Research Brief

Mississippi Urban Research Center

College of Education and Human Development

Jackson State University

February 2023

Examining Predictors of School Performance: A Study of Urban Charter and Public Schools in Jackson, Mississippi

Michael Tornes, Ph.D.
Sam Mozee, Jr., Ph.D.

Abstract

This exploratory study examined whether "charter school distinction" (i.e., being a charter school or public-school), alone or with other education-related variables, significantly predicted Math and English proficiency scores in Jackson, Mississippi middle schools. This study utilized a comparative, correlational design to conduct its analysis. Specific variables examined included charter school distinction, Math proficiency, English proficiency, valid certification, teacher experience, chronic absenteeism, and per-pupil expenditure. This study utilized 2020-2021 and 2018-2019 school year data from the Mississippi Department of Education. Data analysis included conducting linear regression and multiple regression tests to examine the predictive strength of the variables selected for inclusion in this study on Math and English proficiency scores. Results indicated that charter school distinction is not a significant predictor of Math and English proficiency scores for the school years examined (2020-2021 and 2018-2019). In examining the other selected variables, Teacher experience was found to be a significant predictor for Math proficiency scores for the 2020-2021 school year, but not for the 2018-2019 school year. Teacher experience was also found to have a significant negative relationship with Math proficiency scores for both the 2020-2021 and 2018-2019 school years. Chronic absenteeism was found to have a significant negative correlation with both Math and English proficiency for the 2018-2019 school year, but not the 2020-2021 school year. Multiple regression models calculated for both proficiency variables were not statistically significant for either school year. Findings suggest the need for alternative methods to study the differences between charter and public schools in Jackson, Mississippi, and to explore other variables that may better predict school proficiency scores.

Introduction

Debates about charter schools in Jackson, Mississippi have been ongoing. One recent debate concerned the Jackson Public School Board refusing to lease a new building to Midtown Public Charter School (James, 2022). To explore the debate between the performance of urban charter schools and public schools, this study sought to analyze and compare data on middle school performance in Jackson, Mississippi using Math and English proficiency scores. The following sections summarize the findings from this study.

Research Questions

This study assessed whether being a charter school or public school predicted overall school proficiency scores in Math and English. If charter school distinction was not a strong predictor, then the researcher wanted to know what other variables might be stronger predictors of school Math and English proficiency scores. Thus, the following research questions were asked:

RQ1: Does being a public or charter middle school significantly predict overall proficiency scores in Math and English?

RQ2: Are there other variables that may be stronger predictors of overall school proficiency scores in Math and English than a school being a public or charter school?

Methodology

Design

This study utilized a comparative, correlational design to conduct its analysis of secondary data from the Mississippi Department of Education (MDE). Based on the data available from MDE, the following performance variables were of interest:

- Math Proficiency: Defined by MDE as the percentage of "students scoring Proficient or Advanced (Levels 4 or 5) on the statewide MAAP math or Algebra I assessment".
- English Proficiency: Defined by MDE as the percentage of "students scoring Proficient or Advanced (Levels 4 or 5) on the statewide MAAP ELA or English II assessment".

In addition, the following variables were selected as potential predictors of school performance:

- Charter School Distinction: This variable was dummy coded, with a "0" assigned to public schools and a "1" assigned to charter schools.
- Valid Certification: Defined by MDE as the percentage of "teachers with a valid certificate and teaching a course for which they are properly endorsed." The researcher hypothesizes that schools with a greater percentage of teachers with valid certifications have higher proficiency scores.
- Teacher Experience: Defined by MDE as the percentage of "teachers with four or more years of teaching experience." The researchers hypothesize that schools with a greater percentage of experienced teachers have higher proficiency scores.

- Chronic Absenteeism: Defined by MDE as the percentage of "students absent 10% or more of the time enrolled." MDE does not provide the exact percentage if the chronic absentee level is below five percent. Instead, these schools are given the label "<5%." In the rare instance a school was given the "<5%" label, then that school was assigned a numerical value of "5" for the purpose of this study. The researchers hypothesize that schools with a lower percentage of chronic absenteeism have higher proficiency scores.
- Per-Pupil Expenditure (MDE). This variable refers to the amount of money a school spends on each student. The researcher hypothesizes that schools with higher per-pupil expenditures have higher proficiency scores.

Structure of Analysis

This study's analysis was divided into three parts. First, descriptive statistics were calculated to identify the mean values of each variable for both charter schools and public schools. Second, to answer research question one, linear regressions were tested to examine the relationship between charter school distinction and Math/English proficiency. Third, to answer research question two, correlations were initially tested to examine the relationships between the Math/English proficiency variables and the following variables: valid certification, teacher experience, chronic absenteeism, and per-pupil expenditure. One-tailed tests were calculated based on the hypothesized relationships stated above. If any correlations were significant between any of these variables, then a linear regression was tested between those variables to see how well that variable predicted the proficiency variable. Finally, multiple regression models were tested to examine if the variables combined better predicted either Math or English proficiency scores.

Sample

Most of the charter schools in Jackson, Mississippi are at the middle school level. To make charter schools and public schools more comparable, only those schools at the middle school level were chosen for the sample. The only schools removed from the sample were Bailey Middle APAC School and Northwest Middle School because these schools have a competitive application process. The sample was composed of the following charter schools: Reimagine Prep, Midtown Public Charter School, and Joel E. Smilow Prep. The following Jackson Public School District middle schools composed the remainder of the sample: Blackburn Middle School, Brinkley Middle School, Chastain Middle School, Kirksey Middle School, Peeples Middle School, Powell Middle School, Cardozo Middle School, and Whitten Middle School. Two schools were active in the 2018-2019 school year, but not in the 2020-2021 school year. Therefore, the 2018-2019 sample also includes both Siwell Middle School and Hardy Middle School.

Years

The data from the 2020-2021 and 2018-2019 school years were included in the dataset. The most recent MDE data is for the 2020-2021 school year. Since the 2020-2021 data were collected during the COVID-19 pandemic, the researchers also included data from the 2018-2019 school year. Data were unavailable from MDE for the 2019-2020 school year due to the pandemic.

Choosing these two years provided a comparison between the period before the pandemic and the period during the pandemic.

Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software program. To examine the descriptive statistics, the mean values of each variable were calculated for both charter and public schools. The median was also calculated if there were outliers in the data. To test the relationship between charter school distinction and Math/English proficiency, a linear regression was performed. In those tests, charter school distinction was dummy coded as a binary variable (0 = not a charter school, 1= charter school). Charter school distinction was the independent variable, and Math and English proficiency were the respective dependent variables.

In addition, linear correlations were tested between the Math and English proficiency variables and the following variables: valid certification, teacher experience, chronic absenteeism, and per-pupil expenditure. If any correlations were significant, then a linear regression was performed with the proficiency measure as the dependent variable. In order to see if a combination of the variables more strongly predicted Math and English proficiency, multiple linear regression models were tested.

Results

2020-2021 School Year Results

Descriptive statistics were calculated to identify the averages for the proficiency scores and other variables for both charter schools and public schools (see Table 1). Proficiency scores showed some difference between charter schools and public schools at the middle school level. Charter schools had a mean Math proficiency score 3.24 points higher compared to public schools. Charter schools had a mean English proficiency score 1.27 points higher than public schools.

Regarding the other variables examined in this study, public schools had a mean percentage of teachers with a valid certificate 41.46 percentage points higher than charter schools. Public schools had 10.7 percent more teachers with four or more years of teaching experience. Charter schools also spent $3,174.98 less per student on average than public schools.

Two linear regressions were calculated to assess the predictive power of charter school distinction on both Math and English proficiency. In those tests, charter school distinction was the independent variable and the proficiency variables were the respective dependent variables. Both tests were not statistically significant (see Table 2), suggesting that charter school distinction is not a strong predictor of either Math proficiency or English proficiency.

Table 1

Mean scores for Charter Schools and Public Schools (20-21)

Variable	Charter School Mean	Charter School Standard Deviation	Public School Mean	Public School Standard Deviation
Math Proficiency (%)	9.67	6.17	6.43	3.14
English Proficiency (%)	12.27	1.82	11.00	2.96
Valid Certification (%)	55.87	12.55	97.33	3.16
Chronic Absenteeism (%)	37.07	12.28	41.01	22.80
Per-Pupil Expenditure ($)	8,654.18	1,393.97	11,829.16	704.52
Teacher Experience (%)	55.73	22.77	66.43	10.49

Table 2

*Linear Regression results for dependent variables Math and English Proficiency (20-21)**

Dependent Variable	Unstandardized Coefficient	p-value	R^2
Math Proficiency	3.24	0.26	0.14
English Proficiency	1.27	0.51	0.05

*Charter school distinction is the independent variable

One-tailed correlations were calculated to find the relationship between Math proficiency and the following variables respectively: valid certification, chronic absenteeism, per-pupil expenditure, and teacher experience. Only teacher experience had a significant correlation with Math proficiency (see Table 3). However, this relationship was in the opposite direction of the prediction. Instead of the positive relationship, the two variables had a negative relationship; the higher the percentage of experience teachers, the lower the Math proficiency level, and vice versa.

Table 3

Correlations of variables paired with Math Proficiency (20-21)

Variable	Pearson Correlation	p-value (One-Tail)
Valid Certification	-0.25	0.23
Chronic Absenteeism	-0.02	0.47
Per-Pupil Expenditure	-0.36	0.14
Teacher Experience	-0.63	0.02*

*p < 0.05

Since teacher experience had a significant negative correlation with Math proficiency, the researchers calculated a linear regression for the two variables. In this regression test, Math proficiency was the dependent variable and teacher experience was the independent variable. The linear regression was significant (see Table 4), suggesting that teacher experience is a predictor of Math proficiency for the 2020-2021 school year. In this case, the lower the percentage of experienced teachers, the higher the proficiency score.

Table 4

*Linear Regression results for dependent variable Math Proficiency (20-21)**

Dependent Variable	Unstandardized Coefficient	p-value	R^2
Math Proficiency	-0.18	0.04**	0.40

* Teacher experience is the independent variable
**p < 0.05

Table 5

Correlations of variables paired with English Proficiency (20-21)

Variable	Pearson Correlation	p-value (One-Tail)
Valid Certification	-0.17	0.31
Chronic Absenteeism	-0.18	0.30
Per-Pupil Expenditure	0.08	0.40
Teacher Experience	-0.13	0.35

One-tailed correlations were calculated to find the relationship between English proficiency and the following variables respectively: valid certification, chronic absenteeism, per-pupil expenditure, and teacher experience. None of these variables had a significant correlation with English proficiency (see Table 5).

Multiple Regression Models

A multiple regression model was calculated to examine if the combined variables better predicted proficiency in Math and English. There were no significant models for either Math or English proficiency. The multiple regression model calculated for Math proficiency (see Table 6) had a p value of 0.09 and an R^2 value of 0.79, suggesting that when combined, the variables tested in this study are not statistically significant predictors of Math proficiency.

Table 6

*Multiple Regression results for dependent variable Math Proficiency (20-21)**

Independent Variables Predicting Math Proficiency	Unstandardized Coefficient	p-value
Charter School Distinction	18.54	0.05**
Valid Certification	0.43	0.04**
Chronic Absenteeism	-0.01	0.93
Pupil Expenditure	-0.00	0.97
Teacher Experience	-0.24	0.02**

* $R^2 = 0.79$ Model p value = .09 **p < 0.05

Table 7

*Multiple Regression results for dependent variable English Proficiency (20-21)**

Independent Variables Predicting English Proficiency	Unstandardized Coefficient	P-Value
Charter School Distinction	12.26	0.09
Valid Certification	0.08	0.56
Chronic Absenteeism	-0.08	0.11
Pupil Expenditure	0.03	0.04**
Teacher Experience	-0.06	0.38

* $R^2 = 0.66$ Model p value = .24 **p < 0.05

The multiple regression model calculated for English proficiency (see Table 7) had a p value of 0.24 and an R^2 value of 0.66, suggesting that when combined, the variables tested in this study are not statistically significant predictors of English proficiency.

Summary of Tests (2020-2021)

Overall, based on linear regression calculations, charter school distinction was not a significant predictor of either Math or English proficiency scores (see Table 2). Teacher experience was the only variable significantly correlated with Math proficiency (see Table 3). The linear regression calculated was significant as well, suggesting that teacher experience predicts Math proficiency scores (see Table 4). No variables were found to be correlated with English proficiency (see Table 5). The multiple regression models tested were not significant for both Math and English proficiency (see Tables 6 and 7).

2018-2019 School Year Results

Descriptive statistics were calculated to identify the averages for the proficiency scores and other variables for both charter schools and public schools (see Table 8). Charter schools had a mean Math proficiency score 11.03 points higher compared to public schools. Charter schools had a mean English proficiency score 4.16 points higher than public schools.

Regarding the other variables examined in this study, public schools had a mean percentage of teachers with a valid certificate 31.75 percentage points higher than charter schools. Public schools had 19.66 percent more teachers with four or more years of teaching experience. Charter schools also spent $2,484.22 less per student on average than public schools. Public schools had 14.29 percent more chronic absenteeism than charter schools.

To assess the relationship between school proficiency scores and charter school distinction, two linear regressions were calculated to assess the predictive power of charter school distinction on both Math and English proficiency. In these tests, charter school distinction was the independent variable and the proficiency variables were the respective dependent variables. Both tests were not statistically significant (see Table 9), suggesting that charter school distinction does not predict either Math proficiency or English proficiency.

One-tailed correlations were calculated to find the relationship between Math proficiency with the following variables respectively: valid certification, chronic absenteeism, per-pupil expenditure, and teacher experience. Math proficiency had a statistically significant negative correlation with both chronic absenteeism and teacher experience. None of the other variables had a statistically significant correlation with Math proficiency (see Table 10).

Table 8

Mean scores for Charter Schools and Public Schools (18-19)

Variable	Charter School Mean	Charter School Standard Deviation	Public School Mean	Public School Standard Deviation
Math Proficiency (%)	28.77	13.37	17.74	10.0
English Proficiency (%)	17.57	5.87	13.41	4.84
Valid Certification (%)	63.23	12.80	94.98	4.67
Chronic Absenteeism (%)	11.47	2.47	25.76	7.70
Per-Pupil Expenditure ($)	8,588.37	524.30	11,072.59	1,131.97
Teacher Experience (%)	48.37	25.69	68.03	9.74

Table 9

*Linear Regression results for dependent variables Math and English Proficiency (18-19)**

Dependent Variable	Unstandardized Coefficient	p-value	R^2
Math Proficiency	11.03	0.15	0.18
English Proficiency	4.16	0.24	0.13

*Charter school distinction is the independent variable

One-tailed correlations were calculated to find the relationship between English proficiency with the following variables respectively: valid certification, chronic absenteeism, per-pupil expenditure, and teacher experience. English proficiency had a statistically significant negative correlation with chronic absenteeism. None of the other variables had a statistically significant correlation with English proficiency (see Table 11).

Table 10

Correlations of variables paired with Math Proficiency (18-19)

Variable	Pearson Correlation	p-value (One-Tail)
Valid Certification	-0.40	0.09
Chronic Absenteeism	-0.51	0.04*
Per-Pupil Expenditure	-0.32	0.14
Teacher Experience	-0.48	0.05*

*$p < 0.05$

Table 11

Correlations of variables paired with English Proficiency (18-19)

Variable	Pearson Correlation	p-value (One-Tail)
Valid Certification	-0.20	0.26
Chronic Absenteeism	-0.54	0.03*
Per-Pupil Expenditure	-0.36	0.12
Teacher Experience	-0.30	0.16

* $p < 0.05$

Since chronic absenteeism had a significant negative correlation with both Math and English proficiency, the researchers calculated a linear regression for both proficiency variables. In each regression, the proficiency variable was the dependent variable and chronic absenteeism was the independent variable. Both linear regression tests were not significant (see Table 12), suggesting that chronic absenteeism is not a strong predictor of both Math and English proficiency for the 2018-2019 school year.

Table 12

*Linear Regression results for dependent variables Math and English Proficiency (18-19)**

Dependent Variable	Unstandardized Coefficient	p-value	R^2
Math Proficiency	-0.62	0.08	0.25
English Proficiency	-0.30	0.06	0.29

* Chronic absenteeism is the independent variable

Since teacher experience had a significant negative correlation with Math proficiency, the researchers calculated a linear regression of the two variables. In this regression, the proficiency variable was the dependent variable and teacher experience was the independent variable. The linear regression test was not significant (see Table 13), suggesting that teacher experience is not a strong predictor of Math proficiency for the 2018-2019 school year.

Table 13

*Linear Regression results for dependent variables Math Proficiency (18-19)**

Dependent Variable	Unstandardized Coefficient	p-value	R^2
Math Proficiency	-0.34	0.10	0.23

* Teacher experience is the independent variable

Multiple Regression Models

A multiple regression model was calculated to examine if the combined variables better predicted proficiency in Math and English. The multiple regression model calculated for Math proficiency (see Table 14) had a p value of 0.316 and an R^2 value of 0.508, suggesting the variables tested in this study are not statistically significant predictors of Math proficiency.

Table 14

*Multiple Regression results for dependent variable Math Proficiency (18-19)**

Independent Variables Predicting Math Proficiency	Unstandardized Coefficient	p-value
Charter School Distinction	9.29	0.66
Valid Certification	0.25	0.71
Chronic Absenteeism	-1.04	0.15
Pupil Expenditure	0.01	0.24
Teacher Experience	-0.44	0.19

* $R^2 = 0.508$ Model p value = .316

The multiple regression model calculated for English proficiency (see Table 15) had a p value of 0.321 and an R^2 value of 0.505, suggesting the variables tested in this study are not statistically significant predictors of Math proficiency.

Table 15

*Multiple Regression results for dependent variable English Proficiency (18-19)**

Independent Variables Predicting English Proficiency	Unstandardized Coefficient	p-value
Charter School Distinction	10.45	0.30
Valid Certification	0.40	0.21
Chronic Absenteeism	-0.39	0.23
Pupil Expenditure	0.00	0.51
Teacher Experience	-0.21	0.18

* $R^2 = 0.505$ Model p value = .321

Summary of Tests (2018-2019)

Overall, based on linear regression calculations, charter school distinction was not a statistically significant predictor of either Math or English proficiency scores (see Table 9). Chronic absenteeism and teacher experience were the only variables that had significant correlations with one or both proficiency variables (see Tables 10 and 11). However, these variables were not found to be statistically significant predictors of Math/English proficiency scores when linear regression tests were calculated (see Tables 12 and 13). The multiple regression model tested was also not statistically significant (see Tables 14 and 15).

Discussion

Research question one asked if being a public or charter middle school significantly predicted Math/English proficiency scores. Linear regression tests between charter school distinction and Math/English proficiency were not statistically significant, suggesting that being a charter or public middle school did not predict school performance. One possible reason for this finding is that the three charter schools at the middle school level vary in overall performance. Midtown Public Charter School currently has a "D" rating by MDE, Smilow Prep has a "C" rating, and Reimagine Prep has a "B" rating. There may be more within-group variation among charter schools compared to between-group variation among public schools. Another possible reason for this finding is the small sample size of only three charter schools at the middle school level in Jackson, Mississippi.

Research question two asked if there are other variables that may be stronger predictors of Math/English proficiency scores than a school being a public or charter school. For the 2020-2021 school year, only teacher experience was found to be a significant predictor of Math proficiency. However, a negative relationship was found instead of the expected positive relationship; in this case, the lower the percentage of experienced teachers, the higher the Math proficiency scores. This result is surprising because the assumption is that a higher number of

experienced teachers would be related to higher proficiency scores. Looking at the raw data, the charter schools had lower percentages of experienced teachers. Two of these charter schools (Reimagine Prep and Smilow) had higher Math proficiency scores than many of the public schools. One possible explanation could be the teaching strategies that are used by teachers at the charter schools, but more data would have to be collected to explain this finding.

For the 2018-2019 school year, chronic absenteeism and teacher experience were found to be significantly correlated with Math proficiency scores. Both of these variables had a negative relationship with Math proficiency. Chronic absenteeism was found to have a significant negative correlation with English proficiency. However, the linear regression tests for these variables were not statistically significant, suggesting that chronic absenteeism and teacher experience are not strong predictors of either Math or English proficiency.

A multiple regression model was tested for both proficiency variables in 2020-2021 and 2018-2019. None of these models overall were statistically significant. For the 2020-2021 school year, the regression model for Math proficiency and the model for English proficiency each had some significant predictors within the model. The model for Math proficiency showed that charter school distinction, valid certification, and teacher experience were significant predictors. The model for English proficiency showed that pupil expenditure was a significant predictor. However, since the overall models were not significant, we need to assume that these variables in question do not significantly predict either Math or English proficiency scores. The overall multiple regression models for the 2018-2019 school year were not statistically significant, suggesting that the variables (when tested together) do not significantly predict either Math or English proficiency.

Implications

These findings have two implications. First, the results of this study suggest additional methods are needed to accurately compare charter and public schools in Jackson, Mississippi. This study was very limited by the small sample size and the data made available by MDE. There are very few charter schools in Jackson (and Mississippi in general), so statistical tests that compare means like t-tests are less likely to yield significant results when the charter school group only consists of three schools. Similarly, the regression tests in this study were less likely to yield significant results with the sample size of eleven for the 2020-2021 school year and thirteen for the 2018-2019 school year. This small sample size suggests that qualitative research methods might help to get a better understanding of the differences between charter schools and public schools in Jackson, Mississippi. Such a direction can also help to explain findings in this study like the negative relationship between teacher experience and proficiency scores. Perhaps observing other factors like teaching strategies could help explain those surprising findings. Apart from the small sample size, this study relied on secondary data collected by MDE. One possible explanation for the lack of significant findings is there could be more important factors not being collected by MDE that influence proficiency scores. For example, variables like length of class time, disciplinary measures, and use of trauma-informed practices could potentially be related to school performance measures. Future studies could focus on what variables contribute to high Math/English proficiency scores in both charter and public schools.

Second, it is worth noting that chronic absenteeism had a significant correlation with both Math and English proficiency for the 2020-2021 school year. This finding suggests it would help to prioritize efforts to reduce chronic absenteeism in schools. Since the COVID-19 pandemic is now less severe due to vaccination availability, more actions can be taken to encourage students to attend classes. Such actions could potentially increase school proficiency scores.

Overall, the findings of this study stress the need to identify the variables that strongly predict school performance as a way to identify best practices. In addition, other research methods need to be employed to gain a greater understanding of the differences between charter schools and public schools in Jackson, Mississippi. The Mississippi Urban Research Center invites other researchers to reach out to collaborate on studying this issue further.

Qualifiers

Three points need to be considered in this study. First, this study relied on a small sample size, which may explain the lack of significant results for many of the statistical tests calculated. In this study, there were eight public schools (ten public schools in the 2018-2019 year) and three charter schools at the middle school level in Jackson, Mississippi. However, a significant relationship was still found for teacher experience during the 2018-2019 school year. Second, this study relied on available secondary data from MDE. This reliance on available secondary data limited the types of variables that could be collected and examined. Third, the COVID-19 pandemic could have affected the data collected during the 2020-2021 school year. The pandemic likely added other factors that affected school performance, such as a greater number of students being unable to attend schools regardless of how well the school typically performed. The pandemic could be a reason that there were few significant results for the 2020-2021 data.

References

James, J. (2022, May 25). JPS denies Midtown Charter School lease of unused building. Mississippi Today. https://mississippitoday.org/2022/05/25/jps-midtown-charter-school-lease/

Mississippi Department of Education. (n.d.). *Public Reporting.* https://www.mdek12.org/OPR/Reporting