

Student Characteristics and Retention in Merit Preparatory School

An Analysis of Retention in a New Jersey Charter School

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Executive Summary

Charter schools are publicly funded schools that operate with fewer limitations on hiring and firing staff, and that have more flexibility with curriculum than traditional public schools. The goal of charter schools is to improve education and that goal often is measured through test scores in math and reading. This paper is a case study of one charter school, Merit Preparatory Academy, located in Newark, New Jersey, over two academic years. The school operated as a free-standing charter in the first year and was managed by a charter management organization in the second.

Schools are often evaluated by comparing the charter to a control group of traditional public schools or private schools, and schools can be compared to themselves over time, with an observation of longitudinal student level data. The first option requires a data set containing a number of schools, and the second requires regularly measured tests. Neither option of comparison was available for this analysis. Although it would be better to have a control group and a panel over time, this research is restricted to an analysis of student exits in 2014-2015 and to math and reading scores in each of two years, 2013-2014 and 2014-2015.

The research shows that the only factor associated with students exiting Merit Preparatory Academy is low reading scores. Neither demographics, nor math is associated with retention. The lack of association between demographics and retention implies that there is no confirmation the school is either more or less effective for different demographic populations of students. The point that math is not associated with retention is fairly consistent with research that parents value reading performance as a motivator for keeping their child in the school. Whether or not that is generalizable to all schools, the result in this paper is that math scores do not predict retention of students in Merit Preparatory Academy.

The test scores acquired for two years are lower for the following groups: special education students, higher for sixth graders than for seventh graders in 2013, and lower for students with limited English proficiency.

This paper concludes with suggestions for improved data collection by charter schools, additional information that would be helpful for both charter schools and management organizations, and comparisons that would better inform the operation of Merit Preparatory School and Matchbook Learning.

Student Characteristics and Retention in Merit Preparatory School

An Analysis of Retention in a New Jersey Charter School

Introduction

Over the past two decades, there has been an increase in criticism of the traditional public school model in the United States, with some scholars concluding that it is ineffective; “failing to properly educate our children and for being too expensive” (Ruggerio and Vitaliano, 1999, 321). The alternative education model of public charter schools has become increasingly popular with scholars such as Horn and Maas (2013), who assert that charter schools are often more effective in providing a quality education for young students at no additional cost to families. More recently, charter school administrators have employed non-profit, charter management organizations to create more innovative curricula.

Given this debate, the primary focus within literature and popular press has been the relative efficacy of charter schools compared to traditional public schools, though existing studies have not produced consistent findings—“which suggests the possibility that charter-school effectiveness may be related to features of the state policy regime in which charter schools operate” (Zimmer, 2009, 1) and that “in five out of seven locales studied by Zimmer, these non-primary charter schools are producing achievement gains that are, on average, neither substantially better nor substantially worse than those of local TPSs” (Zimmer, 2009, xiii). The two locales excluded were Chicago and Texas, where students in the sample performed worse than those in traditional public schools.

Charter schools are publicly funded but have operational autonomy from the regulations that govern traditional public schools. All are funded by the state and may receive funding through private grants, as well. All charter schools work with an authorizer to “ensure clear plans

for the start-up period” (Zimmer, 2009, xvi). For the purposes of this paper, I examined one school, Merit Preparatory Academy in Newark, New Jersey, and its experience as a freestanding school and then as managed by Matchbook Learning. I examine the characteristics of sixth and seventh grade students enrolled in the 2013-2014 and 2014-2015 schools years to analyze the effect of student characteristics on retention in 2014-2015 and to estimate the association of student characteristics with academic achievement measured through test scores in each academic school year.

Established in 2012, Merit Preparatory Academy operated as a freestanding charter school for two full school years. The operation of the school was/is contingent upon meeting requirements set forth in the charter. When student test scores did not meet guidelines set forth in the schools’ charter for operation, the district contracted Matchbook Learning (a charter management organization) to develop a new curriculum intended to respond to academic needs of the students, and teacher credentials. The theory that many charter schools struggle to improve student performance in the year of inception is discussed later in this paper and the initial issue of low performance within Merit Preparatory is consistent with that concern. Students performed poorly in 2012, but improved from 2013 to 2014, prior to Matchbook Learning’s contract. In spite of that improvement, still only 34.5% of students were proficient in language arts (reading), and 43.5% proficient in math. A majority of students performed below proficiency requirements in both test categories, which prompted the district to seek out a charter management organization to work with Merit Preparatory Academy. As defined by the National Charter School Resource Center (2015), “Charter management organizations (CMOs) are non-profits that operate multiple charter schools as well as launch new ones.” The following research explores a case study of Merit Preparatory Academy in 2013-2014 as a freestanding charter

school and in 2014 as a charter school managed by a charter management organization, to answer the following questions:

1. What student attributes predicted student retention? (*grade, gender, race, test scores, limited English proficiency, special education, individual education plan, and free or reduced lunches*)
2. What student attributes impacted math and reading scores? (*grade, gender, race, test scores, limited English proficiency, special education, individual education plan, and free or reduced lunches*)

Matchbook Learning provided student-level data for students who attended Merit Preparatory Academy for two academic years: 2013-2014 and 2014-2015. Individual student information was not available for the 2012 academic year based on inconsistent documentation by the school. The retention analysis uses student data from in 2013-2014 to predict why students remained or exited the school following the change in management. Without a control group, or sample of students outside of Merit Preparatory, the school is not compared in either retention or test scores with another traditional public school or charter school with a different management model. There is also no comparison of scores between years, as the tests are different in 2013-2014 and 2014-2015. Analysis of scores within each year is possible. This research seeks to understand retention from 2013-2014 to 2014-2015 and characteristics associated with academic performance in math and reading on tests each academic year.

Problem Statement

A 'catch-22' with charter schools can be that every school is different due to autonomy garnered from the school district and other charter schools. This provides a space for innovation but also a less streamlined curriculum from one school to the next. Each school must follow a charter set forth by the district where it resides and adhere to state requirements for test score benchmarks. This results in a limitation when comparing charter schools to each other and to traditional public schools because of the relativity of charter school law and regulations that govern each state. Similarly, the curriculum and programming of each school is unique to the student population, which makes it difficult to generalize the results of charter school performance to apply to another school or state with different regulations and student populations.

The first goal of this research is to analyze data provided by Matchbook Learning, to describe the student population of Merit Preparatory School, and then determine if there is any correlation between student characteristics and retention. The second goal is to identify if certain student characteristics are associated with test score gains or losses. This information will be beneficial to Merit Preparatory School, after its contract with Matchbook Learning ends, in two years and will provide guidance in how to retain students based on the results of this analysis. Similarly, Matchbook Learning will have information about how well the curriculum is working for the student population and future schools with whom they partner.

Literature Review

The inception of charter schools in the early 1990s was spurred by the desire of parents and charter school advocates who pushed for a different school model for families. Charter schools were established as "publicly funded schools of choice" (Toma and Zimmer, 2012, 209),

within a school district, but autonomous from traditional public school regulations, so as to give the school freedom to develop a unique curriculum. Supporters assert that:

“Charter schools can improve student achievement and attainment, serve as laboratories for innovation, provide choice to families that have few options, and promote healthy competition with traditional public schools (TPSs). Critics worry that charter schools perform no better than TPSs, that they may exacerbate stratification by race and ability, and that they harm the students left in TPSs by skimming away financial resources and motivated families” (Zimmer, 2009, 1).

Schools are formed between a district and school, with a governing entity and must follow specific guidelines set forth in a contract from the district in which the school resides. These schools initially drew in and continue to attract “substantially more black and free/reduced lunch students than do TPSs (tradition public schools)” (Zimmer and Buddin, 2007, 238). Many states have limits or caps on charter school enrollment, allowing a certain number of students per school. This stimulates a sense of competition and an assumption that the school must offer something the local public school does not. This leads some parents to opt out of sending their children to assigned district schools and instead, to charter schools. Charter schools are established with a certain level of autonomy from the regulations traditional public schools face, allowing the freedom to create more innovative approaches to learning. Research has shown that many charter schools hire teachers based on experience, rather than technical qualifications and graduate degrees (Carruthers, 2012). This has been positive and negative for some schools, depending on various factors. Some scholars, such as Ron Zimmer (2012), recommend that charter schools use autonomy to require higher standards of teachers, surpassing those of public schools.

Early research examined the initial motivation for creating charter schools, but the bulk of literature measured whether charter schools were more effective than traditional public schools. Some research argues that charter school performance varies based on state legislation and the size of each individual school (Preston et al., 2011, 320). Though there has been inconclusive evidence of whether charter schools are better, the same, or worse, than public schools, “the charter school movement has seen tremendous growth as 40 states, plus the District of Columbia have passed charter school laws” (Zimmer and Buddin, 2007, 232). States with more stringent charter school regulations have displayed better results in student achievement, though those results are in conjunction with other factors, such as school size, administration, location, and school maturity. In *Getting Inside the Black Box*, Zimmer and Buddin (2007) found that many charter schools varied based on the operational and organizational structure of the school, size, and state legislation. Another aspect to charter school success is the idea that “in most locations, charter schools have difficulty raising student achievement in their first year of operation, typically producing achievement results that fall short of those of local traditional public schools” (Zimmer, Gill and Booker, iii). This supports the assumption by Celeste Carruthers (2012), who found that maturity rates of charter schools was and is still, a characteristic that affects improvement.

The effectiveness of charter schools is debated by multiple researchers, but the characteristics of students attending charter schools is fairly consistent throughout most states. Newer “charter schools are more likely to mainstream students for special education” (Zimmer and Buddin, 2007, 232), or include special education students in regular classes, and “in the past, researchers have generally found that charter schools disproportionately serve low-income and high minority students” (Zimmer and Buddin, 2007, 234). This assertion is consistent with Merit

Preparatory's student population, which reflects the demographic make-up of Newark. Based on past research, charter schools consistently enroll higher numbers of minority populations, such as Hispanic, limited English proficiency learners, and African American students. When looking at student composition, researchers have found there is an effect that "charter schools have on the distribution of students by race/ethnicity and ability" and these schools are "generally located where they can attract students, which would primarily be in low-performing school districts or in areas within a district in which traditional public schools performed poorly (Zimmer and Buddin, 2007, 5), such is the case with Merit Preparatory Academy.

Program effectiveness and innovation varies from one school to another, but this school's performance is very similar to the same grades in other schools, on a national scale. Very often, "charter elementary schools reported spending a little less time on English/language arts, and charter middle schools reported spending a little more time on mathematics" (Zimmer and Buddin, 2007, 250). Observing student demographics and grade performance is essential for the purposes of this research to examine the effect of student characteristics on test scores and which student characteristics motivate retention. It has been shown that the overall "trend in test scores is upward for elementary school students and downward for middle and high school students" (Zimmer and Buddin, 2007, 250), which was similar to the outcomes of student performance in traditional public schools. When observing math and reading testing outcomes, it is important to note that "charter students had lower math achievement levels than mainstream students, but higher reading levels, reading gains, and statistically equivalent math gains" (Carruthers, 2012, 284).

Student enrollment in a charter school is based on parental discretion and charter schools may be presented as a better option for students struggling in school, due to their smaller student-

teacher ratios. Some charter schools take advantage of their autonomy and practice innovative programming, but “student achievement falters in new charter schools, but improves as charters mature” (Carruthers, 2012, 280). Carruthers continues to assert that charter schools serve a broad range of student needs and populations of “urbanicity” (Carruthers, 2012, 281). Similarly, students in charter schools were more likely to be on free or reduced lunch, which is indicative of the population most charter schools aim to serve in urban areas. Teachers, administration, and staff in most schools is reflective of the racial composition of the community, and to support that notion, white, non-Hispanic teachers are not highly represented in this particular school.

Charter schools have been examined over the past two decades and are the “fastest growing segments of the K-12 education market” (Zimmer et al. 2009, 213), teaching over one million students. Due to the high demand of innovative practices, as mentioned previously, some charter schools contract with charter management organizations to provide a new or inventive curriculum to be different from traditional public schools. Regardless of assertions about the innovate possibilities charter schools possess, the ultimate consensus of researchers is that there is not enough longitudinal data to state definitively that charter schools are always a better model than private or traditional public schools, and only that certain schools *can* be better based on administration, policies, state regulations, and students.

Program Description

Merit Preparatory Academy of Newark was approved for grant funding and established by the New Jersey Department of Education in September 2012 to serve sixth and seventh grade students. The New Jersey Department of Education describes charter schools as those that cannot charge tuition, have open enrollment, and are public schools, but have a charter authorized by a governing entity. As a result of low test scores and a failure to meet test score standards set forth

in the school charter, the Newark school district contracted Matchbook Learning to reassess the school curriculum and determine what could be improved about programming over the course of a three-year contract.

Matchbook Learning observed students and staff in the spring of 2014 and replaced the administration with a 'leadership team,' which include a new principal, individuals who had five years relevant experience with an advanced degree, and who fit the culture of the school. The staff was reevaluated and the appearance of the school was changed to create an environment that would be attractive and stimulating for students. Students remained the same, unless parents withdrew or transferred them to another charter school or traditional public school by choice.

In the 2013-2014 school year, there were 235 sixth and seventh grade students enrolled. In that academic year, Merit Preparatory administered the New Jersey Assessment of Skills and Knowledge test to assess student learning. The range of possible test scores was between 100 and 300 for both reading and math scores, cumulatively. The majority of students in both grades performed with low proficiency on the state test, with a mean of 189 on math and 196 in reading at the end of the 2013-2014 school year. Though test scores were consistent with reported averages for the district, the performance of Merit Preparatory Academy students did not meet charter requirements, which prompted the district to put the school on a probationary period to change performance outcomes.

To repair this inadequate performance, Merit Preparatory established a three-year contract with the charter management organization, Matchbook Learning, based out of Atlanta, Georgia. Matchbook must use financial resources already available to the school to implement a sustainable learning model. The intent is to implement a new curriculum that is technology based and tailored to each student. Matchbook Learning helps the school use funds allotted by the

district to maximize capacity and build sustainable practices for after the three-year contract is terminated. To do this, the organization implemented a student-centered, individualized learning model in the school, catering to student needs. The charter management organization's purpose is to help the school administration boost test scores through a technology based and student directed curriculum.

Merit Preparatory Academy of Newark was a freestanding charter school, operated by Newark District and after a three-year period under contract with Matchbook Learning, the school will return to that status. Currently, the goal is for the school to be self-sufficient, having redesigned a curriculum to better serve student needs, while also meeting charter requirements through better testing outcomes.

Research Design

For this analysis, data was limited to the sample of Merit Preparatory Academy students over two years. In the first year, the charter school was free standing, and documented student data differently than in the second year with Matchbook Learning as a governing body. This research was guided by Matchbook Learning provided data, which included student grades, gender, race, test scores, limited English proficiency, special education, individual education plan, and free or reduced lunch status. The data prompted the following questions:

1. What student attributes predicted student retention? *(2013-2014 data on grade, gender, race, test scores, limited English proficiency, special education, individual education plan, and free or reduced lunches)*
2. What student attributes impacted math and reading scores? *(2013-2014 and 2014-2015 data on grade, gender, race, test scores, limited English proficiency, special education, individual education plan, and free or reduced lunches)*

Variables and Hypothesis

Table 1. Variables and Hypothesis: Student Characteristics

Explanatory Variable	Description/Measurement	Dummy Variable	Hypothesized Relationship to Dependent Variable
Grade	Seventh grade	1	Negative
Gender	Female	2	Positive
Race	African American	1	Negative
Limited English Proficiency	Y	1	Negative
Free or Reduced Lunch	Y	1	Negative
Special Education	Y	1	Negative

Table 1 above displays variables used in this research, with descriptions and the dummy variables (chosen as 0,1 or 1,2) used to describe them. The hypothesized relationship between student attributes and performance on tests is based on assumptions derived from previous research as shown in the Literature Review. Seventh grade is compared to sixth grade, female students compared to male students, African American compared to Hispanic students, limited English proficiency compared to those not categorized as limited English proficiency, free/reduced lunch students were compared those who were not on free/reduced lunch, and special education students were compared to those not in special education. I hypothesize that sixth grade will have a positive association to test scores and that seventh graders may not perform as well as sixth graders. I hypothesize that females will perform better than males and the other demographic and educational characteristics such as special education, limited English proficiency, free/reduced lunch, and race, will have a negative impact on test scores, though not significantly.

Table 2 (below) portrays the summary statistics of each explanatory variable used in this paper to further describe students who were included in the data and their relationship to

retention and test scores. The table shows results of the effects explanatory variables had on the dependent variable (test scores). This table describes the student population and number of observations in the data set. There were a total of 235 students observed over the two academic years. Limited English proficiency represents the three students who were categorized as such and were shown to be African American.

Dependent Variables	Description	Observations	Range
Retention	1 if retained, 0 if exited	235	71% retained, 29% exit
Math 2013	Z score standardized	232	-2.63 to +3.02
Reading 2013	Z score standardized	232	-3.02 to +2.81
Math 2014	Z score standardized	167	-4.20 to +1.64
Reading 2014	Z score standardized	170	-3.93 to +2.30
Explanatory Variables	Description	Observations	Percentage
Gender	Male	100	42.55
	Female	135	57.45
	Total	235	100.00
Race	African American (1)	208	92.86
	Hispanic (2)	15	6.70
	Asian (3)	1	0.45
	Total	224	100.00
Limited English Proficiency	N (0)	232	98.72
	Y (1)	3	1.28
	Total	235	100.00
Free/Reduced Lunch	N	73	31.06
	R	20	8.51
	F	142	60.43
	Total	235	100.00
Special Education	N (0)	222	94.47
	Y (1)	13	5.53
	Total	235	100.00

Table 2. Summary Statistics of Variables

Students with an individualized education plan were omitted because of collinearity, as well as students whose information was not provided or inconsistently documented. The total number of students enrolled was 235, but the number tested in 2013-2014 was 232. In 2014, 167 students were tested in math, while 170 were tested in reading. All 235 students are used to evaluate retention, and students in both years are used to evaluate math and reading scores. Each year was evaluated separately because the tests were not comparable. In 2013-2014 the school

used the New Jersey Assessment of Skills and Knowledge (NJASK) and in 2014-2015, a Scantron Performance Series test was administered. The math and reading scores in 2013 (NJASK) were based on a scale of 100 to 300 but are standardized by subtracting the mean and dividing by the standard deviation. The math and reading scores in 2014 (Scantron Performance Series) were based on scale of 1300 to 3700 and standardized in the same way. The standardized variables have mean 0.0 and standard deviation 1.0. Again, the tests could not be compared across years, as the scale is different, though the density and distribution of scores for each year can be shown in a graphical representation (Figures 1 through 4).

Past research has shown that the “the charter variable indicates that charter performance is about 1 percentile point higher than TPSs in reading and no different in math” (Zimmer and Buddin, 2009, 256). This assertion, along with previous research, supports the hypothesis that students in this particular charter school will perform better in reading than in math. No comparison with traditional public schools is possible without an external control group, but reading is predicted to be higher than math in this one case.

The tests administered to students in the academic years 2013-2014 and 2014-2015 were completely different and scaled differently. Both tests assessed student knowledge of math and reading, specific to grade. This key difference in testing models meant that the two school years could not be compared to each other, but student characteristics were used as variables to compare student groups to each other within the specified year, relative to their test scores.

Regression Model

To assess the relationship between student attributes and whether or not the student stayed, I used the following model to estimate retention with a multiple linear regression:

$$\text{Retained}_i = \beta_1 \text{Grade}_i + \beta_2 \text{Gender}_i + \beta_3 \text{Race}_i + \beta_4 \text{LEP}_i + \beta_5 \text{Free or Reduced Lunch} + \beta_6 \text{Special Education} + \varepsilon_i$$

Table 3 shows the results from this estimation. The students with higher reading test scores in 2013-2014 were more likely to stay in the school in 2014-2015. Reading appeared to be the only student characteristic associated with retention. The regression showed that math did not have an effect (positive or negative) on retention. There was also no statistically significant relationship between retention and gender (females compared to males), free and reduced lunch (students enrolled and not), those who were limited English proficiency learners, and special education. All other variables showed little or no effect on retention.

Table 3. Retention Based on Student Attributes

VARIABLES	Description	Retention
Grade	Seventh Grade	0.025
	Standard Error	(0.067)
Gender	Female	0.005
	Standard Error	(0.062)
Race	African American	-0.059
	Standard Error	(0.125)
LEP	Y	-0.017
	Standard Error	(0.296)
F or R	Y	0.063
	Standard Error	(0.071)
Spec. Ed.	Y	0.024
	Standard Error	(0.151)
Reading2013		0.004**
	Standard Error	(0.002)
Math2013		-0.001
	Standard Error	(0.001)
Constant		-0.03
	Standard Error	(0.569)
Observations		220
R-squared		0.027

Robust standard errors in parentheses. Effects on the probability of retention are reported.

*** p<0.01, ** p<0.05 p<0.1

From this table, one can see that reading was the only significant variable in predicting retention.

To determine if any student attributes influenced test scores, I used the following model, replacing test scores as my dependent variable:

$$Test\ Scores_i = \beta_1 Grade_i + \beta_2 Gender_i + \beta_3 Race_i + \beta_4 LEP_i + \beta_5 Free\ or\ Reduced\ Lunch + \beta_6 Special\ Education + \beta_7 Math\ and\ Reading\ Scores\ 2013 + \beta_8 Math\ and\ Reading\ Scores\ 2014 + \epsilon_i$$

Table 4. Variable Comparison: Multiple Regression with Robust Standard Errors

Variables	Reading 2013	Reading 2014	Math 2013	Math 2014
Sixth Grade	-0.371**	0.198	-0.684***	0.136
Seventh Grade	(0.145)	(0.157)	(0.142)	(0.142)
Female	0.152	0.005	-0.116	-0.154
Male	(0.137)	(0.147)	(0.131)	(0.143)
Hispanic	-0.113	0.167	-0.270	-0.341
	(0.242)	(0.199)	(0.208)	(0.259)
LEP	-0.285	-1.399***	-0.477	-1.474***
	(0.391)	(0.440)	(0.307)	(0.266)
Free or Reduced	-0.254*	-0.275	-0.150	-0.280*
	(0.153)	(0.167)	(0.158)	(0.160)
Spec. Ed.	-0.959***	-1.778***	-0.885***	-1.865***
	(0.235)	(0.316)	(0.216)	(0.495)
Constant	2.367**	-0.937	4.705***	-0.244
	(0.966)	(0.1.080)	(0.899)	(0.940)
Observations	220	165	220	162
R-squared	0.099	0.231	0.149	0.255

Robust standard errors in parenthesis
 ***p<0.01, **p<0.05, *p<0.1

Table 4 shows that in 2014, there was a negative correlation between test scores and limited English proficiency or special education. Note that there were only three students categorized by the school and organization (in both years) as limited English proficiency and all three were African American students. Additionally, LEP students were not in special education. All demographic categories had an effect on scores, but were not statistically significant. Those with free or reduced lunch special education status performed worse than their counterparts.

The following graphs are visual representations of reading and math scores, which are not highly correlated:

Figure 1. Reading Scores 2013

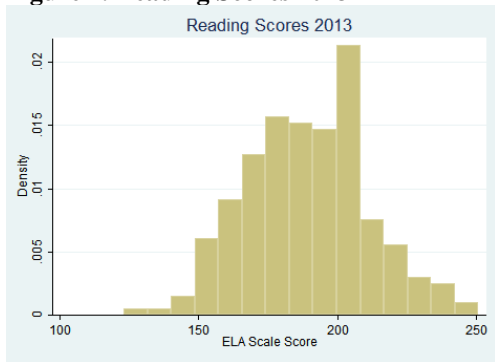


Figure 2. Reading Scores 2014

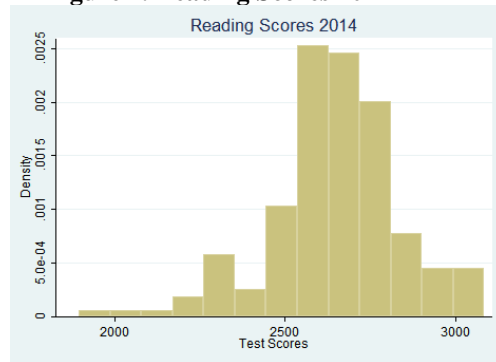


Figure 3. Math Scores 2014

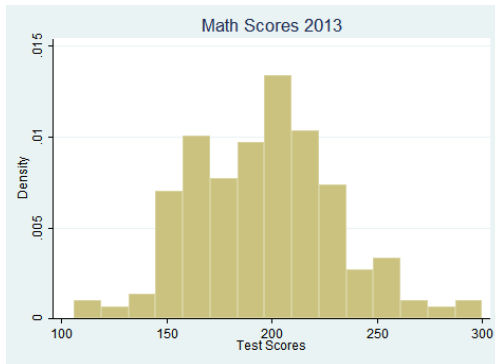
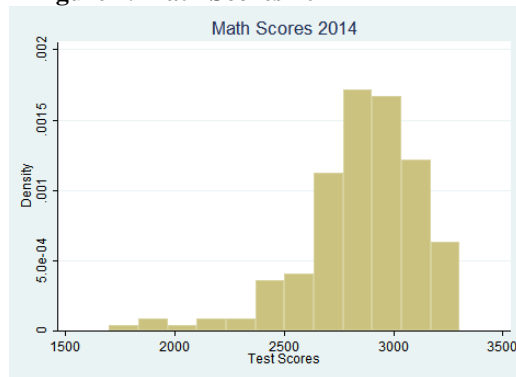


Figure 4. Math Scores 2014



These graphs show that the academic year 2013-2014, in both math and reading, fewer students achieved high scores and had more low scores. One can see this result at the tail end of each distribution. In the 2014, there was a higher density of students who performed better on tests. Given the change in the type of test administered, no conclusion can be reached about absolute gains or losses in math and reading ability from 2013-2014 to 2014-2015. The graphs only show how the scores are distributed in each subject for each year, but cannot be used to determine that students performed better or worse from the first to the second year.

Results

The results of this analysis show that in 2013-2014, seventh graders did not perform as well as sixth graders and that the gap in performance was eliminated in 2014-2015. The tests

were not the same, but were tailored to grade level in both years. Under the new management in 2014-2015, this difference between sixth and seventh graders could be contributed to the test administered or management organization. Regardless, one cannot assert why this occurred based on the data available for this paper and it is only possible to state that a change occurred.

Free or reduced lunch was negatively correlated at a rate of 10%, similarly to special education and LEP students, meaning students in those categories performed worse those who were not in said categories. Proportionately, African American and Hispanic students had an equal chance of being categorized as special education, though the population of African American students was significantly larger than the Hispanic student population. The majority of students were African American and those categorized as limited English proficiency were exclusively African American.

Students who were five test score points lower in reading were more likely to leave, controlling for all other factors. Besides reading scores, there was no other indication of why students would transfer. No other variables (grade, gender, LEP, SpEd, race, free or reduced Lunch) were statistically significant in an effect on retention. Reading, as a determinant for student retention could be based on parent choice, as attendance in a charter school is based on parental discretion. The results show that parents may focus on reading as an indicator of successful programming and are less concerned with math. The lower test scores in math indicate that it did not influence parental decisions in this school, as those who performed poorly in math stayed at the school and those who performed poorly in reading, left. Speculating on the basis for this, parents could find reading easier to evaluate or of higher value.

As shown in the Table 4, the mean reading and math z-scores are 0 with standard deviations of 1.0. Table 3 indicates that being in seventh grade meant a .37 standard deviations

lower test score on average than being sixth grade, controlling for all other factors. Seventh graders had lower test scores in math by .68 standard deviations than sixth graders did in 2013-2014. Students categorized as limited English proficiency learners (LEP) had a mean test score of 1.4 standard deviations lower than those who were not limited English proficiency. Special education students did not perform as well as those not in special education. This could indicate that enrollment in special education is either ineffective and those students are not progressing, *or* there is a gap between the learning levels of those who are enrolled in special education and those who are mainstreamed. Students who received free or reduced lunches scored lower than those who were not on free or reduced lunch. All the effects reported here are sizeable because they refer to standard deviations, or the variance of student performance.

Implications

These results indicate that within this particular school, demographics did affect student performance, though not significantly. Reading was a determinant for retention, yet there was no student attribute present that indicated the likelihood that an individual would perform at a higher rate in this subject, but those who did perform well in reading were more likely to stay in the school from 2013-2014 to 2014-2015. The results of this research suggest that reading is a primary factor when parents chose this particular charter school, with no other factors that appear as obvious determinants of retention. In particular, math scores do not appear to have an effect on retention.

Limitations

There were multiple limitations in this analysis, such as the lack of control group outside the charter school and inconsistent record keeping, by the school prior to advisement of the charter management organization. With one dependent variable and five explanatory variables

for two school years, this analysis was quite restricted and with more information from parents collected by the school, there could be more variables available. A follow up analysis of the program in two years at the culmination of Matchbook Learning's tenure could provide a more insightful look at the performance and progress of students, only if consistent tests are administered. The final limitation for this research was that the test used to determine an effect in the 2013-2014 school year were different from the test used in the 2014-2015 school year, under the advisement of a charter management organization. The school needs to remain consistent in the tests used to assess student performance.

Another limitation of this research was the lack of consistency in documentation and record keeping by the freestanding charter school prior to the charter management organization. The school was operational for two years prior to the contract with Matchbook Learning and did not document student performance information or where/why students transferred. This lack of information contributes to the inconclusive nature of the test results for this paper and makes inference by the management equally difficult.

It would also be beneficial for freestanding charter schools (in general) to document student demographic and performance data for every student in more detail, similar to the methods used by charter management organizations. There was a noticeable difference in the quality of documentation between the data set provided by Merit Preparatory Academy from 2013-2014 compared to the data accumulated by Matchbook Learning for 2014-2015. The level of detail and consistency of the latter organization provided a clearer picture of student performance and attributes. This is a strength of Matchbook Learning's management and made analyzing student information easier for the latter year, and should be continued. Additionally, there were some students whose test scores and demographic information was omitted in the

cross-referencing of the two data sets due to inconsistencies in record keeping between the charter school and charter management organization.

Recommendations

In the future, using consistently coded variables to estimate progress and performance measures could add additional variables and strengthen an analysis of this school. The school should provide annual evaluations to parents with questions about why they chose the school, why the student will stay, and if transferring, what about the school motivated that choice. This study was unable to look at distance from school to students' homes, and surveys of parents could provide that information (i.e. exit surveys, or parental evaluations). This would help Merit Preparatory Academy reinforce relations with parents and find strengths/weaknesses in programming.

Conclusion

With the growing amount of dissatisfaction with the traditional public school model, an increasing number of students attend public charter schools. The analysis to gauge the relationship between student characteristics and retention before and after the guidance of a charter management organization as shown through this case study provides evidence that there is a possible need for evaluation and analysis of other similar organizations. The previous management of Merit Preparatory Academy assessed student performance, demographic information, test scores—or kept consistent data—to estimate areas that needed improvement, possibly contributing to the need for a charter management organization.

Charter schools and charter management organizations are a relatively new concept, only in existence since the early-1990s, which leaves ample opportunity for more longitudinal data accumulation to identify student characteristics that influence school performance. Additional

data, like that acquired from Matchbook Learning, could be expanded to include student-level data on those who leave the institution. The autonomy of charter schools should not be compromised, but perhaps a more stringent regulation for documentation and data collection across all schools would be useful. It would be beneficial to have more consistent regulation, with stricter guidelines for documenting outcomes, across states.

Finally, a control group for further analysis consisting of students in traditional public schools or private schools would make it possible to estimate an effect on test scores and other outcomes because of the characteristics of students who attend charter schools. That is the ultimate goal of researchers and undoubtedly, of many parents.

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