elementary students were specifically selected for this study because Grade 4 is the year prior to the first Student Success Initiative year, Grade 5, in which students must pass the STAAR to be promoted to Grade 6.

Each performance category, Approaches Grade Level, Meets Grade Level, and Masters Grade Level, is aligned to academic language that describe the students’

achievement in mathematics. All scores and performance indicators are reported by the state for individual students as well as in terms of demographic information and economic status.

A student who achieves the Approaches Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) represent, compare, and order whole numbers, decimals, and fractions, and understand relationships related to place value, (b) represent and solve problems involving addition, subtraction, multiplication, and division of whole numbers including two-step problems, (c) represent addition and subtraction of fraction problems with pictorial models, (d) represent and solve problems using data and tables, and (e) use a protractor to measure angles and a ruler to measure lengths.

A student who achieves the Meets Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) solve application problems involving addition, subtraction, multiplication, and division of whole numbers, including two-step problems and problems with a letter representing the unknown, (b) solve and explain multi-step addition and subtraction problems involving money, (c) compare fractions using symbols and justify relationships to the whole, (d) represent numerical relationships and patterns with models and tables including input-output tables, (e) select units and solve problems involving measurement including conversions, (f) apply knowledge of parallel and perpendicular lines to classify two-dimensional shapes, and (g) solve application problems involving perimeter and area including missing measurements.

A student who achieves the Did Not Meet Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) identify points represented by decimals and fractions on a number line, (b) represent decimals using expanded notation, (c) use models to represent and solve problems involving multiplication and division of whole numbers, and (d) identify lines of symmetry and types of angles.

Results

To ascertain whether differences were present in Grade 4 Mathematics STAAR performance indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) between students who were enrolled in charter elementary schools and students who were enrolled in traditional elementary schools, Pearson chi-square procedures were conducted. This statistical procedure was viewed as the optimal statistical procedure to use because frequency data were present for mathematics performance indicators and for school type. As such, chi-squares are the statistical procedure of choice when both variables are categorical. Additionally, with the large sample size, the available sample size per cell was more than five. Therefore, the assumptions underlying a chi-square were met (Slate & Rojas-LeBouef, 2011).

Approaches Grade Level Results

For the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 358.40, p < .001$. The effect size for this finding, Cramer's V, was below small, .04 (Cohen, 1988). A statistically significantly higher percentage, 8.3 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 students who were enrolled

in charter elementary schools. Table 2.1 contains the descriptive statistics for this analysis.

Insert Table 2.1 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 466.61, p < .001$, Cramer's V of .05, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 11 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Delineated in Table 2.1 are the descriptive statistics for this analysis.

With respect to the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 328.30, p < .001$, a Cramer's V of .04, a below small effect size (Cohen, 1988). Congruent with the first two school years, a statistically significantly higher percentage, 6 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Revealed in Table 2.1 are the descriptive statistics for this analysis.

For the 2015-2016 and 2016-2017 school years, Grade 4 students enrolled in traditional schools met the standard of Approaches Grade Level by over 8 percentage points compared to Grade 4 students enrolled in charter schools. For the 2017-2018 school year, Grade 4 students enrolled in traditional schools met the standard by over 6

percentage points compared to Grade 4 students who were enrolled in charter schools.

These results are depicted in Figure 2.1.

Insert Figure 2.1 about here

Meets Grade Level Results

For the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 359.13, p < .001$, Cramer's V of .04, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 9.8 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Table 2.2 contains the descriptive statistics for this analysis.

Insert Table 2.2 about here

Regarding the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 487.83, p < .001$, Cramer's V of .05, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 11 percentage points higher, Grade 4 of students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Delineated in Table 2.2 are the descriptive statistics for this analysis.

Concerning the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 357.55, p < .001$, a Cramer's V of .04, a below small effect size (Cohen, 1988). Commensurate with the first two school years, a statistically significantly higher percentage, 9.7 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Revealed in Table 2.2 are the descriptive statistics for this analysis.

Results were consistent for the 2015-2016, 2016-2017, and 2017-2018 school years. Grade 4 students enrolled in traditional schools met the Meets Grade Level performance indicator by approximately 10 percentage points more than Grade 4 students who were enrolled in charter schools. These results are depicted in Figure 2.2.

Insert Figure 2.2 about here

Masters Grade Level Results

With respect to the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 250.77, p < .001$, Cramer's V of .03, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 7.1 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Masters Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Table 2.3 contains the descriptive statistics for this analysis.

Insert Table 2.3 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 341.67, p < .001$, Cramer's V of .04, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 8.6 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Masters Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Delineated in Table 2.3 are the descriptive statistics for this analysis.

Regarding the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 242.94, p < .001$, a Cramer's V of .04, a below small effect size (Cohen, 1988). Congruent with the first two school years, a statistically significantly higher percentage, 7.4 percentage points higher, of Grade 4 students who were enrolled in traditional elementary schools met the Master Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Revealed in Table 2.3 are the descriptive statistics for this analysis.

For the 2015-2016 and 2017-2018 school years, Grade 4 students enrolled in traditional schools met the standard for Masters Grade Level by over 7 percentage points than Grade 4 students who were enrolled in charter schools. For the 2016-2017 school year, Grade 4 students enrolled in traditional schools met the standard by almost 9 percentage points greater than Grade 4 students who were enrolled in charter schools. These results are shown in Figure 2.3.

Insert Figure 2.3 about here

Results for the Performance Standards Over Time by School Type

With regard to trends in the Grade 4 Mathematics Performance standards of students enrolled in charter schools and students enrolled in traditional schools from the 2015-2016 through the 2017-2018 school years, Grade 4 students enrolled in traditional schools outperformed Grade 4 students enrolled in charter schools. Concerning the Approaches Grade Level indicator, Grade 4 students who were enrolled in traditional schools met this indicator an average of 7.8 percentage points more than Grade 4 students who were enrolled in charter schools. With respect to the Meets Grade Level performance, almost 10 percentage points more of Grade 4 students who were enrolled in traditional schools met this indicator than Grade 4 students enrolled in charter schools. Regarding the Masters Grade Level scores, an average of 7.7 percentage points more Grade 4 students who were enrolled in traditional schools met this indicator than Grade 4 students who were enrolled in charter schools.

Discussion

Analyzed in this investigation was the extent to which differences were present in the mathematics performance of Texas Grade 4 students who were enrolled in traditional elementary schools and Grade 4 students who were enrolled in charter elementary schools. Three years of Texas statewide data on the three Grade 4 STAAR Mathematics Performance Indicators were examined for students who were enrolled in either a charter school or in a traditional elementary school.

Statistically significant results were present in all three school years. For each of the three STAAR Mathematics Performance Indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level), in all three years analyzed, Grade 4 students who were enrolled in traditional elementary schools had statistically significantly better performance than Grade 4 students who were enrolled in charter schools. The gaps were consistent across the three school years and ranged from 6.4 percentage points to 11.1 percentage points. The STAAR Mathematics Performance Indicator with the greatest gap between Grade 4 students who were enrolled in traditional schools and Grade 4 students who were enrolled in charter schools was the Meets Grade Level indicator, with every year yielding approximately a 10 percentage point difference.

To consider a Grade 4 student on or above grade level, students must meet the standard for Meets Grade Level or Masters Grade Level. For each of the three years of data, Grade 4 students enrolled in traditional schools met the standards of Meets Grade Level and Masters Grade Level at higher percentages than Grade 4 students who were enrolled in charter schools. Higher percentages of Grade 4 students in traditional schools were at or above grade level than were Grade 4 students enrolled in charter schools for all three school years. For the 2015-2016 and 2017-2018 school years, the difference between traditional and charter school performance in these two Performance Indicators was about 17 percentage points. In regard to the 2016-2017 school year, Grade 4 students in traditional schools outperformed Grade 4 students in charter schools in the Meets Grade Level and Masters Grade level by almost 20 percentage points.

Of note was that the percentage of Grade 4 students who met the Approaches Grade Level performance indicator increased for both traditional and for charter schools.

The percentages of Grade 4 students who were enrolled in either traditional schools or charter schools who did not meet standard for the Approaches Grade Level performance indicator decreased in each school year analyzed. This trend was congruent for all three performance indicators for the 2015-2016, 2016-2017, and 2017-2018 school years.

In this investigation, higher percentages of Grade 4 students who were enrolled in traditional elementary schools met STAAR Mathematics performance indicators than did Grade 4 students who were enrolled in charter schools. Charter schools have had an accelerated growth, 250% within the last 10 years (Texas Education Agency, 2016b), and school reformers are advocating for the development of charter schools. Yet, the efficacy of charter schools has not been established.

Connections to Existing Literature

Several researchers (e.g., Escalante & Slate, 2017; Penning & Slate, 2011) have previously addressed the degree to which charter school students and traditional school students differed in their academic performance on Texas state-mandated assessments. In this 3-year statewide investigation, higher percentages of Grade 4 students who were enrolled in traditional elementary schools met the STAAR Mathematics Performance Standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) than did Grade 4 students who were enrolled in charter schools. The findings delineated herein were congruent with Penning and Slate (2011) who documented that students who were enrolled in charter schools were not performing better than students who were enrolled in traditional public schools.

These results were also consistent with Escalante and Slate (2017) wherein Grade 3 students who were enrolled in traditional public schools had statistically significantly

higher reading scores than did Grade 3 students who were enrolled in charter schools. Escalante and Slate (2017) established that Grade 3 students who were enrolled in traditional elementary schools had higher average reading passing rates than did their peers who were enrolled in charter elementary schools.

Implications for Policy and Practice

Several implications for policy and for practice can be made based upon the results of this multiyear, statewide investigation. With respect to policy implications, educational leaders should focus their efforts in conducting more educational research in regards to the efficacy of charter schools. Additionally, policymakers should analyze the results of this educational research study before making decisions regarding academic and financial support to charter school systems. Charter schools not fulfilling the purpose of Texas Education Code 12.001 to “improve student learning” should undergo a mandatory partnership with the School Improvement Team at the Texas Education Agency or a local Education Service Center and participate fully in Texas Instructional Leadership practices. Texas Instructional Leadership practices are focused on observation and feedback, culture routines, data-driven instruction, and lesson plans and formative assessment. These tools are what the Texas Education Agency recommends leaders focusing on in order to improve student achievement and produce effective schools.

Regarding implications for practice, to help parents in the decision-making process of deciding where to enroll their children, all schools should be required to provide information of the school academic rating at registration. If charter school students are not performing equal to or above the local, traditional school students’ academic performance, then this information should be released to all parents of that

charter school's students. If parents are given a choice where to send their students, complete transparency in academic achievement should be required.

Recommendations for Future Research

Given the results of this multiyear investigation, several recommendations for future research can be made. This study was conducted using data on only Grade 4 students who were enrolled in either a traditional elementary school or in a charter elementary school in Texas. The degree to which findings obtained herein would be generalizable to schools in other states is not known. Moreover, the extent to which these findings would be generalizable to students in other grade levels is also not known. Accordingly, researchers are encouraged to examine the mathematics performance of students in traditional and charter schools in other states and at other grade levels. Another recommendation is for researchers to analyze mathematics performance by student demographic characteristic. That is, in this investigation, the performance of all students was addressed. Because mathematics gaps have been documented in the literature for students in poverty and for students of color, researchers are encouraged to examine mathematics performance by student demographic characteristic. Finally, researchers are encouraged to conduct longitudinal studies in which they follow the progress of students over the course of their enrollment in traditional schools and in charter schools.

Conclusion

The purpose of this investigation was to determine the extent to which differences were present in the mathematics achievement of Grade 4 students in Texas as a function of school type (i.e., charter schools and traditional schools). Three school years of

archival data from the Texas Education Agency Public Education Information Management System were analyzed. In each of the school years, Grade 4 students who were enrolled in traditional elementary schools had statistically significantly higher percentage of students who met each performance indicator (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level), than did Grade 4 students who were enrolled in charter elementary schools. As such, no evidence was present that students enrolled in charter schools have higher mathematics achievement than students enrolled in traditional schools.

References

- Betts, J. R., & Tang, Y. E. (2011). *The effect of charter schools on student achievement: A meta-analysis of the literature*. National Charter Schools on Student Achievement: Evidence from North Carolina. Working Papers Series. SAN04-01. Terry Sanford Institute of Public Policy.
- Bifulco, R., & Ladd, H. F. (2004). *The impacts of charter schools on student achievement: Evidence from North Carolina*. Working Papers Series. SAN04-01. Terry Sanford Institute of Public Policy.
- Bifulco, R., & Ladd, H. F. (2006). The impacts of charter schools on student achievement: Evidence from North Carolina. *Education Finance and Policy*, 1(1), 50-90.
- Bulkley, K., & Fisler, J. (2003). A decade of charter schools: From theory to practice. *Educational Policy*, 17(3), 317-342.
<https://doi.org/10.1177%2F0895904803017003002>
- Center for Research on Education Outcomes. (2009). *Multiple choice: Charter school performance in 16 states*. Stanford, CA: CREDO at Stanford University.
- Center for Research on Education Outcomes. (2013). *National charter school study*. Stanford, CA: CREDO at Stanford University.
- Center for Research on Education Outcomes. (2017). *Charter school performance in New York City*. Stanford, CA: CREDO at Stanford University.
- Clark, M., Gleason, P., Tuttle, C., & Silverberg, M. (2011). *Do charter schools improve student achievement? Evidence from a national randomized study*. Mathematics Working Paper. Washington, DC: Mathematics Policy Research.

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Crane, E., & Edwards, B. (2007). *California's charter schools: Measuring their performance*. Mountain View, CA: EdSource.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.
<https://doi.org/10.7748/nr.12.1.82.s2>
- Escalante, M. L., & Slate, J. R. (2017). Differences in academic performance between elementary charter schools and traditional public schools. *Journal of Advances in Education Research*, 2(3), 163-170. <https://doi.org/10.22606/jaer.2017.23004>
- Every Student Succeeds Act (ESSA) of 2015, Pub. L. No. 114-95 Stat. 1177 (2015).
- Greene, J. P., Forster, G., & Winters, M. A. (2003). *Apples to apples: An evaluation of charter schools serving general student populations*. (Working paper 1). New York, NY: The Manhattan Institute. Retrieved from https://media4.manhattan-institute.org/pdf/ewp_01.pdf
- Hinojosa, M. (2009). *A comparison of open enrollment charter schools and traditional public schools in a Texas region*. Ann Arbor, MI: ProQuest LLC.
- Hoxby, C. M., & Rockoff, J. E. (2004). *The impact of charter schools on student achievement*. Cambridge, MA: Department of Economics, Harvard University.
- Imberman, S. A. (2011). The effect of charter schools on achievement and behavior of public school students. *Journal of Public Economics*, 95, 850-863.
<https://doi.org/10.1016/j.jpubeco.2011.02.003>

- Klammer, B., & Slate, J. R. (2018). Differences between charter and traditional elementary schools in Grade 3 mathematics performance. *Journal of Educational System*, 2(4), 33-37. Retrieved from <https://www.sryahwapublications.com/journal-of-educational-system/pdf/v2-i4/6.pdf>
- Orfield, M., & Luce, T. (2016). An analysis of student performance in Chicago's charter schools. *Education Policy Analysis Archives*, 24(111), 3-38.
- Penning, F., & Slate, J. R. (2011). Charter schools in Texas: An overview. *International Journal of Educational Leadership Preparation*, 6(3), 3.
- Shields, J., Garland, M., Cannon, S., Booth, E., & Pham, C. (2017). *Texas charter authorizer accountability report, 2016-17* (Gibson Consulting). Retrieved from Texas Education Agency website: https://TexasEducationAgency.texas.gov/Reports_and_Data/Program_Evaluations/Charter_Schools/Program_Evaluation_Texas_Charter_Schools/
- Silvernail, D., & Johnson, A. (2014). *The impacts of public charter schools on students and traditional public schools: What does the empirical evidence tell us?* Gorham, Maine: Maine Education Policy Research Institute, University of Southern Maine.
- Slate, J. R., & Rojas-LeBouef, A. (2011). *Calculating basic statistical procedures in SPSS: A self-help and practical guide to preparing theses, dissertations, and manuscripts*. Ypsilanti, MI: NCPEA Press.
- Swaby, A. (2017, October). In historic win, charters getting state funding for facilities for the first time. *The Texas Tribune*. Retrieved from

<https://www.texastribune.org/2017/03/21/school-choice-debate-debates-whatbest-famillies/>

Texas Education Agency (2016). *Enrollment in Texas public schools, 2015-16*.

(Document No. GE16 601 09). Austin TX: Author. Retrieved from

http://www.tea.texas.gov/acctres/enroll_index.html

Texas Education Agency. (2019). *Performance level descriptors: Grade 4 Mathematics*.

Retrieved from

https://tea.texas.gov/sites/default/files/PLD_Math_G4_April%202019_V2.pdf

Texas Education Agency. (2020). *STAAR performance standards*. Retrieved from

<https://tea.texas.gov/student-assessment/testing/staar/staar-performance-standards>

Texas Education Code, Chapter 12, Subchapters D & E. (2016) Retrieved from

https://texas.public.law/statutes/tex._educ._code_section_12.0011

U.S. Department of Education. (2004). *No Child Left Behind: A toolkit for teachers*.

Retrieved from <http://www.ed.gov/teachers/nclbguide/nclb-teachers-toolkit.pdf>

U.S. Department of Education. (2015). *Every Student Succeeds Act*. Retrieved from

<https://www.ed.gov/essa?src=rn>

Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-

synthesis. *Education Review*, 66(3), 1-21.

<https://doi.org/10.1080/00131911.2013.780>

Winters, M. A. (2018). *New York City's charter schools: What the research shows*. New

York, NY: Manhattan Institute.

Table 2.1

*Descriptive Statistics for the STAAR Grade 4 Mathematics Approaches Grade Level
Standard by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years*

School Year and School Type	Did Not Meet		Met Standard	
	Standard			
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	45,961	22.7	156,603	77.3
Charter	3,002	31	6,687	69
2016-2017				
Traditional	42,138	20.3	165,174	79.7
Charter	3,045	29.1	7,418	70.9
2017-2018				
Traditional	28,349	15.9	149,711	84.1
Charter	2,239	22.3	7,794	77.7

Table 2.2

*Descriptive Statistics for the STAAR Grade 4 Mathematics Meets Grade Level Standard
by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years*

School Year and School Type	Did Not Meet		Met Standard	
	Standard			
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	114,884	56.7	87,680	43.3
Charter	6,440	66.5	3,249	33.5
2016-2017				
Traditional	100,130	48.3	107,182	51.7
Charter	6,211	59.4	4,252	40.6
2017-2018				
Traditional	78,712	44.2	99,348	55.8
Charter	5,403	53.9	4,630	46.1

Table 2.3

*Descriptive Statistics for the STAAR Grade 4 Mathematics Masters Grade Level**Standard by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years*

School Year and School Type	Did Not Meet		Met Standard	
	Standard			
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	153,229	75.6	49,335	24.4
Charter	8,011	82.7	1,678	17.3
2016-2017				
Traditional	143,101	48.3	64,211	31
Charter	8,115	59.4	2,348	22.4
2017-2018				
Traditional	120,107	67.5	57,953	32.5
Charter	7,517	74.9	2,516	25.1

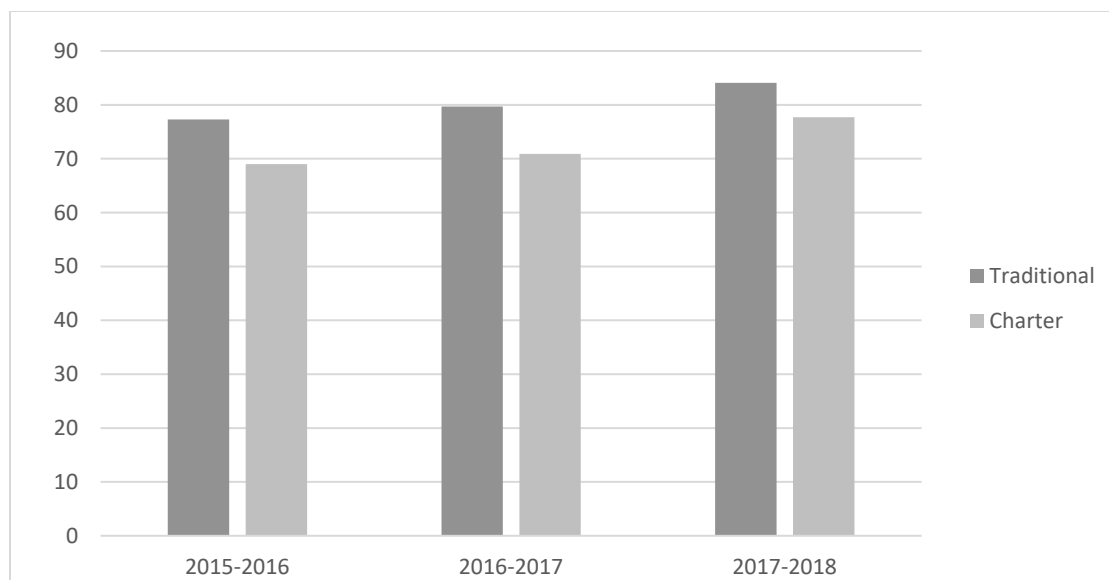


Figure 2.1. Percentages of students who met the Approaches Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

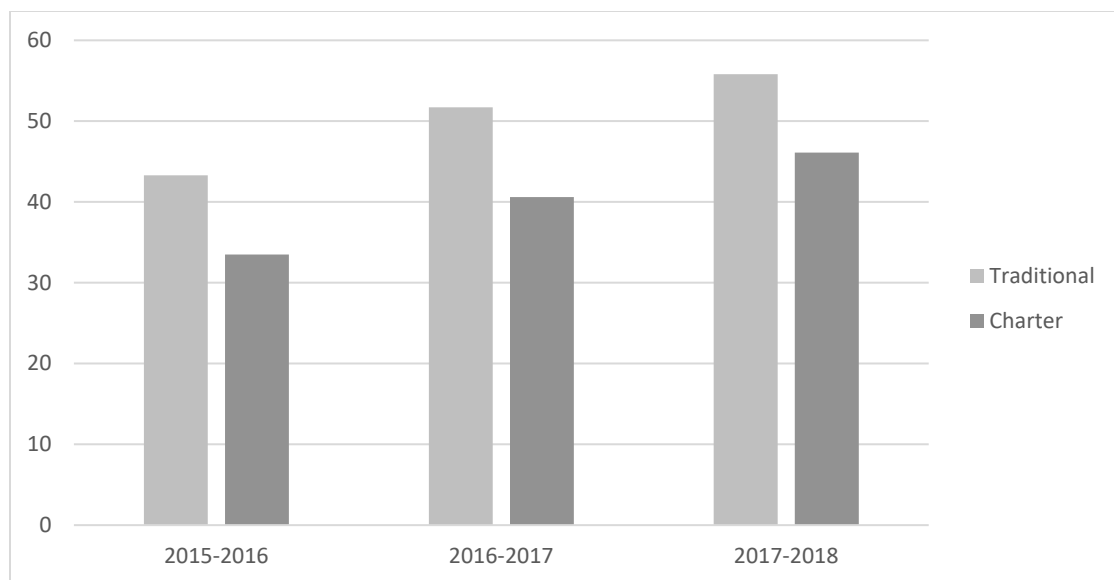


Figure 2.2. Percentages of students who met the Meets Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

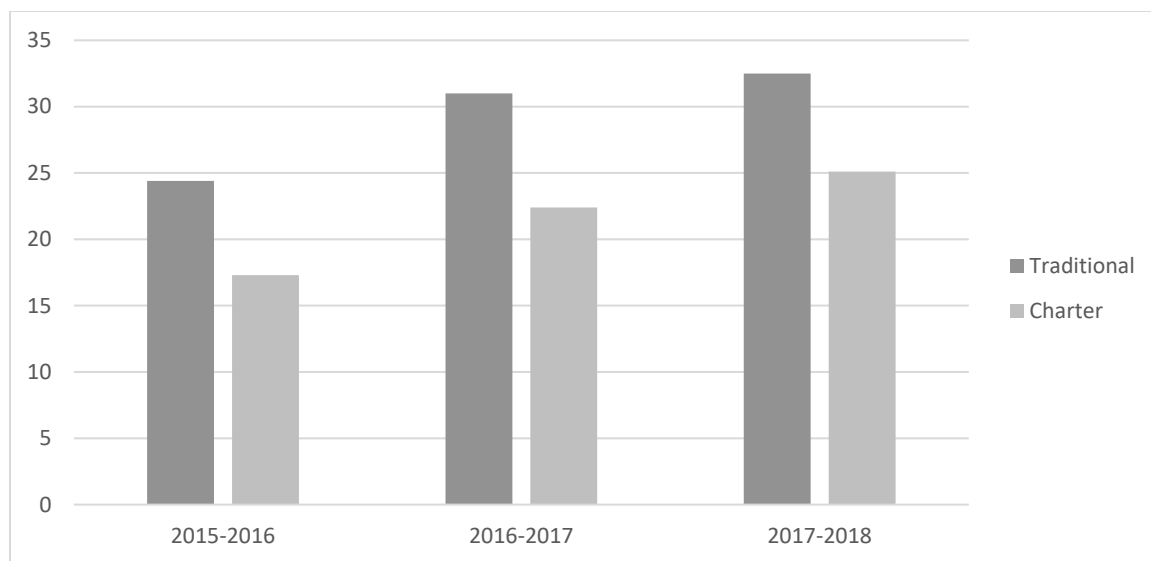


Figure 2.3. Percentages of students who met the Masters Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

CHAPTER III

DIFFERENCES BETWEEN TEXAS CHARTER ELEMENTARY SCHOOLS AND TRADITIONAL ELEMENTARY SCHOOLS IN GRADE 4 MATHEMATICS PERFORMANCE STANDARDS OF THEIR BLACK AND HISPANIC STUDENTS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

In this statewide, multiyear analysis, the extent to which differences were present in mathematics achievement of Grade 4 Hispanic and Black students by school type (i.e., traditional or charter) was determined. Specifically examined was the relationship of school enrollment type to the three State of Texas Assessment of Academic Readiness (STAAR) Mathematics Performance Indicators in the 2015-2016 through the 2017-2018 school years. Statistical analyses revealed the presence of statistically significant differences in mathematics achievement as a function of school type. Grade 4 Hispanic students who were enrolled in charter schools did not perform as well as Grade 4 Hispanic students who were enrolled in traditional schools. Results for Hispanic students were consistent across all three school years and across all three STAAR Mathematics Performance Indicators. Similarly, for the 2015-2016 and 2016-2017 school years, Grade 4 Black students who were enrolled in traditional schools met all performance standards equally to or higher than Grade 4 Black students who were enrolled in charter schools. In contrast, however, were the results for the 2017-2018 school year wherein Grade 4 Black students enrolled in charter schools met the performance standards at a higher rate than Grade 4 Black students enrolled in traditional schools. Implications of these findings and recommendations for future research are discussed.

Keywords: Charter schools; Traditional schools; Texas; Grade 4; STAAR; Mathematics; Performance indicators; Approaches grade level; Meets grade level; Masters grade level; Hispanic students; Black students

DIFFERENCES BETWEEN TEXAS CHARTER ELEMENTARY SCHOOLS AND
TRADITIONAL ELEMENTARY SCHOOLS IN GRADE 4 MATHEMATICS
PERFORMANCE STANDARDS OF THEIR BLACK AND HISPANIC STUDENTS

Since the 1954 *Brown vs. Board of Education* decision in which the United States Supreme Court ruled that segregated schools are unconstitutional and unequal because “disparities in school quality lead to different school outcomes” (Kevelson, 2019, p. 2) achievement gaps of underrepresented populations in the United States have been of concern and interest. In 1966, the authors of the Coleman Report, the first in a long succession of empirical studies to follow, documented the presence of ethnic/racial inequities in student achievement (Coleman et al., 1966). Achievement gaps continue to exist between students of color and White students (Lee, 2002; Mackey et al., 2015).

The 2009 National Assessment for Education Progress established that Black and Hispanic student test scores were three-fourths of a standard deviation below the scores of White students. This difference is equivalent to four years of learning (Reardon 2011). Although efforts have occurred to close the ethnic/racial achievement gap, the gap is still in existence for students of color.

Maloney and Mayer (2010) provided a historic perspective of the achievement gap by stating,

The phrase “achievement gap” in education and political circles signifies the long term and steady score gap between White, Black and Hispanic/Latino youth on standardized tests. Using the National Assessment of Educational Progress and SAT Scores, researchers have shown that this gap, first recognized in the 1960s,

fell by 20% to 40% (depending on the estimate) in the 1970s and 1980s, but then began widening in the late 1990s. (p. 333)

As a result of the widening of achievement gaps between the demographic groups within schools, the 2000 Presidential election allowed for candidates to bring these issues to the forefront and to claim federal legislation was needed to close these gaps. With the election of President George W. Bush, the No Child Left Behind Act (2001) passed, which mandated rigid accountability systems and the tracking of all demographic groups on state mandated tests. The State of Texas' response to the No Child Left Behind Act provided the foundation of the current State of Texas Assessment of Academic Readiness (STAAR) Closing the Gaps domain in the Texas accountability system.

The Closing the Gaps domain in the State of Texas Accountability was implemented in an attempt to ensure educational equity (Texas Education Agency, 2020). All student ethnic/racial groups, students served in special education, students who are mobile, English Language Learners, and students who are in poverty are included in this effort. The academic achievement of these student groups is measured by the STAAR for achievement in mathematics, reading, writing, social studies, and science, and growth or progress in mathematics and reading. Students are measured by how many students in the student group achieved at or above the Meets Grade Level standard (Texas Education Agency, 2018). These indicators make up 30% of the whole accountability system for a school and for Texas districts.

Since the first charter school legislation was passed in 1995 in Texas and the first 17 charter schools were opened in the fall of 1996 with an enrollment of 2,426, the Texas statewide charter school program has grown to 707 campuses serving 296,323 students

which accounts for 5.5% of the total Texas public school population. Charter schools are part of the Texas public school system, with four types of charter schools being present in Texas. The four types are: (a) Home-rule School District Charters (no home-rule school district charters are in Texas); (b) Campus or Campus Program Charters. These charter schools are authorized and overseen by independent school districts; (c) Open-enrollment Charters. Charter schools authorized by the Commissioner of Education (or the State Board of Education prior to 2013). Most of the charter schools in Texas fall under this category; and, (d) University or Junior College Charters. Charter schools authorized by the Commissioner of Education and overseen by public colleges and universities within the state of Texas.

Texas charter schools are funded through federal and state funds and some are funded through private grants. Charter schools do not have to follow all the state laws in place for traditional public schools, and this reduced legislation is meant to encourage more innovation and allow for more flexibility in the instructional setting. These 707 campuses have increased freedom not allowed by traditional public schools; however, students who attend charter schools must take the STAAR test and are under the guidelines of the Every Student Succeeds Act (2015) and Texas House Bill 22 guidelines. The Every Student Succeeds Act (2015) Chapter VIII, required the “implementation of academic standards, assessments, or accountability systems; and how to meet the needs of disadvantaged students, children with disabilities, and English learners, the needs of low-performing schools, and other educational needs of students” (pp. 583-584). Texas House Bill 22 mandated the commissioner “continuously improve student performance to achieve the goals of eliminating achievement gaps based on race, ethnicity, and

socioeconomic status and to ensure this state is a national leader in preparing students for postsecondary success” (Texas Education Agency, 2019, p. 1). Both charter schools and traditional schools in Texas strive to perform well on Closing the Gaps, and with the growing pressure of public schools to perform satisfactorily in the current A-F accountability system, the debate on charter school efficacy versus traditional school efficacy continues.

Charter schools became one solution to eliminating existing achievement gaps; however, “taken in the aggregate, the empirical evidence to date leads one to conclude that we do not have definitive knowledge about the impacts of public charter schools on students and existing schools” (Silvernail & Johnson, 2014, p. i). Rapid growth of school choice and grants available to charter school start-ups have emerged. However, despite this growth, conflicting results regarding the effectiveness of charter schools on student achievement have also emerged.

Chudowsky and Ginsburg (2012) analyzed data from the National Assessment of Educational Progress and concluded that charter school enrollment between 2003 and 2011 increased for all subgroups, however, the most dramatic increase in student enrollment occurred for Black students. The percentage of Grade 4 Black students enrolled in charter schools increased from 4% in 2003 to 12% in 2011. Both nationally and in large cities, charter schools have a larger proportion of Black students than regular public schools. Chudowsky and Ginsburg (2012) analyzed the national data and concluded that in many charter schools that focus on Black or Hispanic students within large cities, students in these subgroups outperformed their traditional school counterparts in several subject and grade level combinations. In large cities, Black

students who were identified as low-income and who attended charter schools had a substantially higher achievement rate in Grade 4 mathematics than similar students attending traditional schools.

Conversely, a study was conducted by the National Center for Education Statistics in 2005 using the National Assessment of Educational Progress 2003 data. Researchers compared the achievement of students attending charter schools and students attending traditional schools. In Grade 4 mathematics, students enrolled in traditional elementary schools outperformed students enrolled in charter schools. However, when students were compared with students of similar racial/ethnic backgrounds, the Grade 4 mathematics performance of Black, Hispanic, and White students enrolled in charter schools was not statistically significantly different than the performance of Black, Hispanic, and White students attending traditional schools.

In a statewide study conducted in Georgia, Plucker, Makel, and Rapp (2007) examined student achievement in charter schools and traditional schools with similar demographics within close geographic proximity. Plucker et al. (2007) documented that Black students generally experienced positive or neutral achievement in mathematics in traditional schools and negative achievement in mathematics in charter schools. Black students were more likely to move into the top 10% in traditional schools.

With respect to the state of interest for this article, Texas, studies have been conducted to evaluate Texas charter schools. In the 2009-2010 school year, the Texas Education Agency contracted with the State of Texas Education Research Center at Texas A&M University to conduct an evaluation of Texas public charter schools. Both secondary source data analysis and survey evaluation were used in the evaluation (Taylor

et al., 2011). No statistically significant differences were determined to exist between student performance at charter schools and traditional public schools. Furthermore, statistically significant differences were not present for Hispanic students, students who were economically disadvantaged, or for English Language Learners. Student overall performance at charter schools was comparable to student performance at traditional schools (Taylor et al., 2011).

In a more recent investigation, Escalante and Slate (2017) analyzed the degree to which differences were present in the reading, writing, and science achievement of Grades 3, 4, and 5 students on the 2015 STAAR tests between charter elementary schools and traditional elementary schools. Escalante and Slate (2017) documented that students enrolled in traditional elementary schools had statistically significantly higher scores on all three content areas than did students who were enrolled in charter elementary schools. In none of their analyses did elementary school students in charter schools outperform elementary school students in traditional schools.

In the same year, Montemayor (2017) conducted a quantitative, comparative analysis on the reading and mathematics performance of students in Grades 3, 4, and 5. Montemayor (2017) specifically analyzed the state-mandated assessments in reading and mathematics of students in South Texas in the 2015-2016 school year. Similar reading and mathematics test scores were present for students in charter elementary schools and traditional elementary schools. Of note was that Montemayor (2017) determined that students in charter schools did not have higher reading and mathematics test scores than the students who were enrolled in traditional elementary schools.

In the most recent published work that could be located, Klammer and Slate (2018) analyzed the degree to which differences were present in mathematics achievement between Grade 3 students who were enrolled in charter elementary schools and Grade 3 students who were enrolled in traditional elementary schools in the State of Texas. They analyzed STAAR data in two performance categories: Satisfactory Academic Performance and Advanced Academic Performance. Based on the results of their analyses, Klammer and Slate (2018) established that students enrolled in traditional schools in Grade 3 had statistically significant higher passing rates in both performance categories than did students enrolled in charter schools.

Statement of the Problem

In 1966, James Coleman analyzed the equality of opportunity in U.S. schools and reported the presence of a great divide between the opportunities of White students and opportunities for students of color. “Today’s racial gap is nearly one standard deviation—approximately the difference between the performance of 4th and 8th graders” (Peterson, 2016, p. 23). Now that charter schools have been in effect for over two decades, the question of their efficacy remains. “The first question that policymakers ask about voucher and charter programs is whether they will improve or harm academic achievement” (Gill, Timpane, Ross, & Brewer; 2004, p. 69). Within the State of Texas’s Accountability system, all public and state-funded charter schools are held to the same academic standards. The Texas Education Agency recently closed the application process for the Generation 25 charter schools. More than 20 applications were filed to fund and open new charter schools (Texas Education Agency, 2020). Analyzing the

achievement of Black and Hispanic students who attend charter schools will add to the literature.

Purpose of the Study

The purpose of this study was to determine the degree to which differences were present in mathematics achievement of Grade 4 Black and Hispanic students between charter elementary schools and traditional elementary schools. Specifically, the extent to which three performance standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) differed for Grade 4 Black and Hispanic students enrolled at charter schools and at traditional schools was determined. Through analyses of three years of Texas statewide data, the degree to which trends were present in student academic performance in these two school types was addressed.

Significance of the Study

Although much time and resources have been allotted for the creation of charter schools, many of which attract Black and Hispanic students, little research has been conducted to determine the extent to which differences might be present in mathematics performance between charter elementary schools and traditional elementary schools in Grade 4. Because Grade 4 is the year before Students Success Initiative, where students must pass the STAAR tests in Grade 5 to be promoted to Grade 6, these data can affect instructional practice within charter and traditional schools. Analyzing the passing performances of students who are enrolled in either charter schools or in traditional schools may also inform law and policymakers on the efficacy of charter schools to close the achievement gaps of historically low performing demographic groups.

Research Questions

The following overarching research question was addressed in this study: What was the difference in Grade 4 STAAR Mathematics achievement of Black and Hispanic elementary school students as a function of school type (i.e., charter or traditional)? Sub-questions under this research question were (a) What is the difference in the Approaches Grade Level standard by school type for Black students?; (b) What is the difference in the Approaches Grade Level standard by school type for Hispanic students?; (c) What is the difference in the Meets Grade Level standard by school type for Black students?; (d) What is the difference in the Meets Grade Level standard by school type for Hispanic students?; (e) What is the difference in the Masters Grade Level performance standard by school type for Black students?; (f) What is the difference in the Masters Grade Level performance standard by school type for Hispanic students?; (g) What trend is present for Black students in Approaches Grade Level, Meets Grade Level, and Masters Grade Level standard over three school years: 2015-2016, 2016-2017, and 2017-2018?; and (h) What trend is present for Hispanic students in Approaches Grade Level, Meets Grade Level, and Masters Grade Level standard over three school years: 2015-2016, 2016-2017, and 2017-2018?

Method

Research Design

A non-experimental, causal comparative research design (Creswell, 2014) was used for this study. Archival data were analyzed to examine the mathematics passing standards of Grade 4 Black and Hispanic students and who were enrolled either in charter elementary schools or traditional elementary schools in the, 2015-2016, 2016-2017, and

2017-2018 school years. The independent variable involved in this research article was school type (i.e., charter elementary school or traditional elementary school), and the dependent variables were the Grade 4 STAAR Mathematics Approaches Grade Level standard, Meets Grade Level standard, and Masters Grade Level standard. Because existing data was analyzed in this multi-year, empirical investigation, neither the independent variable of school type nor the dependent variables of the STAAR passing standards were manipulated.

Traditional public schools in Texas are schools funded by state and local taxes, governed by local school boards, and serve students from ages 3-21 regardless of past academic performance or learning needs. Traditional public schools must follow state initiatives put forth by the Texas Education Agency and the Texas Education Code. Four types of charter schools exist in Texas, but the most common category is the Subchapter D Open-enrollment Charters. The commissioner authorizes these charter schools and most of the charter schools in Texas are in this category. Other types of Charter Schools include Subchapter B Home-rule School District Charters, Subchapter C Campus or Campus Program Charters, and Subchapter E University or Junior College Charters. Charter schools are exempt from many state laws in order to promote innovation and creativity within school systems; however, all public charter schools are mandated to participate in the state assessment and accountability system. (TEA, 2020a)

Participants and Instrumentation

For the purposes of this study, archival data for the 2015-2016, 2016-2017, and 2017-2018 school years for Black and Hispanic Grade 4 students who were enrolled in either charter elementary schools or traditional elementary schools was requested from

the Texas Education Agency. A Public Information Request form was previously submitted to and fulfilled by the Texas Education Agency Public Education Information Management System for these data. The mathematics passing standards of Black and Hispanic Grade 4 students during these school years were the specific data analyzed for this study. Fourth grade elementary students were specifically selected for this study because Grade 4 is the year prior to the first Student Success Initiative year, Grade 5, in which students must pass the STAAR to be promoted to Grade 6.

The performance levels, defined by Texas Education Agency through Performance Level Descriptors, are descriptions of student achievement for each grade level and content area assessed. All students assessed are categorized as: *Approaches Grade Level, Meets Grade Level, Masters Grade Level, or Did Not Meet Grade Level*. The Performance Level Descriptors specifically describe the knowledge and skills that students typically demonstrate at each performance level and focus on the process skills of mathematics. The process skills are described by Texas Education Agency as, “the ways in which students are expected to engage in the content” (2019). These cognitive skills are not assessed in isolation but are applied when students use mathematics to solve problems, analyze mathematical relationships, and communicate mathematical ideas. (Texas Education Agency, 2019a).

A student who achieves the Approaches Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) represent, compare, and order whole numbers, decimals, and fractions, and understand relationships related to place value, (b) represent and solve problems involving addition, subtraction, multiplication, and division of whole numbers including

two-step problems, (c) represent addition and subtraction of fraction problems with pictorial models, (d) represent and solve problems using data and tables, and (e) use a protractor to measure angles and a ruler to measure lengths.

Students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR to achieve the Meets Grade Level performance indicator. To score a rating of Approaches Grade Level, students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR. Students were given a performance indicator of Did Not Meet Grade Level if their raw score was 16 questions correct or below ($\leq 64\%$ and $\leq 59\%$) on the 2017 and 2018 administrations and 17 questions correct or below ($\leq 25\%$) on the 2019 administration of the STAAR. All scores and performance indicators are reported by the state in terms of demographic information.

A student who achieves the Meets Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to:

- (a) solve application problems involving addition, subtraction, multiplication, and division of whole numbers, including two-step problems and problems with a letter representing the unknown, (b) solve and explain multi-step addition and subtraction problems involving money, (c) compare fractions using symbols and justify relationships to the whole, (d) represent numerical relationships and patterns with models and tables including input-output tables, (e) select units and solve problems involving measurement including conversions, (f) apply knowledge of parallel and perpendicular lines to classify

two-dimensional shapes, and (g) solve application problems involving perimeter and area including missing measurements.

A student who achieves the Masters Grade Level performance standard on Grade 4 STAAR Mathematics is described as being able to: “evaluate and justify the reasonableness of solutions to multi-step application problems involving addition, subtraction, multiplication, and division of whole numbers, and can analyze mathematical relationships to compare and solve problems involving fractions.” (Texas Education Agency, 2019a). Students achieved a raw score of 29 questions correct (82% and 79%) on the 2017 and 2018 administrations and 28 questions correct (79%) on the 2019 administration of the STAAR to achieve the Masters Grade Level performance indicator.

A student who achieves the Did Not Meet Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) identify points represented by decimals and fractions on a number line, (b) represent decimals using expanded notation, (c) use models to represent and solve problems involving multiplication and division of whole numbers, and (d) identify lines of symmetry and types of angles.

Results

To ascertain whether differences were present in Grade 4 Mathematics STAAR performance indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for Black and Hispanic students between enrollment in either a charter school or in a traditional elementary school, Pearson chi-square procedures were conducted. This statistical procedure was viewed as the optimal statistical procedure to use because frequency data were present for mathematics performance indicators and for

school type. As such, chi-squares are the statistical procedure of choice when both variables are categorical. Additionally, with the large sample size, the available sample size per cell was more than five. Therefore, the assumptions underlying a chi-square were met (Slate & Rojas-LeBouef, 2011).

Approaches Grade Level Results for Hispanic Students

For the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 33.16, p < .001$. The effect size for this finding, Cramer's V, was below small, .02 (Cohen, 1988). A statistically significantly higher percentage, 3.4 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Table 3.1 contains the descriptive statistics for this analysis.

 Insert Table 3.1 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 89.12, p < .001$, Cramer's V of .03, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 5.1 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Delineated in Table 3.1 are the descriptive statistics for this analysis.

With respect to the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 56.40, p < .001$, a Cramer's V of .02, a below small effect size (Cohen, 1988). Congruent with the first two school years, a statistically significantly higher percentage, almost 4 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Revealed in Table 3.1 are the descriptive statistics for this analysis.

For the 2015-2016 school year, Grade 4 Hispanic students enrolled in traditional schools met the standard of Approaches Grade Level by over 3 percentage points compared to Grade 4 Hispanic students enrolled in charter schools. In regard to the 2016-2017 school year, Grade 4 Hispanic students enrolled in traditional schools met the standard of Approaches Grade Level by over 5 percentage points compared to Grade 4 Hispanic students enrolled in charter schools. For the 2017-2018 school year, Grade 4 Hispanic students enrolled in traditional schools met the standard by about 4 percentage points compared to Grade 4 Hispanic students who were enrolled in charter schools. These results are depicted in Figure 3.1.

 Insert Figure 3.1 about here

Meets Grade Level Results for Hispanic Students

For the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 12.61, p < .001$, Cramer's V of .01, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 2.2 percentage points higher, of Grade 4

Hispanic students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Table 3.2 contains the descriptive statistics for this analysis.

 Insert Table 3.2 about here

Regarding the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 77.45, p < .001$, Cramer's V of .03, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 5.5 percentage points higher, Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Delineated in Table 3.2 are the descriptive statistics for this analysis.

Concerning the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 56.06, p < .001$, a Cramer's V of .02, a below small effect size (Cohen, 1988). Commensurate with the first two school years, a statistically significantly higher percentage, 4.8 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Revealed in Table 3.2 are the descriptive statistics for this analysis.

Results were consistent for the 2015-2016, 2016-2017, and 2017-2018 school years for Hispanic students. Grade 4 Hispanic students enrolled in traditional schools met the Meets Grade Level performance indicator by an average of approximately 4

percentage points more than Grade 4 Hispanic students who were enrolled in charter schools. These results are depicted in Figure 3.2.

Insert Figure 3.2 about here

Masters Grade Level Results for Hispanic Students

With respect to the 2015-2016 school year, a statistically significant difference was revealed, $\chi^2(1) = 9.79, p = .002$, Cramer's V of .01, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 1.5 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Masters Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Table 3.3 contains the descriptive statistics for this analysis.

Insert Table 3.3 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 46.48, p < .001$, Cramer's V of .02, a below small effect size (Cohen, 1988). Similar to the 2015-2016 school year, a statistically significantly higher percentage, 3.7 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Masters Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Delineated in Table 3.3 are the descriptive statistics for this analysis.

Regarding the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 25.67, p < .001$, a Cramer's V of .02, a below small effect size (Cohen, 1988). Congruent with the first two school years, a statistically significantly higher percentage, 2.8 percentage points higher, of Grade 4 Hispanic students who were enrolled in traditional elementary schools met the Master Grade Level performance standard than Grade 4 Hispanic students who were enrolled in charter elementary schools. Revealed in Table 3.3 are the descriptive statistics for this analysis.

For the 2015-2016, 2016-2017, and 2017-2018 school years, Grade 4 Hispanic students enrolled in traditional schools met the standard for Masters Grade Level by over 2, 4, and 3 percentage points more, respectively, than Grade 4 Hispanic students who were enrolled in charter schools. These results are shown in Figure 3.3.

Insert Figure 3.3 about here

Results for Hispanic Students on Performance Standards Over Time by School Type

With regard to trends in the Grade 4 Mathematics Performance standards of Hispanic students enrolled in charter schools and Hispanic students enrolled in traditional schools from the 2015-2016 through the 2017-2018 school years, Grade 4 Hispanic students enrolled in traditional schools outperformed Grade 4 Hispanic students enrolled in charter schools. Concerning the Approaches Grade Level indicator, Grade 4 Hispanic students who were enrolled in traditional schools met this indicator an average of over 4 percentage points more than Grade 4 Hispanic students who were enrolled in charter

schools. With respect to the Meets Grade Level performance, almost 4 percentage points more of Grade 4 Hispanic students who were enrolled in traditional schools met this indicator than Grade 4 Hispanic students enrolled in charter schools. Regarding the Masters Grade Level scores, an average of over 2.5 percentage points more Grade 4 Hispanic students who were enrolled in traditional schools met this indicator than Grade 4 Hispanic students who were enrolled in charter schools.

Approaches Grade Level Results for Black Students

For the 2015-2016 school year, a statistically significant difference was not revealed, $\chi^2(1) = 0.46, p = .499$. Similar percentages of Grade 4 Black students met the Approaches Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Table 3.4 contains the descriptive statistics for this analysis.

Insert Table 3.4 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 10.42, p = .001$, Cramer's V of .02, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 4 percentage points higher, of Grade 4 Black students who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 Black students who were enrolled in charter elementary schools. Delineated in Table 3.4 are the descriptive statistics for this analysis.

With respect to the 2017-2018 school year, a statistically significant result was not revealed, $\chi^2(1) = 1.11, p = .29$. Similar percentages of Grade 4 Black students met the Approaches Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Revealed in Table 3.4 are the descriptive statistics for this analysis.

For the 2015-2016 and the 2017-2018 school years, Grade 4 Black students enrolled in traditional schools and Black students enrolled in charter schools met the standard of Approaches Grade Level at similar percentages, approximately 55% and 67% respectively. In regard to the 2016-2017 school year, Grade 4 Black students enrolled in traditional schools met the standard of Approaches Grade Level by 4 percentage points more than Grade 4 Black students enrolled in charter schools. These results are depicted in Figure 3.4.

Insert Figure 3.4 about here

Meets Grade Level Results for Black Students

For the 2015-2016 school year, a statistically significant difference was not revealed, $\chi^2(1) = 2.21, p = .14$. Similar percentages of Grade 4 Black students met the Meets Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Table 3.5 contains the descriptive statistics for this analysis.

Insert Table 3.5 about here

Regarding the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 9.35, p = .002$, Cramer's V of .02, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 3.4 percentage points higher, Grade 4 Black students who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 Black students who were enrolled in charter elementary schools. Delineated in Table 3.5 are the descriptive statistics for this analysis.

Concerning the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 7.13, p = .008$, a Cramer's V of .02, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 3.3 percentage points higher, of Grade 4 Black students who were enrolled in charter elementary schools met the Meets Grade Level performance standard than Grade 4 Black students who were enrolled in traditional elementary schools. Revealed in Table 3.5 are the descriptive statistics for this analysis.

Results were not consistent for the 2015-2016, 2016-2017, and 2017-2018 school years for Black students. In the first year, similar percentages of Grade 4 Black students met the Approaches Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. For the second year, Grade 4 Black students enrolled in traditional schools met the Meets performance indicator by approximately 4 percentage points more than Grade 4 Black

students enrolled in charter schools. In contrast, for the third year, Grade 4 Black students enrolled in charter schools met the Meets performance indicator by approximately 2 percentage points more than Grade 4 Black students enrolled in traditional schools. These results are depicted in Figure 3.5.

Insert Figure 3.5 about here

Masters Grade Level Results for Black Students

With respect to the 2015-2016 school year, a statistically significant difference was not revealed, $\chi^2(1) = 0.89, p = .34$. Similar percentages of Grade 4 Black students met the Masters Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Table 3.6 contains the descriptive statistics for this analysis.

Insert Table 3.6 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 8.11, p = .004$, Cramer's V of .02, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 2.5 percentage points higher, of Grade 4 Black students who were enrolled in traditional elementary schools met the Masters Grade Level performance standard than Grade 4 Black students who were enrolled in charter elementary schools. Delineated in Table 3.6 are the descriptive statistics for this analysis.

Regarding the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 5.84, p = .002$, a Cramer's V of .02, a below small effect size (Cohen, 1988). In contrast with the first two school years, a statistically significantly higher percentage, 2.3 percentage points higher, of Grade 4 Black students who were enrolled in charter elementary schools met the Master Grade Level performance standard than Grade 4 Black students who were enrolled in traditional elementary schools. Revealed in Table 3.6 are the descriptive statistics for this analysis.

For the first two years, similar percentages of Grade 4 Black students met the Masters Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. In contrast, for the 2017- 2018 school year, Grade 4 Black students enrolled in charter schools met the Masters Grade Level performance standard 2.3 percentage points higher than Grade 4 Black students enrolled in traditional schools. These results are shown in Figure 3.6.

Insert Figure 3.6 about here

Results for Black Students on Performance Standards Over Time by School Type

Of note was that the percentage of Grade 4 Black students who met the Approaches Grade Level performance indicator increased for both traditional and for charter schools from the 2015-2016 to the 2017-2018 school years. In the 2016-2017 school year, Grade 4 Black students enrolled in charter schools had approximately the same percentage of students meet the Approaches Grade Level performance standard as in 2015-2016. Grade 4 Black students enrolled in charter schools increased 14

percentage points from 2016-2017 to 2017-2018, for a total increase of 13.4 percentage points over the three years analyzed. The percentages of Grade 4 Black students who were enrolled in traditional schools consistently increased the percentage of students who met the Approaches Grade Level performance indicator over the three years which yielded a 11.3 percentage point increase from the 2015-2016 to 2017-2018 school years.

In regard to Grade 4 Black students who met the Meets Grade Level performance standard, a statistically significant difference was yielded between charter schools and traditional schools for the 2016-2017 and 2017-2018 school years. In the 2016-2017 school year, traditional schools had higher percentages of Grade 4 Black students who met the Meets Grade Level performance standard than charter schools. In contrast, for the 2017-2018 school year, charter schools had higher percentages of Grade 4 Black students who met the Meets Grade Level performance standard than traditional schools.

For the 2015-2016 school year, Grade 4 Black students met the Meets Grade Level performance standard at approximately the same percentage, regardless of school type. Of note was that the percentage of Grade 4 Black students who met the Meets Grade Level performance indicator increased for both traditional and for charter schools from the 2015-2016 to the 2017-2018 school years. Over the three years, Grade 4 Black students enrolled in traditional schools had a 11.5 percentage point increase, and Grade 4 Black students enrolled in charter schools had a 16.3 percentage point increase from the 2015-2016 to 2017-2018 school years.

In regard to Grade 4 Black students who met the Masters Grade Level performance standard a similar result emerged to the Meets Grade Level results for 2015-2016. For the 2015-2016 school year, Grade 4 Black students met the Masters Grade

Level performance standard at approximately the same percentage, regardless of school type. In contrast, a statistically significant difference was present between charter schools and traditional schools for the 2016-2017 and 2017-2018 school years. For the 2016-2017 school year, Grade 4 Black students enrolled in traditional schools met the Masters Grade Level performance standard at a higher percentage, 2.5 percentage points, than Grade 4 Black students enrolled in charter schools. Conversely, in the 2017-2018 school year, Grade 4 students enrolled in charter schools met the Masters Grade Level performance standard at a higher percentage, 2.3 percentage points, than Grade 4 Black students enrolled in traditional schools. Over the three years, Grade 4 Black students enrolled in traditional schools had a 5.2 percentage point increase, and Grade 4 Black students enrolled in charter schools had an 8.2 percentage point increase from the 2015-2016 to 2017-2018 school years.

Discussion

Analyzed in this investigation was the extent to which differences were present in the mathematics performance of Texas Grade 4 Hispanic and Black students who were enrolled in traditional elementary schools and Grade 4 Hispanic and Black students who were enrolled in charter elementary schools. Three years of Texas statewide data on the three Grade 4 STAAR Mathematics Performance Indicators were examined for Hispanic and Black students who were enrolled in either a charter school or in a traditional elementary school.

Statistically significant results were present in all three school years for Hispanic students. For each of the three STAAR Mathematics Performance Indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level), in all three

years analyzed, Grade 4 Hispanic students who were enrolled in traditional elementary schools had statistically significantly better performance than Grade 4 Hispanic students who were enrolled in charter schools. The gaps were consistent across the three school years and ranged from 1.5 percentage points to 5.5 percentage points. The STAAR Mathematics Performance Indicator with the greatest gap between Grade 4 Hispanic students who were enrolled in traditional schools and Grade 4 Hispanic students who were enrolled in charter schools was the Meets Grade Level indicator in the 2016-2017 and 2017-2018, with both years yielding approximately 5 percentage points difference.

To consider a Grade 4 student on or above grade level, students must meet the standard for Meets Grade Level or Masters Grade Level. For each of the three years of data, Grade 4 Hispanic students enrolled in traditional schools met the standards of Meets Grade Level and Masters Grade Level at higher percentages than Grade 4 Hispanic students who were enrolled in charter schools. Higher percentages of Grade 4 Hispanic students in traditional schools were at or above grade level in mathematics than were Grade 4 Hispanic students enrolled in charter schools for all three school years.

Of importance was that the percentage of Grade 4 Hispanic students who met the Approaches Grade Level performance indicator increased for both traditional and for charter schools. This trend was congruent for all three performance indicators (Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for the 2015-2016, 2016-2017, and 2017-2018 school years.

In this investigation, higher percentages of Grade 4 Hispanic students who were enrolled in traditional elementary schools met STAAR Mathematics performance indicators than did Grade 4 Hispanic students who were enrolled in charter schools, and

School reformers are advocating for the development of charter schools, and charter schools have had an accelerated growth, 250% within the last 10 years (Texas Education Agency, 2016b). However, the efficacy of charter schools on Hispanic student performance has not been established.

In regard to Black student achievement by school type, statistically significant results that were inconsistent were present in two of the three school years. For the STAAR Mathematics Performance Indicator, Approaches Grade Level, Grade 4 Black students enrolled in traditional and charter schools met the performance standard with approximately the same percentage points in 2015-2016 and 2016-2017. In the last school year of data that were analyzed, 2017-2018, Grade 4 Black students who were enrolled in traditional elementary schools had statistically significantly better performance than Grade 4 Black students who were enrolled in charter schools. The STAAR Mathematics Performance Indicator with the greatest gap between Grade 4 Black students who were enrolled in traditional schools and Grade 4 Black students who were enrolled in charter schools was the Approaches Grade Level indicator in the 2016-2017, yielding approximately 4 percentage points difference.

For a Grade 4 student to be on or above grade level, students must meet the standard for Meets Grade Level or Masters Grade Level. For two of three years of data, Grade 4 Black students enrolled in traditional schools met the standards of Meets Grade Level and Masters Grade Level at an equal or higher percentage than Grade 4 Black students who were enrolled in charter schools. For the third year analyzed, 2017-2018, a higher percentage of Grade 4 Black students enrolled in charter schools were at or above

grade level in mathematics than were Grade 4 Black students enrolled in traditional schools.

Of importance was that the percentage of Grade 4 Black students who met the Meets Grade Level performance indicator increased for both traditional and for charter schools. This trend was also congruent for the Masters Grade Level performance indicator for the 2015-2016, 2016-2017, and 2017-2018 school years. The total three-year increase for Grade 4 Black students who met the mathematics Meets Grade Level was 11.5 percentage points for traditional schools and 16.3 percentage points for charter schools. The total three-year increase for Grade 4 Black students who met the Masters Grade Level performance indicator was 5.2 percentage points for traditional schools and 8.2 percentage points for charter schools.

Connections to Existing Literature

Several researchers (Escalante & Slate, 2017, Montemayor, 2017, and Taylor et al, 2011) have investigated academic achievement in traditional and charter schools. In the 2009-2010 study conducted at the State of Texas Education Research Center (Taylor et al., 2011), no statistically significant differences were documented between student performance at charter schools and traditional public schools. Notably, statistically significant differences were not present for Hispanic students. Results delineated herein for Grade 4 Hispanic students are congruent with the findings of previous researchers (e.g., Escalante & Slate, 2017, Montemayor, 2017, and Taylor et al, 2011) for all three performance indicators (Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for the three years analyzed, 2015-2016 through 2017-2018.

The results presented herein for the 2017-2018 school year; Grade 4 Black students yield a different finding than past researchers. In the 2017-2018 school year, Grade 4 Black students who were enrolled in charter schools met the Meets Grade Level and Masters Grade Level performance standards at a higher percentage than Grade 4 Black students enrolled in traditional schools. The results for the 2015-2016 and 2017-2018 school year for the three performance standards are congruent with the findings of previous researchers (Escalante & Slate, 2017; Montemayor, 2017) who established that students enrolled in traditional schools were performing at or above the levels of students enrolled in charter schools on the Grade 4 STAAR exam.

Implications for Policy and Practice

With respect to policy implications, several implications can be made based upon the results of this multiyear, statewide investigation. Educational leaders should focus their efforts in conducting more educational research in regard to the efficacy of charter schools and academic achievement of underrepresented students. Additionally, policymakers should analyze the results of this educational research study to encourage studies that focus on individual charter schools and their academic achievement for various demographic groups. Finding schools that are improving the academic achievement of their Hispanic and Black students will further guide practice and raise the equity of education the state of Texas.

Regarding implications for practice, all schools, both traditional schools and charter schools, should be required to provide academic achievement information by demographics at registration. Because parents are given a choice where to send their school-aged children, complete transparency in academic achievement should be required

of both traditional and charter schools. To continue to increase the performance of under-represented populations, both charter and traditional school teachers, administrators, and staff should undergo training in cultural competency and develop systems that are set up equitably for all students to succeed.

Recommendations for Future Research

Given the results of this multiyear investigation, several recommendations for future research can be made. This study was conducted using data on only Grade 4 Hispanic and Black students who were enrolled in either a traditional elementary school or in a charter elementary school in Texas. The degree to which findings obtained herein would be generalizable to schools in other states is not known. Moreover, the extent to which these findings would be generalizable to Hispanic and Black students in other grade levels is also not known. Accordingly, researchers are encouraged to examine the mathematics performance of Hispanic and Black students in traditional and charter schools in other states and at other grade levels. Another recommendation is for researchers to analyze mathematics performance by additional student demographic characteristic. That is, in this investigation, the performance of Hispanic and Black students was addressed. Because mathematics gaps have been documented in the literature for students in poverty and for students of color, researchers are encouraged to examine mathematics performance by student demographic characteristic. Finally, researchers are encouraged to conduct longitudinal studies in which they follow the progress of students over the course of their enrollment in traditional schools and in charter schools.

Conclusion

The purpose of this investigation was to determine the extent to which differences were present in the mathematics achievement of Grade 4 Hispanic and Black students in Texas as a function of school type (i.e., charter schools and traditional schools). Three school years of archival data from the Texas Education Agency Public Education Information Management System were analyzed. In each of three years of data that were analyzed, Grade 4 Hispanic students who were enrolled in traditional elementary schools had statistically significantly higher percentage of students who met each performance indicator (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level), than did Grade 4 Hispanic students who were enrolled in charter elementary schools. As such, no evidence was present that Hispanic students enrolled in charter schools have higher mathematics achievement than Hispanic students enrolled in traditional schools.

In regard to Grade 4 Black student achievement as a function of school type, in the first two years analyzed, 2015-2016 and 2016-2017, Grade 4 Black students who were enrolled in traditional elementary schools had statistically significantly higher percentage of students or similar percentage of students who met each performance indicator (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level), than did Grade 4 Black students who were enrolled in charter elementary schools. For the 2017-2018 school year, Grade 4 Black students who were enrolled in charter schools had a statistically significant higher percentage of students who met all performance standards than Grade 4 Black students who were enrolled in traditional schools.

References

- Chudowsky, N., & Ginsburg, A. (2012). *Who attends charter schools and how are those students doing?* Exploratory Analysis of National Assessment of Educational Progress Data prepared for the National Assessment Governing Board.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, A. D., & York, R. L. (1966). *Equality of educational opportunity*. Washington, DC: National Center for Education Statistics.
- Escalante, M. L., & Slate, J. R. (2017). Differences in academic performance between elementary charter schools and traditional public schools. *Journal of Advances in Education Research*, 2(3), 163-170. <https://dx.doi.org/10.22606/jaer.2017.23004>
- Every Student Succeeds Act (ESSA) of 2015, Pub. L. No. 114-95 Stat. 1177 (2015).
- Gill, B. P., Timpane, M., Ross, K. E., & Brewer, D. J. (2007). *Rhetoric versus reality: What we know and what we need to know about vouchers and charter schools*. Santa Monica, CA: Rand Corporation.
- Kevelson, M. J. C. (2019). *The measure matters: Examining achievement gaps on cognitively demanding reading and mathematics assessments*. (Research Report No. RR-19-43). Princeton, NJ: Educational Testing Service.
<https://doi.org/10.1002/ets2.12278>
- Klammer, B., & Slate, J. R. (2018). Differences between charter and traditional elementary schools in Grade 3 mathematics performance. *Journal of Educational System*, 2(4), 33-37. Retrieved from

<https://www.sryahwapublications.com/journal-of-educational-system/pdf/v2-i4/6.pdf>

Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity? *Educational Researcher*, 31(1), 3-2.

<https://doi.org/10.3102/0013189X031001003>

Makey, A. P., Finn, A. S., Leonard, J. A., Jacoby-Senghor, D. S., West, M. R., Gabrieli, C. F., & Gabrieli, J. D. (2015). Neuroanatomical correlates of the income-achievement gap. *Psychological Science*, 26(6), 925-933.

<https://doi.org/10.1177/0956797615572233>

Maloney, P., & Mayer, K. U. (2010). The US educational system: Can it be a model for Europe. *United in diversity: Comparing social models in Europe and America*, 328-358.

Montemayor, K. P. (2017). *A comparative analysis of charter schools and neighboring traditional public schools' reading and mathematics performance in South Texas*.

Retrieved from ProQuest Dissertations & Theses Global.

No Child Left Behind Act of 2001, P.L. 107-110, 20 U.S.C. § 6319 (2002).

Peterson, P. E. (2016). The end of the Bush-Obama regulatory approach to school reform: choice and competition remain the country's best hope. *Education Next*, 16(3), 22-23.

Plucker, J. A., Makel, M. C., & Rapp, K. E. (2007). The impact of charter schools on promoting high levels of mathematics achievement. *Journal of School Choice*, 1(4), 63-76.

- Reardon, S. F. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. In G. J. Duncan & R. J. Murnane, eds., *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 91-115). New York, NY: Russell Sage Foundation.
- Silvernail, D. L., & Johnson, A. F. (2014). *The impacts of public charter schools on students and traditional public schools: What does the empirical evidence tell us?* University of Southern Maine; Maine Education Policy Research Institute.
- Slate, J. R., & Rojas-LeBouef, A. (2011). *Calculating basic statistical procedures in SPSS: A self-help and practical guide to preparing theses, dissertations, and manuscripts*. Ypsilanti, MI: NCPEA Press.
- Snyder, T. D., Tan, A. G., & Hoffman, C. M. (2006). *Digest of education statistics 2005* (NCES 2006-030). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office.
- Taylor, L. L., Alford, B. L., Rollins, K. B., Brown, D. B., Stillisano, J. R., & Waxman, H. C. (2011). *Evaluation of Texas charter schools 2009-10*. Report prepared for the Texas Education Agency, Austin, TX.
- Texas Education Agency. (2018). *Texas Assessment Program Frequently Asked Questions*. Austin, TX: Author. Retrieved from <https://tea.texas.gov/WorkArea/DownloadAsset.aspx?id=51539620927>
- Texas Education Agency. (2019a). *Closing the Gaps PPT*. Retrieved from https://TexasEducationAgency.texas.gov/sites/default/files/Closing%20the%20GaGa%20Domain_fnl.pdf

Texas Education Agency. (2019b). *Performance level descriptors: Grade 4 Mathematics*.

Retrieved from

https://tea.texas.gov/sites/default/files/PLD_Math_G4_April%202019_V2.pdf

Texas Education Agency. (2020a). *History of charter schools*. Retrieved from

<https://tea.texas.gov/texas-schools/texas-schools-charter-schools/charter-schools-history-of-charter-schools>

U.S. Department of Education. (2004). *No Child Left Behind: A toolkit for teachers*.

Retrieved from <http://www.ed.gov/teachers/nclbguide/nclb-teachers-toolkit.pdf>

U.S. Department of Education. (2015). *Every Student Succeeds Act*. Retrieved from

<https://www.ed.gov/essa?src=rn>

Table 3.1

Descriptive Statistics for the STAAR Mathematics Approaches Grade Level Standard for Grade 4 Hispanic Students by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	30,729	27.9	79,601	72.1
Charter	1,889	31.3	4,152	68.7
2016-2017				
Traditional	27,860	24.4	86,291	75.6
Charter	1,974	29.5	4,711	70.5
2017-2018				
Traditional	19,151	19.7	77,970	80.3
Charter	1,538	23.6	4,991	76.4

Table 3.2

Descriptive Statistics for the STAAR Mathematics Meets Grade Level Standard for Grade 4 Hispanic Students by School Type for the 2015-2016, 2016-2017, and 2017-2018

School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	73,036	66.2	37,294	33.8
Charter	4,133	68.4	1,908	31.6
2016-2017				
Traditional	63,928	56	50,223	44
Charter	4,111	61.5	2,574	38.5
2017-2018				
Traditional	51,172	52.7	45,949	47.3
Charter	3,752	57.5	2,777	42.5

Table 3.3

Descriptive Statistics for the STAAR Mathematics Masters Grade Level Standard for Grade 4 Hispanic Students by School Type for the 2015-2016, 2016-2017, 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	92,320	83.7	18,010	16.3
Charter	5,147	85.2	894	14.8
2016-2017				
Traditional	87,245	76.4	26,906	23.6
Charter	5,352	80.1	1,333	19.9
2017-2018				
Traditional	73,762	75.9	23,359	24.1
Charter	5,139	78.7	1,390	21.3

Table 3.4

Descriptive Statistics for the STAAR Mathematics Approaches Grade Level Standard for Grade 4 Black Students by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	8,185	44.5	10,218	55.5
Charter	798	45.3	963	54.7
2016-2017				
Traditional	7,879	41.9	10,947	58.1
Charter	781	45.9	921	54.1
2017-2018				
Traditional	5,204	33.2	10,947	58.1
Charter	511	31.9	921	54.1

Table 3.5

Descriptive Statistics for the STAAR Mathematics Meets Grade Level Standard for Grade 4 Black Students by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	14,606	79.4	3,797	20.6
Charter	1,424	80.9	337	19.1
2016-2017				
Traditional	13,527	71.9	5,299	28.1
Charter	1,282	75.3	420	24.7
2017-2018				
Traditional	10,631	67.9	5,034	32.1
Charter	1034	64.6	567	35.4

Table 3.6

Descriptive Statistics for the STAAR Mathematics Masters Grade Level Standard for Grade 4 Black Students by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	16,732	90.9	1,671	9.1
Charter	1,613	91.6	148	8.4
2016-2017				
Traditional	16,272	86.4	2,552	13.6
Charter	1,513	88.9	189	11.1
2017-2018				
Traditional	13,422	85.7	2,243	14.3
Charter	1,336	83.4	265	16.6

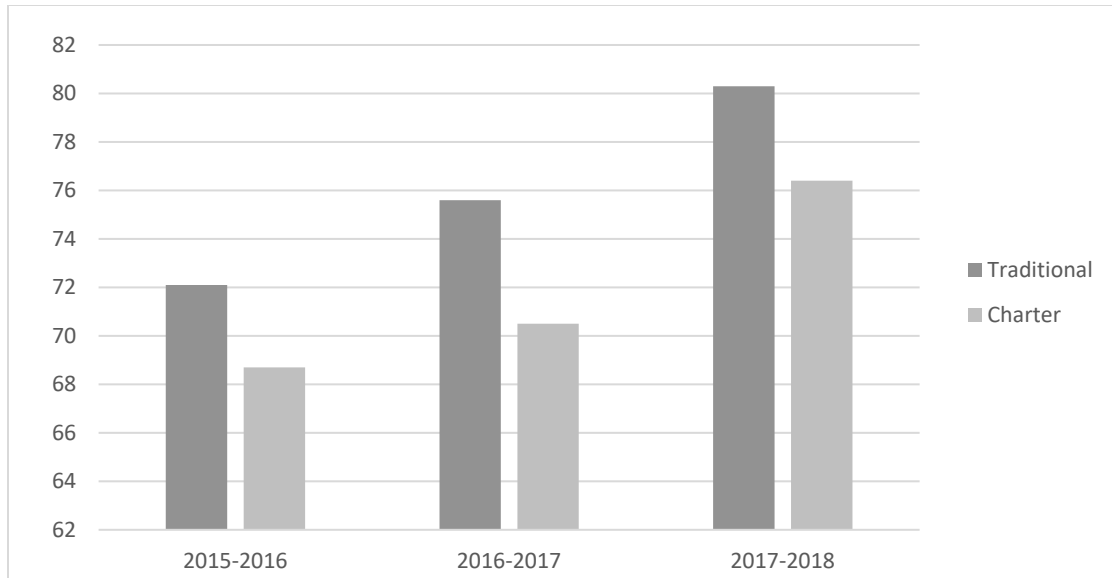


Figure 3.1. Percentages of Hispanic students who met the Approaches Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

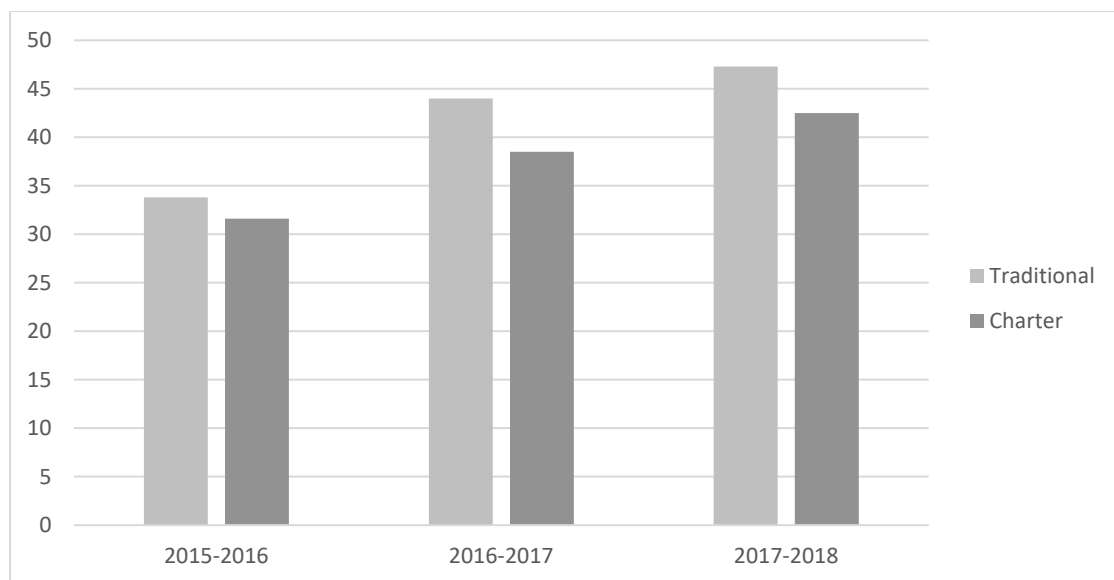


Figure 3.2. Percentages of Hispanic students who met the Meets Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

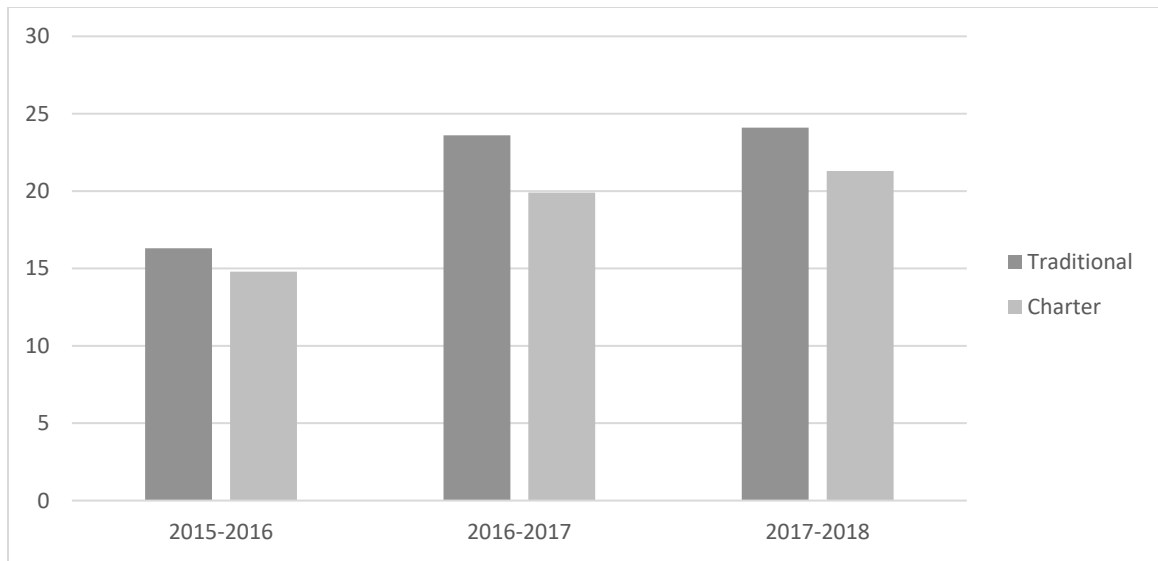


Figure 3.3. Percentages of Hispanic students who met the Masters Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

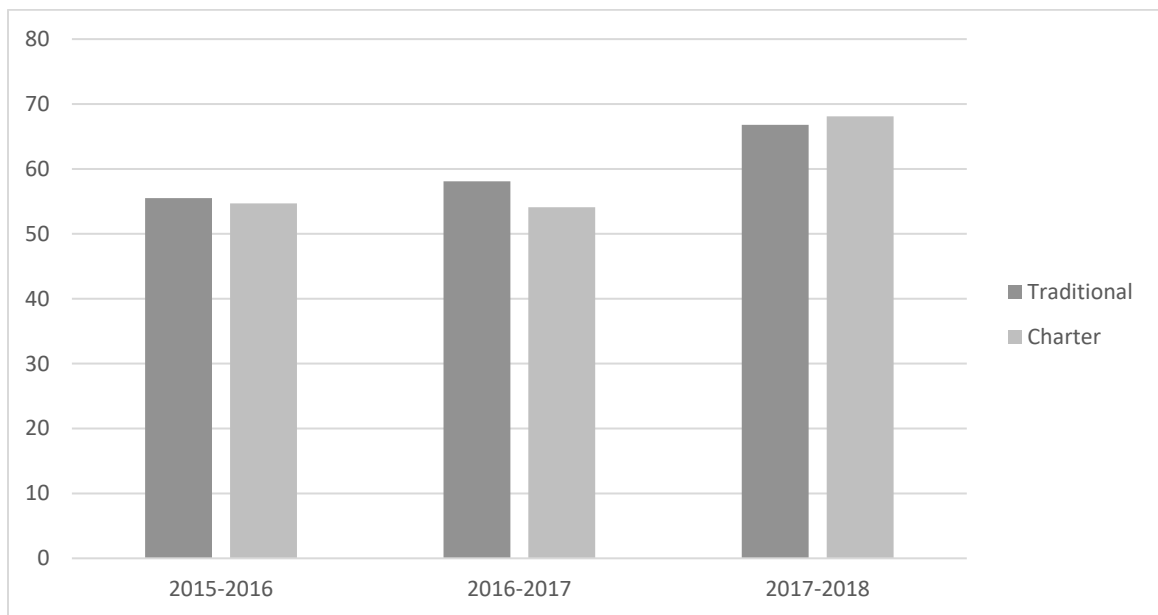


Figure 3.4. Percentages of Black students who met the Approaches Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

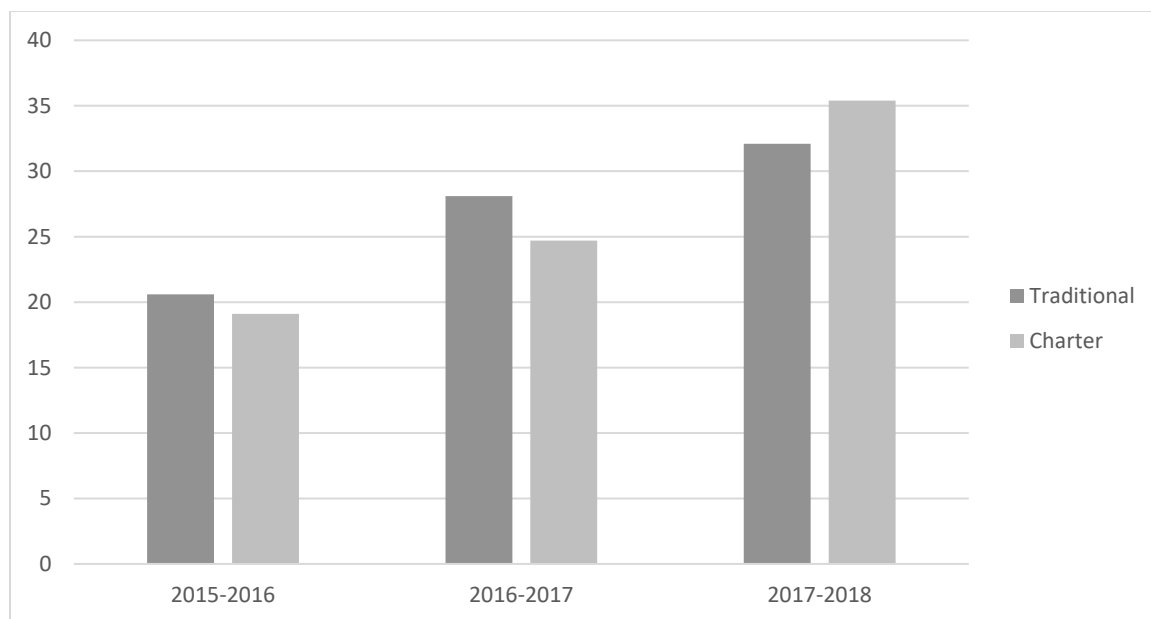


Figure 3.5. Percentages of Black students who met the Meets Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

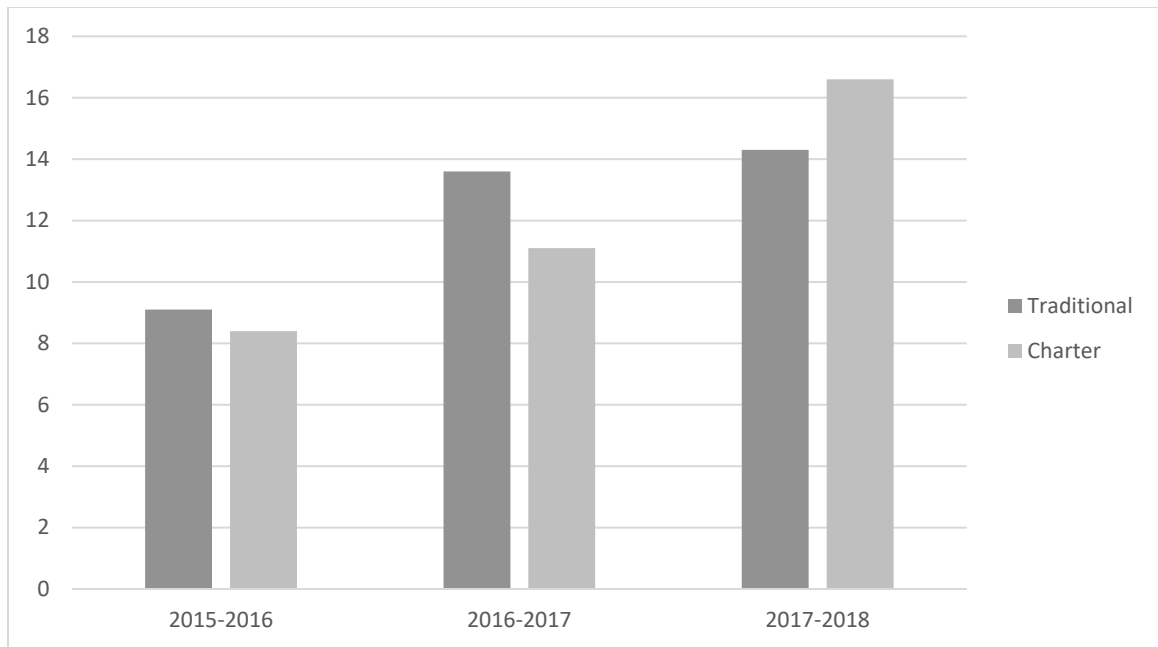


Figure 3.6. Percentages of Black students who met the Masters Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

CHAPTER IV

DIFFERENCES IN GRADE 4 MATHEMATICS PERFORMANCE STANDARDS OF STUDENTS IN POVERTY BETWEEN TEXAS CHARTER ELEMENTARY SCHOOLS AND TRADITIONAL ELEMENTARY SCHOOLS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

In this statewide, multiyear analysis, the extent to which differences were present in mathematics achievement of Grade 4 students in poverty by school type (i.e., traditional or charter) was determined. Specifically examined was the relationship of performance to the three State of Texas Assessment of Academic Readiness (STAAR) Mathematics Performance Indicators in the 2015-2016 through the 2017-2018 school years. Statistical analyses revealed the presence of statistically significant differences in mathematics achievement as a function of school type. Grade 4 students in poverty who were enrolled in traditional schools met or exceeded the percent of students enrolled in charter schools who met the performance standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) in all but one year with one standard. Students in poverty enrolled in charter schools met the 2015-2016 Masters Grade Level performance standard at a higher percent than students in poverty enrolled in traditional schools.

Keywords: Charter schools; Traditional schools; Texas; Grade 4; STAAR; Mathematics; Performance indicators; Approaches grade level; Meets grade level; Masters grade level; Poverty; Economically disadvantaged

DIFFERENCES IN GRADE 4 MATHEMATICS PERFORMANCE STANDARDS OF
STUDENTS IN POVERTY BETWEEN TEXAS CHARTER ELEMENTARY
SCHOOLS AND TRADITIONAL ELEMENTARY SCHOOLS

The adverse effects of poverty on student achievement has been well documented by researchers (e.g., Gregory, Skiba & Noguera, 2010, Ladd, 2012, Reardon, 2011). Poverty has strong detrimental effects on student academic performance (Claro, Paunesku, & Dweck, 2016). Students from low income families begin their school career lacking background experiences and beginning school behind in literacy skills (Wamba, 2010). Egalite (2016) listed family income as one of the four family background factors that can influence student achievement, citing that better income can secure better neighborhoods with high-quality schools. Furthermore, Reardon (2011) established that the relationship between family income and student academic achievement grew substantially stronger in the 1980s and 1990s in the United States. Regarding reading and mathematics specifically, Allington et al. (2010) reported that 77% of Grade 4 students who were not in poverty achieved above a basic level of reading proficiency, whereas only 46% of students in poverty (i.e., based upon receiving free/reduced lunch) had the same level of achievement. Other scholars, Friedman-Krauss and Raver (2015) and Goforth et al. (2014) have also established that poverty status is a strong predictor of lower mathematics scores. Children from low economic status homes experience reduced academic achievement (Milne & Plourde, 2006). Inadequate medical and dental care, food insecurity, and family stress often endured in homes with low income are outside stressors that can have negative effects on student academic opportunity and achievement (Berliner, 2009).

The number of students enrolled in Texas schools for the 2017-2018 school year identified as being economically disadvantaged was 67.5% of the total student enrollment (Texas Education Agency, 2018). In the decade between the 2007-2008 and 2017-2018 school years, the percentage increase in the number of students who were economically disadvantaged was greater than the increase in the overall student population. The number of students in poverty increased by over one half million, or 23% in just this 10-year time period.

Regarding student economic status, the Texas Education Agency defines students as poor if the student is “coded eligible for free or reduced-price lunch or eligible for other public assistance” (Texas Education Agency, 2015, p. 10). The free and reduced lunch program indicator, which is a guideline set by The Department of Health and Human Service, is frequently used to designate students living in poverty. According to the Texas Education Agency 2017-2018 Pocket Edition of statistics, in 2017, 58.7% of the 5.3 million students who attend Texas schools were from low economic homes.

With the federal mandates of The Every Student Succeeds Act (2015), local education agencies and school campuses are expected to eliminate the achievement gap and to improve academic achievement of all ethnic/racial groups of students, as well as students in poverty. To measure the academic achievement of students enrolled in Texas schools, children in Grades 3-12 take a yearly assessment, the State of Texas Assessment of Academic Readiness (STAAR). Beginning with the 2016-2017 school year, the STAAR provides not only a percent score and raw score of the number of questions students answer correctly, but also provides a performance level for each student. These performance levels, defined by Texas Education Agency through Performance Level

Descriptors, are descriptions of student achievement for each grade level and content area assessed. All students assessed are categorized as: *Approaches Grade Level*, *Meets Grade Level*, *Masters Grade Level*, or *Did Not Meet Grade Level*. The Performance Level Descriptors specifically describe the knowledge and skills that students typically demonstrate at each performance level and focus on the process skills of mathematics. The process skills are described by Texas Education Agency as the ways in which students are expected to engage in the mathematical content and use the mathematical skills in everyday life. They are not assessed in isolation but are applied when students use mathematics to solve problems, analyze mathematical relationships, and communicate mathematical ideas (Texas Education Agency, 2019a).

In addition to the performance standards, the Texas Accountability system has a Closing the Gap Domain. This Domain constitutes 30% of the total accountability for districts and schools. It measures performance of up to 14 student groups, including students considered poor, and measures against specified targets.

After more than 25 years since the first charter school, the debate about their efficacy and influence on student achievement continues. In the first years of charter schools, the debate centralized around predicted improvements in student achievement based on the fundamental premises of charter schools (Epple, Romano, & Zimmer, 2016). Supporters of charter schools (e.g., Finn et al., 2000, Kolderie, 2004) thought that because of the greater freedom from state regulations, charter schools would be innovative and create competitive pressure on all schools to improve. In contrast, critics (e.g., Cobb & Glass, 1999, Fiske & Ladd, 2000; Frankenberg & Lee, 2003) of charter schools believed the charter schools would deplete public resources and fail to serve all

populations, including students with lower-ability and students with special needs. With the number of students served by charter schools, it becomes important to analyze student achievement, especially for underrepresented demographic groups.

Earlier studies have had mixed results when researchers compared student mathematics achievement between students enrolled in charter schools and students enrolled in traditional schools. In 2005, researchers from the National Center for Educational Statistics used the National Assessment of Educational Progress data to compare mathematics achievement in charter schools and traditional elementary schools. Using 2003 data, Chudowsky and Ginsburg (2012) determined that charter school mathematics performance lagged behind that of traditional schools in Grade 4 mathematics.

Similarly, Clark, Gleason, Tuttle, and Silverberg (2011) conducted a study in which they analyzed student data from charter schools and traditional schools. In their investigation, they established that charter schools had negative effects on student mathematics performance. In contrast, Betts and Tang (2011) conducted a study in which they compared the academic effect of attending a charter elementary school and attending a traditional elementary school. Betts and Tang concluded charter schools outperformed traditional schools in elementary mathematics. Chingo and West (2015) analyzed the effects of charter schools across Arizona, which had the largest proportion of students attending charter schools in the nation. The researchers reported that academic performance in all subject areas, in every grade level of charter schools was slightly less than traditional schools.

With reference to the state of interest in this article, Texas, researchers have compared student achievement between students who attend charter schools and students who attend traditional school. Sahlin, Wilson, and Capraro (2018) analyzed the performance of one of the largest charter school networks in the state, Harmony Public Schools, compared to the state's traditional schools. Sahlin et al. (2018) examined 2009-2011 student data from the Texas Assessment of Knowledge and Skills in reading, mathematics, and science. They documented that the charter school students performed statistically significantly better at Grade 9 and worse at Grade 11 than students enrolled in traditional schools. No statistically significant difference was determined for Grade 10 mathematics. For Grades 9 and 10 reading achievement, no statistically significant differences were documented between school types.

Montemayor (2017) analyzed reading and mathematics academic performance in charter schools and traditional schools in South Texas. Montemayor specifically analyzed data from 2015-2016 for students in Grades 3, 4 and 5 who were economically disadvantaged. No statistically significant differences were established in academic performance in the performance of students in poverty between charter schools and traditional schools on the Grade 3, 4, and 5 STAAR Reading and Mathematics tests.

In this same year, Escalante and Slate (2017) analyzed reading, writing, and science achievement of students in Grades 3, 4 and 5 on the 2015 STAAR tests. Specifically compared in their study were students enrolled in charter elementary schools and students enrolled in traditional elementary schools. Escalante and Slate (2017) documented that students enrolled in traditional elementary schools had statistically

significantly higher scores on all three content areas than did students who were enrolled in charter elementary schools.

In an extension of Escalante and Slate's (2017) work, Klammer and Slate (2018) analyzed the degree to which differences were present in mathematics achievement between Grade 3 students who were enrolled in charter elementary schools and Grade 3 students who were enrolled in traditional elementary schools in Texas. Klammer and Slate (2018) analyzed STAAR data in two performance categories, Satisfactory Academic Performance and Advanced Academic Performance. They documented that Grade 3 students enrolled in traditional schools had statistically significant higher passing rates in both performance categories than students enrolled in charter schools.

Statement of the Problem

Mirroring the national trend, the number of charter schools in Texas is increasing each year. In addition to the number of charter schools in Texas increasing, the population of students enrolled in existing and new charter schools is growing. Most of the student population enrolled in and attending charter schools in Texas are identified as poor (Texas Education Agency, 2018). For the 2017-2018 school year, Texas Education Agency reports that 67.5%, or over 200,000 students enrolled in Texas charter schools are identified as poor. This result is a 216% increase in the number of students enrolled in charter schools in Texas for the 2007-2008 school year. In the last several decades, enough evidence has been collected that income-related achievement gaps have grown substantially (Reardon, 2011). To ensure that the opportunity gaps and academic achievement gaps do not continue to increase between students who are identified as

poor, student academic achievement data should be analyzed to determine the extent to which performance might differ between charter schools and traditional schools.

Purpose of the Study

The purpose of this study was to determine the extent to which differences were present in the mathematics achievement of Grade 4 students in poverty between charter elementary schools and traditional elementary schools. Specifically addressed herein was the degree to which differences existed in passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) on the Grade 4 STAAR Mathematics for students in poverty between charter elementary schools and traditional elementary schools.

Significance of the Study

Although much time and resources have been allotted for the creation of charter schools, the research literature is limited on the efficacy of charter schools in whether or not their students have higher mathematics test scores than traditional school students. Instructional practice within charter and traditional schools may be informed and improved as a result of this study. Furthermore, legislators and policymakers may be influenced to review the efficacy of charter schools in present form. The results from this study added to the existing literature on the subject of the performance of charter school students compared to traditional public school students.

Research Questions

The following overarching research question was addressed in this study: What is the difference in Grade 4 STAAR performance standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) in mathematics as a function of school-

type (i.e., charter or traditional) for students who are economically disadvantaged? Sub-questions under this research question were (a) What is the difference in the STAAR Mathematics Approaches Grade Level standard for Grade 4 students in poverty between charter and traditional elementary schools?, (b) What is the difference in the STAAR Mathematics Meets Grade Level standard for Grade 4 students in poverty between charter and traditional elementary schools?, (c) What is the difference in the STAAR Mathematics Masters standard for Grade 4 students in poverty between charter and traditional elementary schools?, and (d) What trend is present for students in poverty between charter and traditional elementary schools for the Approaches Grade Level, Meets Grade Level, and Masters Grade Level standard over three school years: 2015-2016, 2016-2017, and 2017-2018?

Method

Research Design

A non-experimental, causal comparative research design (Creswell, 2014) was used for this study. Archival data were utilized to examine the mathematics and passing standards of Grade 4 students who were in poverty and were enrolled in either charter elementary schools or traditional elementary schools in the 2015-2016, 2016-2017, and 2017-2018 school years. The independent variable involved in this research article was school type (i.e., charter elementary school or traditional elementary school), and the dependent variables were the three Grade 4 STAAR Mathematics performance standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for students who were in poverty in the 2015-2016, 2016-2017, and 2017-2018 school years. Because existing data were analyzed in this multi-year, empirical investigation, neither

the independent variable of school type nor the dependent variables of the STAAR performance standards can be manipulated.

Participants and Instrumentation

For the purpose of this study, archival data for the 2015-2016, 2016-2017, and 2017-2018 school years for Grade 4 students in poverty who were enrolled in either charter elementary schools or traditional elementary schools were obtained from the Texas Education Agency. The terms of students in poverty or students who were economically disadvantaged refers to students who are “eligible for free or reduced-price lunch or eligible for other public assistance” (Texas Education Agency, Glossary for the Texas Academic Performance Report, 2015, p. 10).

A Public Information Request form was submitted to and fulfilled by the Texas Education Agency Public Education Information Management System for these data. The STAAR Mathematics passing standards of Grade 4 students who were in poverty during these school years were the specific data analyzed for this study. Grade 4 elementary students were specifically selected for this study because Grade 4 is the year prior to the first Student Success Initiative year, Grade 5 in which students must pass the STAAR to be promoted to Grade 6.

A student who achieves the Approaches Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) represent, compare, and order whole numbers, decimals, and fractions, and understand relationships related to place value, (b) represent and solve problems involving addition, subtraction, multiplication, and division of whole numbers including two-step problems, (c) represent addition and subtraction of fraction problems with

pictorial models, (d) represent and solve problems using data and tables, and (e) use a protractor to measure angles and a ruler to measure lengths.

Students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR to achieve the Meets Grade Level performance indicator. To score a rating of Approaches Grade Level, students achieved a raw score of 25 questions correct (64% and 59%) on the 2017 and 2018 administrations and 24 questions correct (57%) on the 2019 administration of the STAAR. Students were given a performance indicator of Did Not Meet Grade Level if their raw score was 16 questions correct or below ($\leq 64\%$ and $\leq 59\%$) on the 2017 and 2018 administrations and 17 questions correct or below ($\leq 25\%$) on the 2019 administration of the STAAR. All scores and performance indicators are reported by the state in terms of demographic information and economic information, including poor and not poor.

A student who achieves the Meets Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to:

- (a) solve application problems involving addition, subtraction, multiplication, and division of whole numbers, including two-step problems and problems with a letter representing the unknown, (b) solve and explain multi-step addition and subtraction problems involving money, (c) compare fractions using symbols and justify relationships to the whole, (d) represent numerical relationships and patterns with models and tables including input-output tables, (e) select units and solve problems involving measurement including conversions, (f) apply knowledge of parallel and perpendicular lines to classify

two-dimensional shapes, and (g) solve application problems involving perimeter and area including missing measurements.

A student who achieves the Masters Grade Level performance standard on Grade 4 STAAR Mathematics is described as being able to: “evaluate and justify the reasonableness of solutions to multi-step application problems involving addition, subtraction, multiplication, and division of whole numbers, and can analyze mathematical relationships to compare and solve problems involving fractions” (Texas Education Agency, 2019a, p 2). Students achieved a raw score of 29 questions correct (82% and 79%) on the 2017 and 2018 administrations and 28 questions correct (79%) on the 2019 administration of the STAAR to achieve the Masters Grade Level performance indicator.

A student who achieves the Did Not Meet Grade Level performance standard on Grade 4 STAAR Mathematics is described by Texas Education Agency (2019a) as being able to: (a) identify points represented by decimals and fractions on a number line, (b) represent decimals using expanded notation, (c) use models to represent and solve problems involving multiplication and division of whole numbers, and (d) identify lines of symmetry and types of angles.

Results

To ascertain whether differences were present in Grade 4 Mathematics STAAR performance indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for students who were in poverty between enrollment in either a charter school or in a traditional elementary school, Pearson chi-square procedures were conducted. This statistical procedure was viewed as the optimal statistical procedure to use because frequency data were present for mathematics performance indicators and for

school type. As such, chi-squares are the statistical procedure of choice when both variables are categorical. Additionally, with the large sample size, the available sample size per cell was more than five. Therefore, the assumptions underlying a chi-square were met (Slate & Rojas-LeBouef, 2011).

Approaches Grade Level Results for Students in Poverty

For the 2015-2016 school year, a statistically significant difference was not revealed, $\chi^2(1) = 1.23, p = .27$. Similar percentages of Grade 4 students who were in poverty met the Approaches Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or were enrolled in charter elementary schools. Table 4.1 contains the descriptive statistics for this analysis.

Insert Table 4.1 about here

Concerning the 2016-2017 school year, a statistically significant difference was yielded, $\chi^2(1) = 16.78, p < .001$, Cramer's V of .01, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 2.5 percentage points higher, of Grade 4 students in poverty who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 students in poverty who were enrolled in charter elementary schools. Delineated in Table 4.1 are the descriptive statistics for this analysis.

With respect to the 2017-2018 school year, a statistically significant result was revealed, $\chi^2(1) = 6.48, p = .01$, Cramer's V of .01, a below small effect size (Cohen, 1988). A statistically significantly higher percentage, 1.5 percentage points higher, of

Grade 4 students in poverty who were enrolled in traditional elementary schools met the Approaches Grade Level performance standard than Grade 4 students in poverty who were enrolled in charter elementary schools. Revealed in Table 4.1 are the descriptive statistics for this analysis.

For the 2015-2016 school year, Grade 4 students who were economically disadvantaged and enrolled in traditional schools or enrolled in charter schools met the standard of Approaches Grade Level at similar percentages, approximately 66% and 65%, respectively. In regard to the 2016-2017 and 2017-2018 school years, higher percentages of Grade 4 students in poverty enrolled in traditional schools met the standard of Approaches Grade Level than Grade 4 students in poverty enrolled in charter schools. These results are depicted in Figure 4.1.

Insert Figure 4.1 about here

Meets Grade Level Results for Students in Poverty

For the 2015-2016 school year, a statistically significant difference was not revealed, $\chi^2(1) = 1.10, p = .30$. Similar percentages of Grade 4 students in poverty met the Meets Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Table 4.2 contains the descriptive statistics for this analysis.

Insert Table 4.2 about here

Regarding the 2016-2017 school year, a statistically significant difference was not yielded, $\chi^2(1) = 2.75, p = .10$. Similar percentages of Grade 4 students in poverty met the Meets Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Delineated in Table 4.2 are the descriptive statistics for this analysis.

Concerning the 2017-2018 school year, a statistically significant difference approached but did not reach the conventional level of statistical significance, $\chi^2(1) = 3.04, p = .08$. A slightly higher percentage of Grade 4 students in poverty, 1.2%, who were enrolled in traditional elementary schools met the Meets Grade Level performance standard than Grade 4 students who were enrolled in charter elementary schools. Revealed in Table 4.2 are the descriptive statistics for this analysis.

Results were consistent for the 2015-2016, 2016-2017, and 2017-2018 school years for students in poverty. For two years analyzed, 2015-2016 and 2016-2017, similar percentages of Grade 4 students who were economically disadvantaged met the Approaches Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Concerning the 2017-2018 school year, students in poverty enrolled in traditional schools met the Meets Grade Level performance standard with marginally higher percentage points than students in poverty enrolled in charter schools. These results are depicted in Figure 4.2.

Insert Figure 4.2 about here

Masters Grade Level Results for Students in Poverty

With respect to the 2015-2016 school year, a statistically significant difference approached but did not reach the conventional level of statistical significance, $\chi^2(1) = 3.03, p = .08$. A slightly higher percentage of Grade 4 students in poverty, 0.8%, who were enrolled in charter elementary schools met the Masters Grade Level performance standard than Grade 4 students who were enrolled in traditional elementary schools.

Table 4.3 contains the descriptive statistics for this analysis.

Insert Table 4.3 about here

Concerning the 2016-2017 school year, a statistically significant difference was not yielded, $\chi^2(1) = 0.11, p = .74$. Similar percentages of Grade 4 students in poverty met the Masters Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Delineated in Table 4.3 are the descriptive statistics for this analysis.

Regarding the 2017-2018 school year, a statistically significant result was not revealed, $\chi^2(1) = 0.87, p = .35$. Similar percentages of Grade 4 students in poverty met the Masters Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. Revealed in Table 4.3 are the descriptive statistics for this analysis.

For the three years, similar percentages of Grade 4 students in poverty met the Masters Grade Level performance standard, regardless of whether they were enrolled in traditional elementary schools or enrolled in charter elementary schools. In each year,

the difference between the students who met this performance standard was less than 0.8 percentage points. These results are shown in Figure 4.3

Insert Figure 4.3 about here

Results for Students in Poverty on Performance Standards Over Time by School Type

Concerning the percentage of Grade 4 students in poverty who met the Approaches Grade Level performance standard, two out of the three years students enrolled in traditional schools met the standard with a higher percentage than students enrolled in charter schools. The first year, 2015-2016, Grade 4 students in poverty had approximately the same percentage of students meet the Approaches Grade Level performance standard.

Of note, students in poverty who met the Approaches Grade Level performance indicator increased for both traditional and for charter schools from the 2015-2016 to the 2017-2018 school years. Grade 4 students who were economically disadvantaged enrolled in charter schools increased 8.6 percentage points over the three years analyzed. The percentages of Grade 4 students who were economically disadvantaged enrolled in traditional schools yielded a 9.5 percentage point increase from the 2015-2016 to 2017-2018 school years.

In regard to Grade 4 students in poverty who met the Meets Grade Level performance standard, a statistically significant difference was not revealed between charter schools and traditional schools for the 2015-2016 and 2016-2017 school years.

Students who were economically disadvantaged met the Meets Grade Level performance standard at approximately the same percentage, regardless of school type, 27% and 36% respectively. For the 2017-2018 school year, students of poverty enrolled in traditional schools met the Meets Grade Level performance standard at a slightly higher percentage, 1.2 percentage points, than students in poverty enrolled in charter schools.

Of note was the percentage of Grade 4 students in poverty who met the Meets Grade Level performance indicator increased for both traditional and for charter schools from the 2015-2016 to the 2017-2018 school years. Over the three years, Grade 4 students in poverty enrolled in traditional schools revealed a 13 percentage point increase, and Grade 4 students in poverty enrolled in charter schools yielded an 11.2 percentage point increase from the 2015-2016 to 2017-2018 school years.

In regard to Grade 4 students who were economically disadvantaged and who met the Masters Grade Level performance standard for the 2016-2017 and 2017-2018 school years, students met the standard at approximately the same percentage, regardless of school type, 18% and 19% respectively. For the 2015-2016 school year, Grade 4 students in poverty enrolled in charter schools met the Masters Grade Level performance standard at a slightly higher percentage, 0.8 percentage points, than Grade 4 students in poverty enrolled in traditional schools.

Over the three years, Grade 4 students who were economically disadvantaged enrolled in traditional schools and charter schools increased the percentage of students meeting the Masters Grade Level performance standard each year. Students in poverty enrolled in traditional schools had a 6.8 percentage point increase from the 2015-2016 to

2017-2018 school years. Grade 4 students in poverty enrolled in charter schools yielded a 6.5 percentage point increase from the 2015-2016 to the 2017-2018 school years.

Discussion

Analyzed in this investigation was the extent to which differences were present in the mathematics performance of Texas Grade 4 students in poverty who were enrolled in traditional elementary schools and Grade 4 students in poverty who were enrolled in charter elementary schools. Three years of Texas statewide data on the three Grade 4 STAAR Mathematics Performance Indicators (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) were examined for students in poverty who were enrolled in either a charter school or in a traditional elementary school.

Statistically significant results were present in two of the school years for the Approaches Grade Level performance standard. For the 2016-2017 and 2017-2018, students in poverty and enrolled in traditional schools met the standard at a higher percent than students in poverty enrolled in charter schools. Results from the 2015-2016 school year revealed Grade 4 students in poverty met the Approaches Grade Level similarly regardless of school type.

In regard to the Meets Grade Level, there was minimal difference in the performance of Grade 4 students in poverty regardless of school type. Grade 4 students in poverty are not academically performing better at Texas charter schools than traditional schools. Of note, both charter school students and traditional school students increased the percentage of meeting the Meets Grade Level over the three years. From 2015-2016 to 2017-2018, traditional schools increased the percent of students Meeting

Grade Level by 13 percentage points, and charter schools increased the percent of student Meeting Grade Level by 11.2 percentage points.

To consider a Grade 4 student above grade level, students must meet the standard for Masters Grade Level. For each of the three years of data, Grade 4 students in poverty revealed no statistical significance regarding school type. Similar percentages of students enrolled in traditional schools met the standards of Masters Grade as Grade 4 students in poverty who were enrolled in charter schools. Of note, the 2015-2016 school year approached but did not meet the conventional level of statistical significance.

School reformers are advocating for the continued development of charter schools. Charter schools have had an accelerated growth, 250% within the last 10 years (Texas Education Agency, 2016b). However, the efficacy of charter schools on students in poverty mathematics performance has not been established.

Connections to Existing Literature

Montemayor (2017) previously investigated the academic achievement of students in poverty in traditional schools and charter schools in Texas. Montemayor (2017) documented an absence of statistically significant differences between students in poverty at charter schools and traditional public schools. Results delineated herein for Grade 4 students in poverty are congruent with the findings of this previous researcher for the performance indicators of Meets Grade Level for the 2015-2016 and 2016-2017 school years. Also congruent to Montemayor's (2017) findings are the results delineated herein for the 2016-2017 and 2017-2018 Masters Grade Level performance standard and the 2015-2016 Approaches Grade Level performance standard. These results yielded

similar percentages in passing the performance standard indicated regardless of school type.

Grade 4 students in poverty yielded a different finding for students who met the Approaches Grade Level performance standard than Montemayor (2017) but a similar finding to Escalante and Slate (2017). Escalante and Slate (2017) documented that students enrolled in Texas traditional elementary schools had statistically significantly higher scores on all three content areas than did students who were enrolled in charter elementary schools. In the, 2016-2017 and 2017-2018 school years, Grade 4 students in poverty enrolled in traditional schools met the Approaches Grade Level performance standard at a higher percentage than Grade 4 students in poverty enrolled in charter schools. Similarly, the result for the 2017-2018 school year for the Masters Grade Level performance standard is congruent with the findings of Escalante and Slate (2017). Grade 4 students in poverty enrolled in traditional schools met the Masters Grade Level performance standard at a slightly higher percentage than students in poverty enrolled in charter schools. Conversely, students in poverty enrolled in charter schools met the Masters Grade Level performance standard at a slightly higher percentage than students in poverty enrolled in traditional schools in the 2015-2016 school year.

Implications for Policy and Practice

With respect to policy implications, several implications can be made based upon the results of this multiyear, statewide investigation. Educational leaders should focus their efforts in conducting more educational research in regard to the efficacy of charter schools and academic achievement of students in poverty. Additionally, policymakers should analyze the results of this educational research study to encourage researchers to

focus on individual charter schools and their academic achievement for students in poverty. Teachers and school leaders who are succeeding reaching and teaching students in poverty practices should be studied by teachers and school leaders of all Texas public schools.

Regarding implications for practice, complete transparency in academic achievement should be required of both traditional and charter schools. Because parents are given a choice where to send their students to school, all schools should be required to provide academic achievement information by demographics at registration. To continue to increase the performance of students who are economically disadvantaged, both charter and traditional school teachers, administrators, and staff should engage in professional development efforts as well as to provide relief to the outside stressors that may cause negative effects on students' academic achievement.

Recommendations for Future Research

Given the results of this multiyear investigation, several recommendations for future research can be made. This study was conducted on data on only Grade 4 students in poverty who were enrolled in either a traditional elementary school or in a charter elementary school in Texas. The degree to which findings obtained herein would be generalizable to schools in other states is not known. Researchers are encouraged to examine the mathematics performance of students in poverty in traditional and charter schools in other states. Additionally, the extent to which these findings would be generalizable to students in poverty in other grade levels is also not known. Accordingly, researchers are encouraged to examine the mathematics performance of students in poverty in traditional and charter schools at other grade levels. Another recommendation

is for researchers to analyze mathematics performance by additional student demographic characteristic. That is, in this investigation, the performance of students who were economically disadvantaged was addressed. Because mathematics gaps have been documented in the literature for students of color, researchers are encouraged to examine mathematics performance by student demographic characteristic. Finally, researchers are encouraged to conduct longitudinal studies in which they follow the progress of students over the course of their enrollment in traditional schools and in charter schools.

Conclusion

In this investigation, the extent to which differences were present in the mathematics achievement of Grade 4 students in poverty in Texas as a function of school type (i.e., charter schools and traditional schools) was addressed. Three school years of archival data from the Texas Education Agency Public Education Information Management System were analyzed. In each of three years of data that were analyzed, statistically significantly higher percentages of Grade 4 students in poverty who were enrolled in traditional elementary met each performance indicator (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) or performed similarly than did Grade 4 students in poverty who were enrolled in charter elementary schools. The exception was the Approaches Grade Level performance standard in the 2015-2016 school. Slightly higher percentages, 0.8%, of Grade 4 students in poverty enrolled in charter schools met the Approaches Grade Level performance standards, than did students in poverty enrolled in traditional schools. As such, little evidence was present that students in poverty enrolled in charter schools have higher mathematics achievement than students in poverty enrolled in traditional schools.

References

- Allington, R. L., McGill-Franzen, A., Camilli, G., Williams, L., Graff, J., & Zeig, J. (2010). Addressing summer reading setback among economically disadvantaged elementary students. *Reading Psychology, 31*(5), 411-427.
- Berliner, D. C. (2009). *Poverty and potential: Out-of-school factors and school success*. Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit.
- Betts, J. R., & Tang, Y. E. (2011). *The effect of charter schools on student achievement: A meta-analysis of the literature*. Bothell, WA, National Charter School Research Project, Center on Reinventing Public Education.
- Chingo, M. M., & West, M. R. (2015). The uneven performance of Arizona's charter schools. *Education Evaluation and Policy Analysis, 37*, 120S-134S.
- Chudowsky, N., & Ginsburg, A. (2012). *Who attends charter schools and how are those students doing?* Exploratory Analysis of National Assessment of Educational Progress Data prepared for the National Assessment Governing Board.
- Clark, M., Gleason, P., Tuttle, C., & Silverberg, M. (2011). Do charter schools improve student achievement? Evidence from a national randomized study. *Mathematics Working Paper*. Washington, DC: Mathematics Policy Research.
- Claro, S., Paunesku, D., & Dweck, C. S. (2016). Mindset tempers effects of poverty on achievement. *Proceedings of the National Academy of Sciences, 113*(31).
<https://doi.org/10.1073/pnas.1608207113>

- Cobb, C. D., & Glass, G. V. (1999). Ethnic segregation in Arizona charter schools. *Education Policy Analysis Archives*, 7(1).
<https://doi.org/10.14507/epaa.v7n1.1999>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Egalite, A. J. (2016). How family background influences student achievement: can schools narrow the gap? *Education Next*, 16(2), 70-79.
- Epple, D., Romano, R., & Zimmer, R. (2016). Charter schools: A survey of research on their characteristics and effectiveness. *Handbook of the Economics of Education*, 5, 139-208. <https://doi.org/10.1016/B978-0-444-63459-7.00003-8>
- Escalante, M. L., & Slate, J. R. (2017). Differences in academic performance between elementary charter schools and traditional public schools. *Journal of Advances in Education Research*, 2(3), 163-170. <https://dx.doi.org/10.22606/jaer.2017.23004>
- Every Student Succeeds Act (ESSA) of 2015, Pub. L. No. 114-95 Stat. 1177 (2015).
- Executive Office of the President. (1990). *National Goals for Education*. Washington, DC. ED319143
- Finn, C. E., Manno, B. V., & Vanourek, G. (2000). *Charter schools in action: Renewing public education*. Princeton, NJ: Princeton University Press.
- Fiske, E., & Ladd, H. (2000). *When schools compete: A cautionary tale*. Washington, DC: Brookings Institution.
- Frankenberg, E., & Lee, C. (2003). *Charter schools and race: A lost opportunity for integrated education*. Cambridge, MA: The Civil Rights Project at Harvard University

- Friedman-Krauss, A. H., & Raver, C. C. (2015). Does school mobility place elementary school children at risk for lower mathematics achievement? The mediating role of cognitive dysregulation. *Developmental Psychology, 51*, 1725-1739.
<https://doi.org/10.1037/a0039795>
- Goforth, K., Noltemeyer, A., Patton, J., Bush, K. R., & Bergen, D. (2014). Understanding mathematics achievement: an analysis of the effects of student and family factors. *Educational Studies, 40*, 196-214.
- GovTrack.us (2020). S. 1177- 114th Congress: *Every Student Succeeds Act*. Retrieved from <https://www.Govtrack.us/congress/bills/114/s1177>
- Gregory, A., Skiba, R. J., & Noguera, P. A. (2010). The achievement gap and the discipline gap: Two sides of the same coin? *Educational Researcher, 39*(1), 59-68. <https://doi.org/10.3102/0013189x09357621>
- Klammer, B., & Slate, J. R. (2018). Differences between charter and traditional elementary schools in Grade 3 mathematics performance. *Journal of Educational System, 2*(4), 33-37. Retrieved from <https://www.sryahwapublications.com/journal-of-educational-system/pdf/v2-i4/6.pdf>
- Kolderie, T. (2004). *Creating the capacity for change: How and why governors and legislatures are opening a new-schools sector in public education*. Bethesda, MD: Education Week Press.
- Ladd, H. F. (2012). Education and poverty: Confronting the evidence. *Journal of Policy Analysis and Management, 31*, 203-227. <https://doi.org/10.1002/pam.21615>

- Milne, A., & Plourde, L. A. (2006). Factors of a low-SES household: What aids academic achievement? *Journal of Instructional Psychology*, 33(3), 183-193.
- Montemayor, K. P. (2017). *A comparative analysis of charter schools and neighboring traditional public schools' reading and mathematics performance in South Texas*. Retrieved from ProQuest Dissertations & Theses Global.
- Reardon, S. F. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. In G. J. Duncan & R. J. Murnane, eds., *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 91-115). New York, NY: Russel Sage Foundation.
- Sahin, A., Willson, V., & Capraro, R. M. (2018). Charter school achievements in Texas: Public versus charter schools. *International Journal of Educational Reform*, 27(1), 46-62. <https://doi.org/10.1177/105678791802700103>
- Slate, J. R., & Rojas-LeBouef, A. (2011). *Calculating basic statistical procedures in SPSS: A self-help and practical guide to preparing theses, dissertations, and manuscripts*. Ypsilanti, MI: NCPEA Press.
- Snyder, T., de Brey, C., & Dillow, S. (2019). *Digest of education statistics 2017* (NCES 2018-070). Washington, DC: National Center for Education Statistics.
- Texas Education Agency. (2015). *Glossary for Texas Academic Indicator Report, 2015-2016*. Retrieved from <https://rptsvr1.tea.texas.gov/perfreport/tapr/2016/glossary.pdf>
- Texas Education Agency (2016). *Enrollment in Texas public schools, 2015-16*. (Document No. GE16 601 09). Austin TX: Author. Retrieved from http://www.tea.texas.gov/acctres/enroll_index.html

Texas Education Agency. (2018). *Pocket Edition Final: 2017-2018*. Retrieved from
https://tea.texas.gov/sites/default/files/2017-2018_Pocket_Edition_final.pdf

Texas Education Agency. (2019). *Performance Level Descriptors: Grade 4 Mathematics*.
Retrieved from
https://tea.texas.gov/sites/default/files/PLD_Math_G4_April%202019_V2.pdf

Texas Education Code. Title 2; Subtitle C; Chapter 12, Section 12. Retrieved from
https://texas.public.law/statutes/tex._educ._code_section_12.0011

U.S. Department of Education. (2015). *Every Student Succeeds Act*. Retrieved from
<https://www.ed.gov/essa?src=rn>

Wamba, N.G. (2010) Poverty and literacy: An introduction. *Reading & Writing Quarterly*, 26(3), 189-194. <https://doi.org/10.1080/10573561003769533>

Table 4.1

Descriptive Statistics for the STAAR Mathematics Approaches Grade Level Standard for Grade 4 Students in Poverty by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	32,331	34.1	62,614	65.9
Charter	2,215	34.7	3,991	65.3
2016-2017				
Traditional	30,354	30.3	69,748	69.7
Charter	2,058	32.8	4,221	67.2
2017-2018				
Traditional	20,912	24.6	64,092	75.4
Charter	1,435	26.1	4,057	73.9

Table 4.2

Descriptive Statistics for the STAAR Mathematics Meets Grade Level Standard for Grade 4 Students in Poverty by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	69,107	72.8	25,838	27.2
Charter	4,414	72.2	1,702	27.8
2016-2017				
Traditional	63,061	63.0	37,041	37.0
Charter	4,021	64.0	2,258	36.0
2017-2018				
Traditional	50,808	59.8	34,196	40.2
Charter	3,348	61.0	2,144	39.0

Table 4.3

Descriptive Statistics for the STAAR Mathematics Masters Grade Level Standard for Grade 4 Students in Poverty by School Type for the 2015-2016, 2016-2017, and 2017-2018 School Years

School Year and School Type	Did Not Meet Standard		Met Standard	
	<i>n</i>	%	<i>n</i>	%
2015-2016				
Traditional	83,607	88.1	11,338	11.9
Charter	5,340	87.3	776	12.7
2016-2017				
Traditional	81,731	81.6	18,371	18.4
Charter	5,137	81.8	1,142	18.2
2017-2018				
Traditional	69,121	81.3	15,883	18.7
Charter	4,438	80.8	1,054	19.2

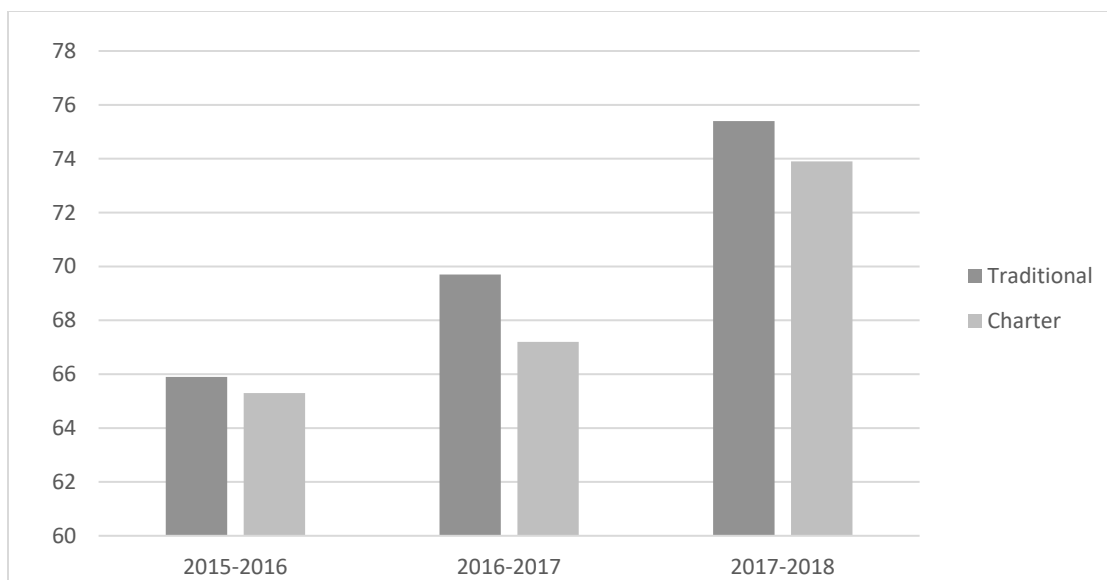


Figure 4.1. Percentages of students in poverty who met the Approaches Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

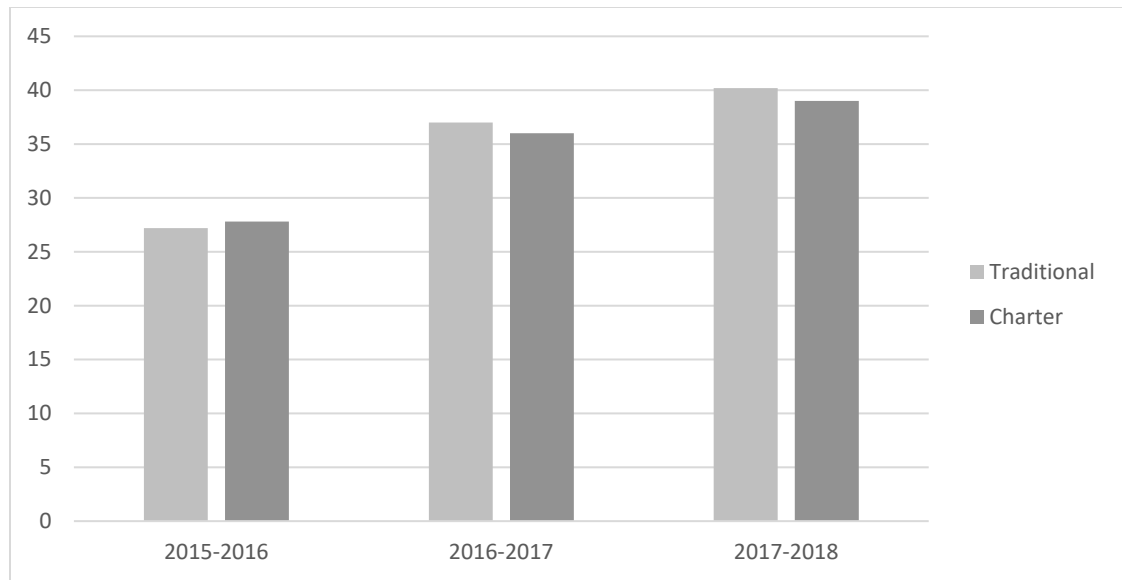


Figure 4.2. Percentages of students in poverty who met the Meets Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

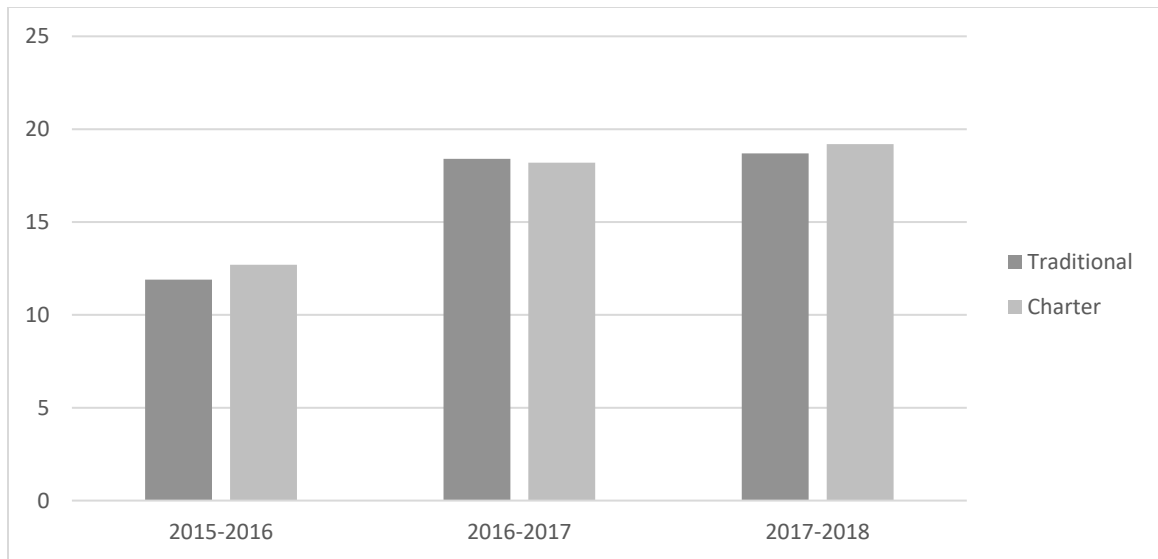


Figure 4.3. Percentages of students in poverty who met the Masters Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type.

CHAPTER V

DISCUSSION

The purpose of this journal-ready dissertation was to determine the degree to which differences were present in mathematics achievement between Grade 4 students enrolled in charter elementary schools and Grade 4 students enrolled in traditional elementary schools. In the first article, the extent to which differences existed in mathematics achievement between all Grade 4 students enrolled in charter elementary schools and traditional elementary schools in Texas was determined. In the second study, the degree to which differences were present in mathematics achievement between Grade 4 Black and Hispanic students enrolled in charter elementary schools and Black and Hispanic students enrolled in traditional elementary schools was addressed. In the third study, the extent to which differences were present in mathematics achievement in Grade 4 students who were economically disadvantaged and who were enrolled in charter elementary schools and students who were economically disadvantaged and who were enrolled in traditional elementary schools was examined. Specifically, the extent to which the differences in passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) were present in Grade 4 STAAR Mathematics between students enrolled in charter elementary schools and students enrolled in traditional elementary schools was determined. Additionally, three years of data were analyzed to determine if a trend in the levels of passing standards (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) in each school-type (i.e., charter and traditional) was present.

For each of the studies in this journal-ready dissertation, the results are discussed and summarized in this chapter. Then, implications for policy and practice will be provided, followed by recommendations for future research. A summary will conclude this chapter.

Discussion of Article One Results

A summary of the statistical analyses of Texas Grade 4 students enrolled in charter schools and traditional schools and who participated in the STAAR Mathematics exam for the 2015-2016, 2016-2017, and 2017-2018 school years are summarized in Table 5.1. In each STAAR Mathematics Performance standard, and in all three years investigated, statistically significantly higher percentages of students enrolled in traditional schools met the three STAAR Mathematics standards than students enrolled in charter schools. All effect sizes were below small (Cohen, 1988).

Table 5.1

Summary of Results for the Grade 4 STAAR Mathematics Performance Standards by School Type for the 2015-2016 School Year through the 2017-2018 School Year

School Year and Mathematics Performance Standard	Statistically Significant	Effect Size	School Type with Largest Percentage Meeting Standard
2015-2016			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional
2016-2017			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional
2017-2018			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional

These results are congruent with the findings of Klammer and Slate (2018) who established that traditional schools had a higher percentage of their Grade 3 students meet the STAAR Mathematics performance standards in the 2015-2016 school year than charter schools. In this study, in the 2015-2016, 2016-2017 and 2017-2018 school years, the percentages of students who met the Performance Indicators (Approaches Grade Level, Meets Grade Level, and Masters Grade Level) were similar to Klammer and Slate's (2018) findings.

Discussion of Article Two Results

The results of the statistical analyses of Texas Grade 4 Hispanic students who took the STAAR Mathematics test in the 2015-2016, 2016-2017, and 2017-2018 school years and were enrolled in either a traditional elementary school or in a charter elementary school are summarized in Table 5.2. In all three years investigated and for each STAAR Mathematics Performance Standard, statistically significantly higher percentages of Grade 4 Hispanic students enrolled in traditional schools met the STAAR mathematics standards than Grade 4 Hispanic students enrolled in charter schools. Concerning practical relevance, all effect sizes were below small (Cohen, 1988).

Table 5.2

*Summary of Results for the STAAR Mathematics Performance Standards of Grade 4
Hispanic Students by School Type for the 2015-2016 School Year Through the 2017-2018
School Year*

School Year and Mathematics Reporting Category	Statistically Significant	Effect Size	School Type with Largest Percentage Meeting Standard
2015-2016			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional
2016-2017			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional
2017-2018			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	Yes	Below Small	Traditional
Masters Grade Level	Yes	Below Small	Traditional

Presented in Table 5.3 are the results of the statistical analyses of Texas Grade 4 Black students enrolled in either a traditional elementary schools or in a charter elementary school and who participated in the STAAR Mathematics test in the 2015-2016, 2016-2017, and 2017-2018 school years. For the first two school years and all three STAAR Mathematics Performance Standards, higher percentages of Grade 4 Black students enrolled in traditional schools outperformed or performed the same as Grade 4 Black students enrolled in charter schools. For the 2017-2018 school year, however, higher percentages of Grade 4 Black students enrolled in charter schools performed the same or outperformed Grade 4 Black students enrolled in traditional schools. Five effect sizes were below small (Cohen, 1988).

Table 5.3

*Summary of Results for the STAAR Mathematics Performance Standards of Grade 4**Black Students by School Type for the 2015-2016 School Year Through the 2017-2018**School Year*

School Year and Grade Level Standard	Statistically Significant	Effect Size	School Type with Largest Percentage Meeting Standard
2015-2016			
Approaches	No	-	Similar Percentages
Meets	No	-	Similar Percentages
Masters	No	-	Similar Percentages
2016-2017			
Approaches	Yes	Below Small	Traditional
Meets	Yes	Below Small	Traditional
Masters	Yes	Below Small	Traditional
2017-2018			
Approaches	No	-	Similar Percentages
Meets	Yes	Below Small	Charter
Masters	Yes	Below Small	Charter

Discussion of Article Three Results

A summary of the statistical analyses of Texas Grade 4 students in poverty enrolled in either a traditional or charter elementary school who took the STAAR Mathematics exam in the 2015-2016, 2016-2017, and 2017-2018 school years is revealed in Table 5.4. In analyzing the mathematics achievement of Grade 4 students in poverty across the three years of data, few statistically significant results existed. Grade 4 students in poverty, regardless of their school type, met the Mathematics Performance Standards at similar percentages. Only for the 2016-2017 and 2017-2018 school years for the Approaches Grade Level were statistically significant results revealed. For these school year, Grade 4 students in poverty enrolled in traditional schools had a higher percentage of students who met the Approaches Grade Level performance standard than

Grade 4 students in poverty enrolled in charter schools. For the 2015-2016 school year, the results approached, but did not reach the conventional level of statistical significance. In this instance, slightly higher percentages of charter school students in poverty met the Masters Grade Level performance standard than did students in poverty enrolled in traditional schools. Across the three years, the three effect sizes were below small (Cohen, 1988).

Table 5.4

Summary of Results for the STAAR Mathematics Performance Standards of Grade 4

Students in Poverty for the 2015-2016 School Year Through the 2017-2018 School Year

School Year and Mathematics Reporting Category	Statistically Significant	Effect Size	School Type with Largest Percentage Meeting Standard
2015-2016			
Approaches Grade Level	No	-	Similar Percentages
Meets Grade Level	No	-	Similar Percentages
Masters Grade Level	Approaching	Below Small	Charter
2016-2017			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	No	-	Similar Percentages
Masters Grade Level	No	-	Similar Percentages
2017-2018			
Approaches Grade Level	Yes	Below Small	Traditional
Meets Grade Level	No	-	Similar Percentages
Masters Grade Level	No	-	Similar Percentages

Montemayor (2017) specifically analyzed data from the 2015-2016 school year for students from South Texas in Grades 3, 4, and 5 who were economically disadvantaged. No statistically significant differences were present in the academic performance of these students in poverty between charter schools and traditional schools on the Grade 3, 4, and 5 STAAR Reading and Mathematics tests. The results from this

study are congruent to Montemayor's (2017) findings. Students in poverty met the performance standards similarly regardless of school type.

Implications for Policy and Practice

Several implications for policy and for practice can be made based upon the results of the three multiyear, statewide investigations conducted in this journal-ready dissertation. In regard to policy, educational leaders should focus their efforts in conducting more educational research in regard to the efficacy of charter schools. Policymakers are encouraged to analyze the results of the studies in this journal-ready dissertation before making decisions regarding academic and financial support to charter school systems. Funding decisions for charter schools should be based upon empirical evidence, and not solely for political purposes. Results delineated herein provide more evidence of the inefficacy of charter schools. As such, policymakers and legislators are encouraged to provide more funding and support to traditional schools, rather than providing additional funding to charter schools. Finding schools that are improving the academic achievement of their Hispanic student, Black students, and students in poverty will further guide practice and raise the equity of education the state of Texas Charter schools not fulfilling the purpose of Texas Education Code 12.001 to "improve student learning" should undergo a mandatory partnership with the School Improvement Team at the Texas Education Agency or a local Education Service Center, and participate fully in Texas Instructional Leadership practices.

Regarding implications for practice to help parents in the decision-making process of deciding where to enroll their children, all schools should be required to provide information of the school academic rating at registration. If in an area, charter school

students are not performing equal to or above the local, traditional school student academic performance, then this information should be released to all parents of that charter school's students. If parents are given a choice where to send their students, complete transparency in academic achievement should be required.

To continue to increase the performance of under-represented populations, both charter and traditional school teachers, administrators, and staff should undergo training in cultural competency and develop systems that are set up equitably for all students to succeed. To continue to increase the performance of students who are economically disadvantaged, both charter and traditional school teachers, administrators, and staff should undergo professional development and provide relief to the outside stressors that may cause negative effects on students' academic achievement.

Recommendations for Future Research

Given the results of these three statewide, multiyear investigations, several recommendations for future research can be made. This study was conducted on data on only Grade 4 students who were enrolled in either a traditional elementary school or in a charter elementary school in Texas. Accordingly, the degree to which findings obtained herein would be generalizable to other states is not known. Therefore, researchers are encouraged to examine the mathematics performance of students in traditional and charter schools in other states. Moreover, the extent to which these findings would be generalizable to students in other grade levels is also not known. As such, researchers are encouraged to examine the mathematics performance of students in traditional and charter schools at other grade levels. Another recommendation is for researchers to analyze mathematics performance by student demographic characteristic. That is, in

these investigations, the performance of Hispanic students, Black students, and students in poverty was addressed. Because mathematics gaps have been documented in the literature for students in poverty and for students of color, researchers are encouraged to examine mathematics performance by further student demographic characteristics (e.g., at-risk, English Language Learner). Finally, researchers are encouraged to conduct longitudinal studies in which they follow the progress of students over the course of their enrollment in traditional schools and in charter schools.

Conclusion

The purpose of this journal-ready dissertation was to determine the extent to which differences were present in the mathematics achievement of Grade 4 students, Grade 4 Hispanic and Black students, and Grade 4 students in poverty in Texas as a function of school type (i.e., charter schools and traditional public schools). Specifically, three STAAR Mathematics Performance Standards were addressed (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level). Three school years of archival data from the Texas Education Agency Public Education Information Management System were analyzed. Results of this study were that Grade 4 students who were enrolled in traditional elementary schools met the performance standards at a higher percent than did Grade 4 students who were enrolled in charter schools. Similarly, for Grade 4 Hispanic students, for all three years and all performance standards, Hispanic students enrolled in traditional schools met the standards at a higher percentage than Grade 4 Hispanic students enrolled in charter schools. Grade 4 Black students enrolled in traditional schools met the performance standards at a similar or greater percentage than Grade 4 Black students enrolled in charter schools. The exception to this finding was the

2017-2018 Meets Grade Level standard and the Masters Grade Level standard where Grade 4 Black students enrolled in charter schools met the standards at a slightly higher percentage than did Grade 4 Black students enrolled in traditional schools. Of note, all the statistically significant differences had below small effect sizes. As such, minimal differences were present in the actual mathematics performance of Grade 4 students who were either enrolled in charter schools or in traditional elementary schools. Despite billions of dollars being invested in charter schools and the tremendous political movement toward charter schools, the evidence still does not support that the academic instruction is better than traditional schools. Results delineated in this journal-ready dissertation were supportive that traditional schools are more effective than are charter schools.

REFERENCES

- Allington, R. L., McGill-Franzen, A., Camilli, G., Williams, L., Graff, J., & Zeig, J. (2010). Addressing summer reading setback among economically disadvantaged elementary students. *Reading Psychology, 31*, 411-427.
- Berliner, D. C. (2009). *Poverty and potential: Out-of-school factors and school success*. Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit.
- Betts, J. R., & Tang, Y. E. (2008). *Value-added and experimental studies of the effect of charter schools on student achievement*. Seattle, WA: Center on Reinventing Public Education.
- Betts, J. R., & Tang, Y. E. (2011). *The effect of charter schools on student achievement: A meta-analysis of the literature*. Bothell, WA, National Charter School Research Project, Center on Reinventing Public Education.
- Bifulco, R., & Ladd, H. F. (2004). *The impacts of charter schools on student achievement: Evidence from North Carolina*. Working Papers Series. SAN04-01. Terry Sanford Institute of Public Policy.
- Bifulco, R., & Ladd, H. F. (2006). The impacts of charter schools on student achievement: Evidence from North Carolina. *Education Finance and Policy, 1*(1), 50-90.
- Bracey, G. W. (2000). The 10th Bracey report on the condition of public education. *Phi Delta Kappan, 82*, 133-144. <https://doi.org/10.1177/003172170008200210>
- Bracey, G. W. (2003). April foolishness: The 20th anniversary of A Nation at Risk. *Phi Delta Kappan, 84*, 616-621. <https://doi.org/10.1177/003172170308400815>

Bulkley, K., & Fisler, J. (2003). A decade of charter schools: From theory to practice.

Educational Policy, 17, 317-342.

<https://doi.org/10.1177%2F0895904803017003002>

Center for Research on Education Outcomes. (2009). *Multiple choice: Charter school performance in 16 States*. Stanford, CA: CREDO at Stanford University.

Center for Research on Education Outcomes. (2013). *National charter school study*. Stanford, CA: CREDO at Stanford University.

Center for Research on Education Outcomes. (2017). *Charter school performance in New York City*. Stanford, CA: CREDO at Stanford University

Chingo, M. M., & West, M. R. (2015). The uneven performance of Arizona's charter schools. *Education Evaluation and Policy Analysis*, 37, 120S-134S.

Chudowsky, N., & Ginsburg, A. (2012). *Who attends charter schools and how are those students doing?* Exploratory Analysis of National Assessment of Educational Progress Data prepared for the National Assessment Governing Board.

Clark, M., Gleason, P., Tuttle, C., & Silverberg, M. (2011). *Do charter schools improve student achievement? Evidence from a national randomized study*. Mathematics Working Paper. Washington, DC: Mathematics Policy Research.

Claro, S., Paunesku, D., & Dweck, C. S. (2016). Mindset tempers effects of poverty on achievement. *Proceedings of the National Academy of Sciences*, 113(31).

<https://doi.org/10.1073/pnas.1608207113>

Cobb, C. D., & Glass, G. V. (1999). Ethnic segregation in Arizona charter schools.

Education Policy Analysis Archives, 7(1), 1-35.

<https://doi.org/10.14507/epaa.v7n1.1999>

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, A. D., & York, R. L. (1966). *Equality of educational opportunity*. Washington, DC: National Center for Education Statistics.
- Crane, E., & Edwards, B. (2007). *California's charter schools: Measuring their performance*. Mountain View, CA: EdSource.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.
<https://doi.org/10.7748/nr.12.1.82.s2>
- Egalite, A. J. (2016). How family background influences student achievement: can schools narrow the gap? *Education Next*, 16(2), 70-79.
- Epple, D., Romano, R., & Zimmer, R. (2016). Charter schools: A survey of research on their characteristics and effectiveness. *Handbook of the Economics of Education*, 5, 139-208. <https://doi.org/10.1016/B978-0-444-63459-7.00003-8>
- Escalante, M. L., & Slate, J. R. (2017). Differences in academic performance between elementary charter schools and traditional public schools. *Journal of Advances in Education Research*, 2(3), 163-170. <https://doi.org/10.22606/jaer.2017.23004>
- ETS. (2017). *Understanding the STAAR Report Card*; Transcript 4. Retrieved from: <https://www.texasassessment.com/uploads/ets-understandingreportcard-transcript4.pdf>
- Every Student Succeeds Act (ESSA) of 2015, Pub. L. No. 114-95 Stat. 1177 (2015).

- Executive Office of the President. (1990). *National Goals for Education*. Washington, DC. ED319143
- Finn, C. E., Manno, B. V., & Vanourek, G. (2000). *Charter schools in action: Renewing public education*. Princeton, NJ: Princeton University Press.
- Fiske, E., & Ladd, H. (2000). *When schools compete: A cautionary tale*. Washington, DC: Brookings Institution.
- Frankenberg, E., & Lee, C. (2003). *Charter schools and race: A lost opportunity for integrated education*. Cambridge, MA: The Civil Rights Project at Harvard University.
- Friedman-Krauss, A. H., & Raver, C. C. (2015). Does school mobility place elementary school children at risk for lower mathematics achievement? The mediating role of cognitive dysregulation. *Developmental Psychology*, 51, 1725-1739.
<https://doi.org/10.1037/a0039795>
- Gill, B. P., Timpane, M., Ross, K. E., & Brewer, D. J. (2007). *Rhetoric versus reality: What we know and what we need to know about vouchers and charter schools*. Santa Monica, CA: Rand Corporation.
- Goforth, K., Noltemeyer, A., Patton, J., Bush, K. R., & Bergen, D. (2014). Understanding mathematics achievement: an analysis of the effects of student and family factors. *Educational Studies*, 4(2), 196-214.
- GovTrack.us. (2020). S. 1177- 114th Congress: *Every Student Succeeds Act*. Retrieved from <https://www.Govtrack.us/congress/bills/114/s1177>
- Greene, J. P., Forster, G., & Winters, M. A. (2003). *Apples to apples: An evaluation of charter schools serving general student populations*. (Working paper 1). New

- York, NY: The Manhattan Institute. Retrieved from https://media4.manhattan-institute.org/pdf/ewp_01.pdf
- Gregory, A., Skiba, R. J., & Noguera, P. A. (2010). The achievement gap and the discipline gap: Two sides of the same coin? *Educational Researcher*, 39(1), 59-68. <https://doi.org/10.3102/0013189x09357621>
- Gronberg, T., & Jansen, D. W. (2005). *Navigating newly chartered waters: An analysis of Texas charter school performance*. Austin, TX: Texas Public Policy Foundation.
- Haber, S., & Cremin, L. A. (1991). Popular education and its discontents. *The Journal of American History*, 77, 1414. <https://doi.org/10.2307/2078381>
- Han, E., & Keefe, J. (2020). The impact of charter school competition on student achievement of traditional public schools after 25 years: Evidence from national district-level panel data, *Journal of School Choice*, 14, 429-467. <https://doi.org/10.1080/15582159.2020.1746621>
- Hinojosa, M. (2009). *A comparison of open enrollment charter schools and traditional public schools in a Texas region*. Ann Arbor, MI: ProQuest LLC.
- Hoxby, C. M., & Rockoff, J. E. (2004). *The impact of charter schools on student achievement*. Cambridge, MA: Department of Economics, Harvard University.
- Imberman, S. A. (2011). The effect of charter schools on achievement and behavior of public school students. *Journal of Public Economics*, 95, 850-863. <https://doi.org/10.1016/j.jpubeco.2011.02.003>
- Kevelson, M. J. C. (2019). *The measure matters: Examining achievement gaps on cognitively demanding reading and mathematics assessments*. (Research Report

No. RR-19-43). Princeton, NJ: Educational Testing Service.

<https://doi.org/10.1002/ets2.12278>

Klammer, B., & Slate, J. R. (2018). Differences between charter and traditional elementary schools in Grade 3 mathematics performance. *Journal of Educational System*. Retrieved from <https://www.sryahwapublications.com/journal-of-educational-system/pdf/v2-i4/6.pdf>

Kolderie, T. (2004). *Creating the capacity for change: How and why governors and legislatures are opening a new-schools sector in public education*. Bethesda, MD: Education Week Press.

Ladd, H. F. (2012). Education and poverty: Confronting the evidence. *Journal of Policy Analysis and Management*, 31, 203-227. <https://doi.org/10.1002/pam.21615>

Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity? *Educational Researcher*, 31(1), 3-12.
<https://doi.org/10.3102/0013189X031001003>

Makey, A. P., Finn, A. S., Leonard, J. A., Jacoby-Senhor, D. S., West, M. R., Gabrieli, C. F., & Gabrieli, J. D. (2015). Neuroanatomical correlates of the income-achievement gap. *Psychological Science*, 26(6), 925-933.
<https://doi.org/10.1177/0956797615572233>

Maloney, P., & Mayer, K. U. (2010). The US educational system: Can it be a model for Europe. *United in diversity: Comparing social models in Europe and America*, 328-358.

Milne, A., & Plourde, L. A. (2006). Factors of a low-SES household: What aids academic achievement? *Journal of Instructional Psychology*, 33(3), 183-193.

- Montemayor, K. P. (2017). *A comparative analysis of charter schools and neighboring traditional public schools' reading and mathematics performance in South Texas*. Retrieved from ProQuest Dissertations & Theses Global.
- National Center for Education Statistics. (2017). *Digest of education statistics*. Retrieved from https://nces.ed.gov/programs/digest/d17/tables/dt17_211.10.asp
- National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. *The Elementary School Journal*, 84(2), 113-130.
- No Child Left Behind Act of 2001, P.L. 107-110, 20 U.S.C. § 6319 (2002).
- Orfield, M., & Luce, T. (2016). An analysis of student performance in Chicago's charter schools. *Education Policy Analysis Archives*, 24 (111), 3-38.
- Penning, F., & Slate, J. R. (2011). Charter schools in Texas: An overview. *International Journal of Educational Leadership Preparation*, 6(3), 3.
- Peterson, P. E. (2016). The end of the Bush-Obama regulatory approach to school reform: Choice and competition remain the country's best hope. *Education Next*, 16(3).
- Plucker, J. A., Makel, M. C., & Rapp, K. E. (2007). The impact of charter schools on promoting high levels of mathematics achievement. *Journal of School Choice*, 1(4), 63-76.
- Public Impact. (2018). *Closing achievement gaps in diverse and low-poverty schools: An action guide for district leaders*. Chapel Hill, NC: Public Impact and Geneva, Switzerland: Oak Foundation.

- Reardon, S. F. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. In G. J. Duncan & R. J. Murnane, eds., *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 91-115). New York, NY: Russell Sage Foundation.
- Sahin, A., Willson, V., & Capraro, R. M. (2018). Charter school achievements in Texas: Public versus charter schools. *International Journal of Educational Reform*, 27(1), 46-62. <https://doi.org/10.1177/105678791802700103>
- Shields, J., Garland, M., Cannon, S., Booth, E., & Pham, C. (2017). *Texas charter authorizer accountability Report, 2016-17 (Gibson Consulting)*. Retrieved from Texas Education Agency website:
https://tea.texas.gov/Reports_and_Data/Program_Evaluations/Charter_Schools/Program_Evaluation_Texas_Charter_Schools/
- Silvernail, D., & Johnson, A. (2014). *The impacts of public charter schools on students and traditional public schools: What does the empirical evidence tell us?* University of Southern Maine; Maine Education Policy Research Institute.
- Slate, J. R., & Rojas-LeBouef, A. (2011). *Calculating basic statistical procedures in SPSS: A self-help and practical guide to preparing theses, dissertations, and manuscripts*. Ypsilanti, MI: NCPEA Press.
- Snyder, T., de Brey, C., & Dillow, S. (2019). *Digest of education statistics 2017* (NCES 2018-070). Washington, DC: National Center for Education Statistics
- Snyder, T. D., Tan, A. G., & Hoffman, C. M. (2006). *Digest of education statistics 2005* (NCES 2006-030). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office.

Swaby, A. (2017). School choice bill proponents, foes debate what's best for families.

The Texas Tribune. Retrieved from

<https://www.texastribune.org/2017/03/21/school-choice-debate-debates-whatbest-famillies/>

Taylor, L. L., Alford, B. L., Rollins, K. B., Brown, D. B., Stillisano, J. R., & Waxman, H.

C. (2011). *Evaluation of Texas charter schools 2009-10*. Report prepared for the Texas Education Agency, Austin, TX.

Texas Education Agency. (2015). *Glossary for Texas Academic Indicator Report, 2015-2016*. Retrieved from

<https://rptsvr1.tea.texas.gov/perfreport/tapr/2016/glossary.pdf>

Texas Education Agency. (2016a). *Appendix F: Federal Requirements for Ethnicity and Race Data Collection and Reporting*. Retrieved from

<https://tea.texas.gov/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=25769822691>

Texas Education Agency (2016b). *Enrollment in Texas public schools, 2015-16*.

(Document No. GE16 601 09). Austin TX: Author. Retrieved from

http://www.tea.texas.gov/acctres/enroll_index.html

Texas Education Agency. (2018a). *Pocket Edition Final: 2017-2018*. Retrieved from

https://tea.texas.gov/sites/default/files/2017-2018_Pocket_Edition_final.pdf

Texas Education Agency. (2018b). *Texas Assessment Program Frequently Asked Questions*. Austin, TX: Author. Retrieved from

<https://tea.texas.gov/WorkArea/DownloadAsset.aspx?id=51539620927>

- Texas Education Agency. (2019a). *Closing the Gaps PPT*. Retrieved from https://TexasEducationAgency.texas.gov/sites/default/files/Closing%20the%20Gaps%20Domain_fnl.pdf
- Texas Education Agency. (2019b). *Performance Level Descriptors: Grade 4 Mathematics*. Retrieved from https://tea.texas.gov/sites/default/files/PLD_Math_G4_April%202019_V2.pdf
- Texas Education Agency. (2020a). *History of charter schools*. Retrieved from <https://tea.texas.gov/texas-schools/texas-schools-charter-schools/charter-schools-history-of-charter-schools>
- Texas Education Agency. (2020b). *STAAR Performance Standards*. Retrieved from <https://tea.texas.gov/student-assessment/testing/staar/staar-performance-standards>
- Texas Education Code. Title 2; Subtitle C; Chapter 12, Section 12. Retrieved from [https://texas.public.law/statutes/tex._educ._code_section_12.103#:~:text=\(a\),zoning%20ordinances%20governing%20public%20schools](https://texas.public.law/statutes/tex._educ._code_section_12.103#:~:text=(a),zoning%20ordinances%20governing%20public%20schools)
- Texas Education Code, *Chapter 12, Subchapters D & E*. (2016). Retrieved from https://texas.public.law/statutes/tex._educ._code_section_12.0011
- U.S. Department of Education. (2004). *No Child Left Behind: A toolkit for teachers*. Retrieved from <http://www.ed.gov/teachers/nclbguide/nclb-teachers-toolkit.pdf>
- U.S. Department of Education. (2015). *Every Student Succeeds Act*. Retrieved from <https://www.ed.gov/essa?src=rn>
- Wamba, N. G. (2010). Poverty and literacy: An introduction. *Reading & Writing Quarterly*, 26(3), 189-194. <https://doi.org/10.1080/10573561003769533>

Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-synthesis. *Educational Review*, 66(3), 1-21.

<https://doi.org/10.1080/00131911.2013.780009>

Winters, M. A. (2018). *New York City's charter schools: What the research shows*. New York, NY: Manhattan Institute.

APPENDIX



Date: Dec 15, 2020 2:46:22 PM CST

TO: Elizabeth Klammer John Slate

FROM: SHSU IRB

PROJECT TITLE: Differences in Grade 4 Mathematics Performance Between Texas Charter Elementary Schools and Traditional Elementary Schools as a Function of Ethnicity/Race and by Poverty

PROTOCOL #: IRB-2020-371

SUBMISSION TYPE: Initial

ACTION: Exempt

DECISION DATE: December 15, 2020

EXEMPT REVIEW CATEGORY: Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:

- (i) The identifiable private information or identifiable biospecimens are publicly available;
- (ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;
- (iii) The research involves only information collection and analysis involving the investigator's use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of "health care operations" or "research" as those terms are defined at 45 CFR 164.501 or for "public health activities and purposes" as described under 45 CFR 164.512(b); or
- (iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

Greetings,

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

VITA
Elizabeth C. Klammer

EDUCATIONAL HISTORY

Doctorate of Education – Educational Leadership, May 2021

Sam Houston State University, Huntsville, TX

Dissertation: Differences in Grade 4 Mathematics Performance between Texas Charter Elementary Schools and Traditional Elementary Schools as a Function of Ethnicity/Race and by Poverty

Master of Arts- Instructional Leadership, December 2006

Sam Houston State University, Huntsville, TX

Bachelor of Science – Interdisciplinary Studies, May 1997

Sam Houston State University, Huntsville, TX

PROFESSIONAL EXPERIENCE

2020-Present

Leadership Development and School Improvement Lead, ESC Region 6

2017-2020

Director of ELAR/SLAR and Social Studies, Navasota ISD

2014-2017

Director of Curriculum and Instruction, Montgomery ISD

012-2014

Assistant Principal, Stewart Creek Elementary, Montgomery ISD

2000-2012

Grade 3 Math Teacher, Grade 4 ELAR Teacher, Instructional Support Specialist, Montgomery ISD

1997-2000

Grade 6 Reading Through Social Studies Teacher, Stehlik Intermediate, Aldine ISD

SCHOLARLY RESEARCH ACTIVITY

Klammer, B., & Slate, J. R. (2018). Differences between charter and traditional elementary schools in Grade 3 mathematics performance. *Journal of Educational System*, 2(4), 33-37. Retrieved from <https://www.sryahwapublications.com/journal-of-educational-system/pdf/v2-i4/6.pdf>

PRESENTATIONS

Klammer, B. (2018, September). *Differences between charter and traditional elementary schools in Grade 3 mathematics performance*. Paper presented at the Texas Council of Professors of Educational Administration, Austin, TX.

RECOGNITIONS

Teacher of the Year, Montgomery ISD, 2002

Excellence in Writing, College of Education, Sam Houston State University, 2005

New Teacher of the Year, Stehlik Intermediate, Aldine ISD, 1997