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Differences in Grade 4 Mathematics Performance of Students in Poverty Between Charter and Traditional Elementary Schools: A Multiyear Texas Analysis

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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 then 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

1. Introduction

The adverse effects of poverty on student achievement have been well documented by researchers (e.g., Gregory et al., Ladd, 2012; Reardon, 2011). Poverty has strong detrimental effects on student academic performance (Claro et al., 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 period.

Regarding student economic status, the Texas Education Agency defined 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 attended 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 et al., 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 Education 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 et al. (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 et al. (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.

1.1 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 reported 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 different between charter schools and traditional schools.

1.2 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.

1.3 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.

1.4 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?

2. Method

2.1 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.

2.2 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 (≤ 64% and ≤ 59%) on the 2017 and 2018 administrations and 17 questions correct or below (≤ 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.

3. 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, 2023).

3.1 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 1 contains the descriptive statistics for this analysis.

Table 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

	Did Not Meet Standard		Met Standard	
School Year and School Type	*n*	%	*n*	%
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

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 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 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 1.

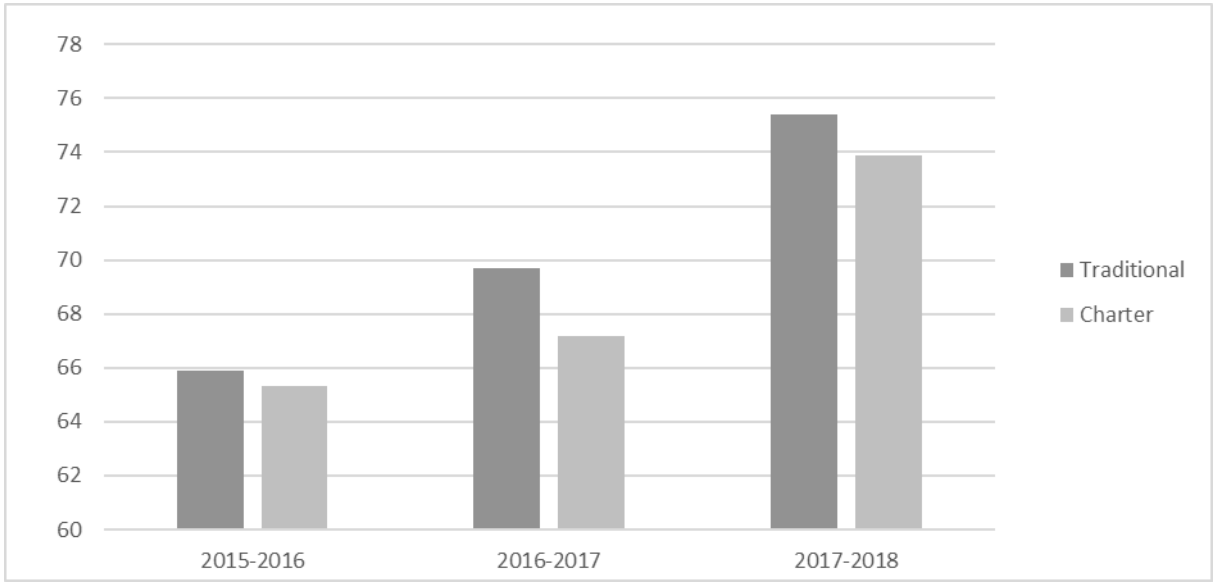

Figure 1. Percentages of students in poverty who met the Approaches Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type

3.2 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 of enrolled in charter elementary schools. Table 2 contains the descriptive statistics for this analysis.

Table 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

	Did Not Meet Standard		Met Standard	
School Year and School Type	*n*	%	*n*	%
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

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 of 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 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 2.

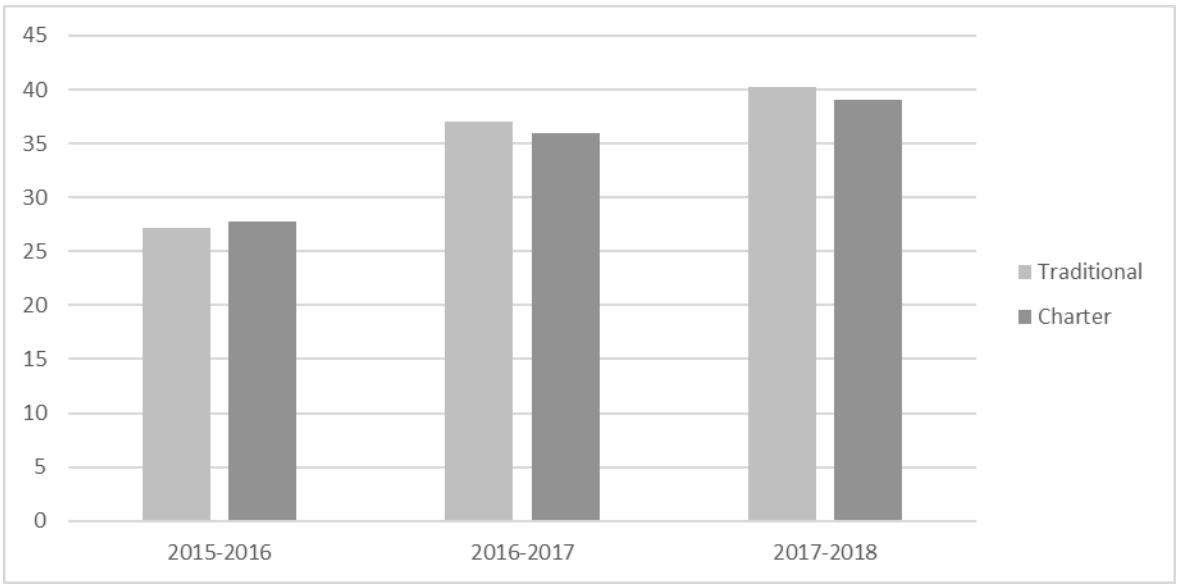

Figure 2. Percentages of students in poverty who met the Meets Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type

3.3 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 3 contains the descriptive statistics for this analysis.

Table 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

	Did Not Meet Standard		Met Standard	
School Year and School Type	*n*	%	*n*	%
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

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 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 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 lea than 0.8 percentage points. These results are shown in Figure 3.

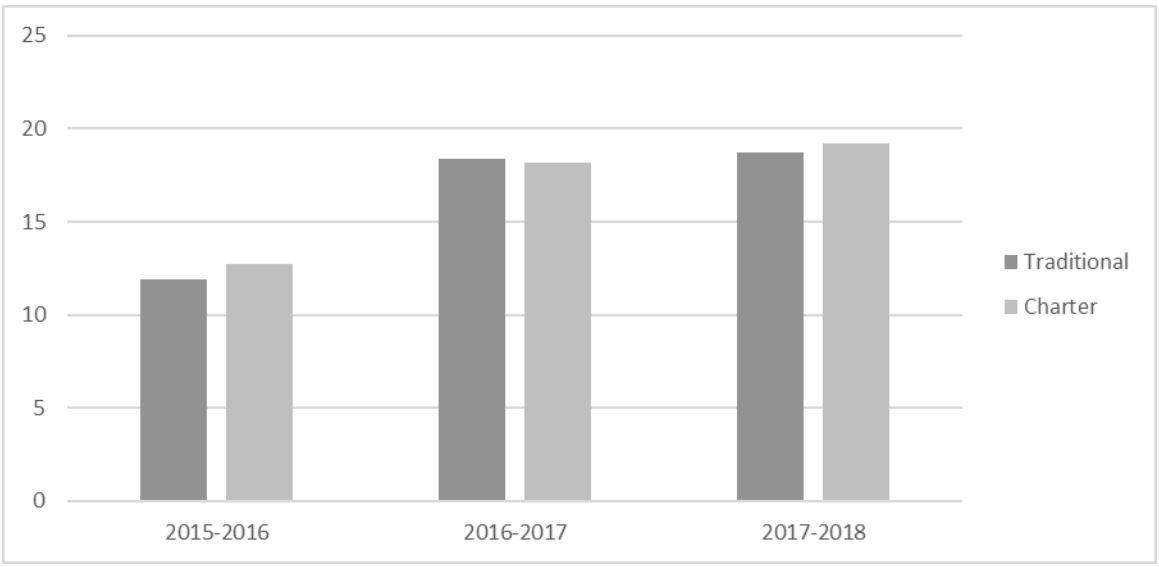

Figure 3. Percentages of students in poverty who met the Masters Grade Level standard on the Grade 4 STAAR Mathematics exam for the 2015-2016 through the 2017-2018 school year by school type

3.4 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.

4. 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.

5. 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 then 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.

6. 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.

7. 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.

8. 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.

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