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ccsr

Chicago High School Redesign Initiative

Schools, Students, and Outcomes

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Executive Summary

Between 2002 and 2007, the Chicago High School Redesign Initiative (CHSRI) opened 23 small high schools. Implemented in partnership with Chicago Public Schools (CPS), this initiative aimed to provide populations of low-performing students in under-served areas of the city with high-quality, small high schools. These schools were formed (1) by converting large high schools into a number of small ones, which were called redesigned schools, or (2) by creating new-start schools. This initiative was supported by the Bill and Melinda Gates Foundation, with additional funding provided by local foundations. CHSRI ceased to exist as a separate entity in August 2008, leaving 17 small high schools still in full operation in their original locations.

Chicago was one of many cities across the country that adopted small school reform in order to address high dropout rates and low academic performance at the high school level. This nation-wide reform wave attracted much attention and fanfare. However, as early results across multiple settings indicated a lack of consistent improvement in test scores, interest in small school reform faded in many cities. Attention shifted to other models for school improvement and other possible solutions to address the poor performance of high schools. Yet, continuing research across the country—and in Chicago—now indicates that graduation rates are often better in small high schools. This finding has important implications not only for small school reformers and researchers but also for those working on other reform models, including turnarounds that are designed to fundamentally reshape very low-performing schools.

CHSRI posited that small, more intimate schools would improve student outcomes through two main mechanisms. First, if students felt personally and academically supported and teachers had more opportunities to know

their students, students would attend school more regularly and would learn more of the material. Students would, therefore, have higher academic performance. Second, if teachers had a working environment with more opportunities for meaningful collaboration that was conducive to innovation, they would develop strong professional communities that would spur instructional activities. This, in turn, would lead to stronger instruction and improved student performance.

Our earlier work on this initiative indicated that most of the elements of the theory of action were present in the CHSRI schools but that they were not strong enough to bring about changes in instruction or improve student test scores. Our previous work, based on surveys of students and teachers, revealed that CHSRI students consistently reported better relationships with adults in their schools and indicated that they felt academically challenged and supported. Teachers consistently reported more positive working environments that were marked by collegiality, innovation, and trust. However, these surveys did not indicate a consistent pattern of instructional strength. Furthermore, CHSRI teachers reported in interviews that they were teaching no differently in CHSRI schools than they had been before.

Instead of elaborating on theory or mechanisms for change, this report focuses on student outcomes at CHSRI schools and how they compare to other similar CPS schools. We paid particular attention to graduation rates and were guided by the following three sets of questions:

1. Did the population of students served by CHSRI schools change over time as CHSRI created new schools?

   We find that CHSRI created and supported schools serving at-risk students, especially through the redesigned schools. The new-start CHSRI schools are more similar to CPS non-selective schools in general than they are to the redesigned schools, but neither set of CHSRI schools serves CPS students who enter high school with privileged backgrounds or strong academic records.

2. On average, how did CHSRI schools compare to other schools serving similar students in terms of absences, academic achievement, and graduation? Have these differences changed over time?

   We found that students in CHSRI schools performed as well as or better than similar students in other similar CPS schools on a number of important outcomes. CHSRI freshmen were engaged enough to have better attendance than their peers (although, on average, they still missed almost a month of school per year) and to earn better grades in core subjects than similar students (although their average is still slightly below a C). They have typically been more likely to be on-track to graduate than similar freshmen, although this difference is very small in the most recent year. And cohorts of CHSRI students have been more likely to persist to graduation; in the 2004-05 cohort, 57.2 percent of CHSRI students graduated compared to 49 percent for similar students who attended similar non-CHSRI schools.[1]

   However, students at CHSRI schools scored about the same on the ACT (and the Prairie State Achievement Exam) as academically and demographically similar students at similar schools. And their average composite ACT scores remained low for the six years covered by this report; their average of 15.4 or below was well below the ACT college readiness benchmarks, which range from 18 in English to 22 in math and 24 in science.

3. To what extent did CHSRI graduation rates vary across schools? Were some CHSRI schools more effective at graduating the students they serve? And, were CHSRI schools more effective at graduating some students than others?

   When looking at graduation rates across CHSRI schools, we found some variation. However, the overall positive difference in graduation rates across CHSRI schools is not limited to a few schools; all but two CHSRI schools had graduation rates similar to or higher than what we would have predicted, given the characteristics of the students they were serving.

Finally, CHSRI schools were very effective at graduating the students who were most at risk of not graduating. This is true for all of the cohorts for which we have data—particularly the earlier ones. Furthermore, by the third cohort, students at CHSRI schools were more likely to graduate than similar students at other schools, regardless of their risk factors when they started high school.

Our findings show that this initiative did accomplish much, but not all, of what it was intended to do. CHSRI schools seem to have created an environment that encourages student attendance and persistence in school. CHSRI students' academic outcomes are similar or slightly better than those of similar students. However, being "slightly better" than similar students does not mean that these students are college ready. Many other school districts are facing the same problem: how to bring under-performing students to college readiness in the span of four years. Countless researchers and practitioners are searching for a replicable, scalable method to accomplish this formidable task. The CHSRI schools have gotten at least part of the equation: their students persist in school and they graduate. This foundation should be recognized and built upon—and not forgotten—as schools continue to find ways to accelerate academic achievement for their students.


Little Bites

Introduction

The Chicago High School Redesign Initiative (CHSRI) was an initiative that sought to improve educational opportunities and academic outcomes among under-served students in Chicago by creating high-quality, small high schools. These were not to be schools-within-schools: each had its own unit number, administrative staff, and budget. This initiative was supported by the Bill and Melinda Gates Foundation with additional funding provided by local foundations, and was implemented in partnership with the Chicago Public Schools (CPS). Between 2002 and 2007, CHSRI opened and supported 23 such small high schools to serve populations of generally low-performing students in neighborhoods in need of high-quality schooling options. This initiative ceased to exist as a separate entity in August 2008, leaving 17 small high schools still in full operation in their original locations.

A research team at the Consortium on Chicago School Research (CCSR) at the University of Chicago has studied CHSRI since spring 2003, relying on both qualitative and quantitative methodologies. We published a number of reports and articles chronicling the successes and challenges faced by the schools as they grew to maturity. We explored implementation issues, school contexts, and a range of student outcomes.[2]

In this report we present a close look at the schools making up the initiative, showing the characteristics of the students served by CHSRI schools and examining the degree to which this initiative remained true to its original goal of serving the needs of under-served students as it grew and changed over time. We then update our analyses of student outcomes, presenting all six years of data from the cohorts of students who started at CHSRI schools in fall 2002 through fall 2007. These outcomes include freshman absences, grade point averages (GPAs), and on-track rates;

results from standardized tests taken during students' junior year; and cohort graduation rates. Each of these analyses provides an indication of how well, on average, CHSRI students performed compared to similar students at non-CHSRI schools serving similar students.

In addition, this report focuses in-depth on graduation rates, which is a particularly critical outcome. Here we analyze whether individual CHSRI schools were more effective at graduating their students than other schools serving similar students. And we analyze whether CHSRI schools were more effective at graduating some types of students than others, to see, for example, if CHSRI had a different impact on weaker students than it did on stronger students.

Prior Research

CHSRI's theory of action proposed that student outcomes could be improved through two main mechanisms. First, if students were attracted to a school's theme or philosophy and felt personally and academically supported, they would attend school more regularly and learn more of the material. Therefore, they would perform at a higher academic level. Second, if teachers had a working environment conducive to innovation and collaboration that was supported by CHSRI and CPS, they would develop strong professional communities with a focus on instructional improvement. In turn, instruction and, ultimately, student performance would improve. Although this initiative did not promise an overall reduction in class size, it did theorize that small school size would enhance the opportunities for meaningful collaboration and conversations about teaching and learning among teachers, increase the likelihood that teachers would get to know their students better, and improve and strengthen both student-teacher and student-student relationships.[3]

Much of our prior work examined pieces of the theory of action through surveys, observations, and interviews. This prior work showed that CHSRI students consistently reported better relationships with adults in their schools and indicated they felt academically challenged and supported. They also reported stronger connections with other students and with the school, as the theory predicted, although students in the early cohorts did not seem to have been especially committed to the focus or theme of their new schools. Additionally, CHSRI teachers consistently reported having more extensive knowledge of their students and a more positive working environment, marked by collegiality, innovation, and trust. However, teachers reported that they were teaching no differently in CHSRI schools than they had been before, and our analyses of student and teacher survey reports did not find that classroom instruction was much different in CHSRI schools than in other schools serving similar students.

Our prior work also focused on student outcomes, since improving student performance was the main purpose of this initiative. We analyzed early indicators, such as freshman on-track rates and freshman absences. We also looked at cumulative dropout rates and test scores for juniors. These earlier analyses showed that early cohorts of CHSRI freshmen were absent fewer days and were slightly more likely to be on-track than similar freshmen at schools serving similar students. CHSRI schools had three-year cumulative dropout rates that were significantly lower than those of non-CHSRI schools serving similar students. As this initiative matured, our work indicated that graduation rates among the first cohort of students to attend CHSRI schools for four years were better than the graduation rates of similar students at non-CHSRI schools. However, this prior work also found that academic achievement, as measured by test scores was consistently low; it was not much different than that of similar students at similar non-CHSRI schools.

These findings mirror what other researchers across the country have found: small schools seem to provide benefits related to the closer relationships among students and between students and adults.[4] One especially salient finding is that students at these small schools graduate at higher rates. However, the hoped-for improvement in academic achievement, as measured by test scores, has not occurred. This is also similar to emerging findings about charter schools; in a study of charters in eight states, researchers from RAND Corporation found that test score achievement

gains at charter schools are similar to those of students at traditional public schools, although their graduation rates are higher.[5]

This lack of overall academic improvement was one factor that led the Gates Foundation to change its emphasis to include a specific focus on curriculum and instruction.[6] It has also been a factor that has led CPS to a renewed strong emphasis on instructional leadership and instructional change.[7]

Questions Guiding this Report

In this report, we examine the schools and students making up CHSRI over time, update past analyses of student outcomes with additional years of data, and explore graduation rates in more detail than we have in other work. We address the following questions:

1. Did the population of students served by CHSRI schools change over time as the initiative matured?
2. On average, how did CHSRI schools compare to other schools serving similar students in terms of absences, academic achievement, and graduation? Did these differences change over time?
3. To what extent did CHSRI graduation rates vary across schools? Were some CHSRI schools more effective at graduating the students they serve? And, were CHSRI schools more effective at graduating some students than others?

Chapter 1

Characteristics of CHSRI Schools and the Students They Served

CHSRI employed two different strategies for new school creation. Driven by a sense of urgency to get new schools started as soon as possible, CHSRI relied first on the strategy of creating redesigned schools. This strategy involved converting large, low-performing high schools that already had a history of creating informal learning communities based on student interest into a cluster of individual small schools that were housed within the same building. The second strategy relied on creating new-start schools.

Of the 23 new, small CHSRI high schools, 12 were formed through redesign and 11 were formed through new-start schools. The blend of redesigned schools and new-start schools changed over time. In the early years, CHSRI schools were mainly redesigned schools. By fall 2005, the proportion of redesigned schools in this initiative had fallen to 50 percent. When CHSRI ceased to exist as a separate entity in fall 2008, 17 schools remained open in their original locations and served students in all high school grades—eight redesigned schools and nine new-start schools.[8]

Table 1 details which schools were part of this initiative, when they opened, whether they were redesigned or new-starts, and what grades were included when they opened. Ten of the 11 new-start schools began with the ninth grade and added a new grade each year. The eleventh new-start school began with the seventh grade. Four of the 12 redesigned schools opened with ninth grade only. Two of the redesigned schools began with both ninth grade and an additional grade so they could build on already existing programmatic clusters, and six opened with grades nine through 12.

TABLE 1

Schools making up the Chicago High School Redesign Initiative

	Redesign			New-Start	
	South Shore Campus	**Bowen Campus**	**Orr Campus**		
2002-2003	• School of the Arts[a] • School of Entrepreneurship[b]	• Chicago Discovery Academy[c] • Bowen Environmental Studies (BEST)	• Phoenix Academy[c]		
2003-2004	• School of Leadership[c] • School of Technology	• Global Visions Academy	• Mose Vines Academy[c]	• Big Picture Back of the Yards • Big Picture Metro	
2004-2005		• New Millennium School of Health	• Applied Arts, Science and Technology (AAST)[c] • EXCEL[c]	• Al Raby • Chicago Academy High School	
				DuSable Campus	**Little Village/ North Lawndale Campus**
2005-2006				• DuSable School of Leadership • Bronzeville Scholastic Academy • Daniel Hale Williams Prep School of Medicine[d]	• Social Justice • Infinity Math and Science • World Language • Multicultural Arts

Note: No superscript indicates that the school opened with ninth grade only.

a Opened with grades 9 and 11. **b** Opened with grades 9 and 10.

c Opened with grades 9 through 12. **d** Opened with grade 7.

There were, of course, many differences in early school formation between the two strategies. The 12 redesigned schools were formed by converting three large comprehensive schools (Bowen, South Shore, and Orr) into 12 small schools in a phased-in process; however, the large schools did not immediately cease operation. Some incoming freshmen chose the small schools and others chose the comprehensive school during the early years of this initiative. These were neighborhood schools, meaning that all students who lived in the attendance area could attend the school while students who did not live in the attendance area could apply for any additional spaces that were available. In this strategy, many of the teachers in the new schools had been teachers in the large "host" school before it was converted. All of the large host schools were on probation when they were converted. One of them, Orr, had been "reconstituted" in the fall of 1997; all of them had gone through "intervention" starting in fall 2000.[9] As would be expected, the redesigned schools that opened in these buildings had to confront a negative image and some staff morale challenges.

The 11 new-start schools followed a different pattern. Seven were housed in shared space in two different buildings. Four were housed in the Little Village/ North Lawndale Campus, which was a new building that had been designed specifically for these new schools. Three shared space with each other and, for the first year only, with graduating seniors from DuSable, a school that had been phased out. Two (Big Picture Metro and Chicago Academy) shared space with elementary schools. Two (Al Raby and Big Picture Back of the Yards) had their own buildings.

Because the new-start schools started from scratch, it was not possible for their faculty to come from any single location, as was the case in general with the faculty at the redesigned schools. Only the schools at Little Village, created at least in part due to neigh-

borhood demands, were considered neighborhood schools; the other seven had city-wide enrollment, meaning that incoming students had to apply to attend. None of the 11 new-start schools had to overcome a history of poor past performance. Although Al Raby and the schools at DuSable were housed in schools that had been previously closed, a number of years had passed since these closed schools had last accepted freshmen; thus, these new-start schools were not seen as continuations of the schools in which they were housed.

The literature on small schools indicates that it is more difficult and takes longer to create successful schools through redesign than through starting new ones,[10] at least in part due to some of the differences noted here—faculty hiring patterns, school reputation from the past, and whether students needed to apply or could enroll "by default" based on where they lived. In Chicago, geography also played a role. The 12 redesigned schools served three specific neighborhoods. The 11 new-start schools were located across the city in six different locations.

CHSRI Students

CHSRI schools were intended to provide educational opportunities for students in under-served neighborhoods—neighborhoods marked by significant educational need.[11] Table 2 summarizes student characteristics for CHSRI schools as a whole and for other CPS non-selective schools at three points over the life of this initiative: 2002-03, 2004-05, and 2007-08. Overall, students at CHSRI schools showed lower prior achievement, were more likely to be receiving special education services, were more likely to be old-for-grade, and were more likely to have changed schools in the years immediately prior to high school. Because of their geographic locations, the earliest CHSRI schools served a population that had a high proportion of African American students.

Table 2 also differentiates CHSRI redesigned schools from CHSRI new-start schools. Here we see that the population served by the redesigned schools was consistently more vulnerable than the student population of CPS overall or of the new-start schools. In fact, the

TABLE 2

Demographic characteristics of first-time freshmen

	2002-03		2004-05				2007-08			
	CHSRI		CHSRI				CHSRI			
	All (Redesigned) n=5	All Other Nonselective HS n=63	All n=16	Redesigned n=12	New-Start n=4	All Other Nonselective HS n=62	All n=20	Redesigned* n=11	New-Starts** n=9	All Other Nonselective HS n=62
	Percentage Receiving Special Education Services									
	24.2	18.3	25.5	26.7	20.0	18.2	17.6	21.0	13.7	16.4
	Percentage Old for Grade									
	25.1	24.9	34.9	37.4	23.4	25.9	28.8	36.7	19.4	24.3
	Percentage with Two or More Moves in the Three Years Prior to High School									
	19.3	14.1	20.1	21.1	15.4	13.7	10.9	15.5	5.6	8.2
	Racial Composition Percentage									
African American	82.6	51.2	85.6	90.6	63.1	53.0	76.6	92.4	57.9	49.1
Latino	16.1	37.7	11.5	8.6	24.8	36.8	20.9	7.2	37.2	41.4
White	1.1	8.1	2.2	0.4	10.7	7.3	1.8	0.0	3.8	6.6

* Phoenix, one of the initial redesigned schools, left this initiative in 2005; it is not included here.

** Both of the Big Picture schools started to phase out in 2006, when they stopped accepting freshmen; they are not included here.

new-start schools compared favorably with CPS overall; especially by 2007, new-start schools served fewer students who were old-for-grade, were receiving special education services, or had changed schools in the years immediately preceding high school.

Since we noted such demographic differences between students in CHSRI and non-CHSRI schools, as well as between students in CHSRI redesigned and CHSRI new-start schools, we also wanted to focus more closely on achievement differences among students at the time they began high school. To measure the achievement of incoming first-time freshmen, we used composite scores on the EXPLORE test. Students in CPS take the EXPLORE test, which is one of a series of tests created by ACT, in the fall of their freshman year. Because it is given so early in the school year, it provides a good picture of the pre-high school achievement level of incoming freshmen.

As Figure 1A shows, the initial cohorts of schools served some of the lowest-performing students in Chicago. The median CHSRI school in academic years 2002, 2003, and 2004 had students whose average composite ninth grade EXPLORE score was around 12.3, more than one point below the median for similar non-CHSRI schools. Indeed, in those years, the average EXPLORE score of the CHSRI school with the very highest level of incoming achievement only slightly surpassed the median achievement level of all of the non-CHSRI schools. Furthermore, in those years of the lines with the circles tells us that there was little variability among CHSRI schools. Starting in academic year 2005, however, the median average composite EXPLORE scores for CHSRI schools went up and the distribution widened; this indicates that CHSRI schools were more different from each other than they had been earlier. By 2007, both the median score and the amount of variation across CHSRI schools started to look very similar to non-CHSRI schools.

Because this increase in the incoming achievement level of CHSRI ninth-graders roughly coincided with the introduction of six new-start schools serving freshmen and because of the demographic differences we noted in Table 2, we explored whether there was a difference in the average prior achievement level between redesigned CHSRI schools and new-start CHSRI schools. As Figure 1B shows, there had indeed been such a difference. In 2004, new-start schools (denoted by the lines with triangles) had higher levels of prior achievement than redesigned schools.[12] Because there were so few new-start schools that year, however, their relatively higher achievement scores were not enough to change the overall CHSRI average shown in Figure 1A. Starting in 2005 when the six new-start schools serving freshmen opened, there was a notable difference in both ninth grade composite EXPLORE averages and in the distribution of those test scores. In that year and in the succeeding years, the median achievement level of CHSRI new-start schools was the same as, or higher

How to Read Figures 1A and 1B

Figures 1A and 1B depict the distribution of schools based on their average composite EXPLORE scores among first-time ninth-graders. In Figure 1A, the squares represent the median school achievement among non-CHSRI schools; this is the point at which half of the schools have higher average ninth grade EXPLORE scores, while half have lower average ninth grade EXPLORE scores. Similarly, the circles represent the median achievement among CHSRI schools. In Figure 1B, the diamonds represent the median EXPLORE score for redesigned CHSRI schools, while the median score for new-start CHSRI schools is represented by the triangles. In both Figure 1A and 1B, the top of each line represents the school with the highest average level of incoming school achievement and the bottom of each line represents the school with the lowest average level of incoming school achievement. Therefore, the length of the lines describes how much variability there is among the schools in terms of their average incoming freshmen scores.

FIGURE 1A

On average, CHSRI schools serve many of the lowest-performing CPS students

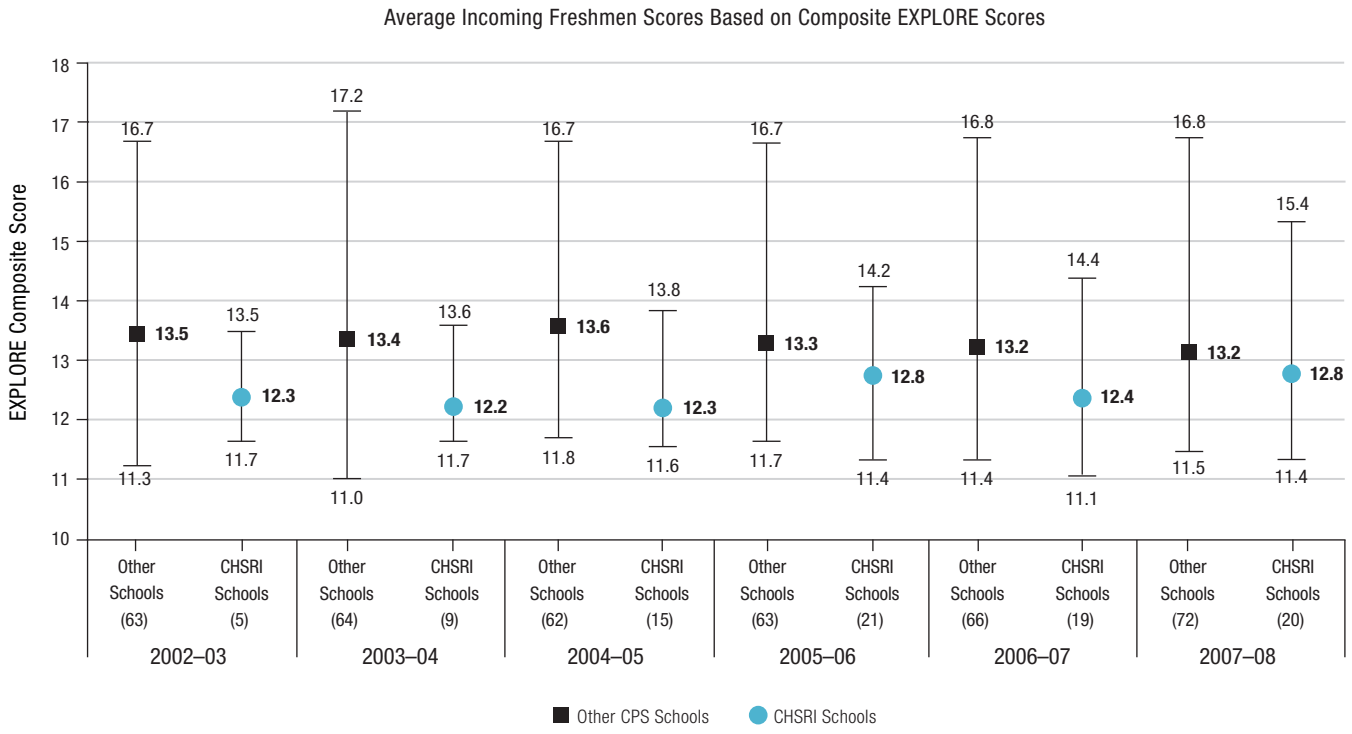
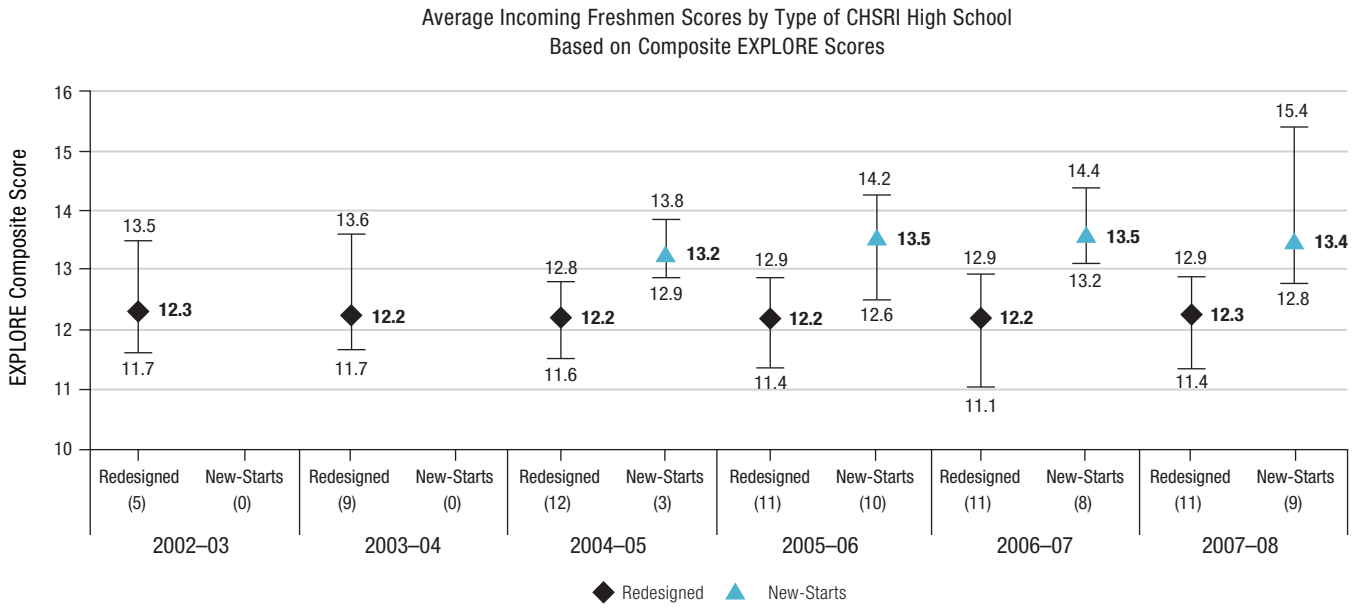


FIGURE 1B

First-time ninth grade students in new-start CHSRI schools consistently have higher prior achievement than first-time ninth-graders in redesigned CHSRI schools



than, the achievement level of the highest redesigned CHSRI schools. Thus, the rise in mean incoming achievement in 2005-06 noted in Figure 1A is solely attributable to new-start schools in that year. Incoming achievement remained very low at redesigned schools over this whole time period.

It is worth comparing Figures 1A and 1B to note that by 2007 the nine new-start schools (including Al Raby, Chicago Academy, and the seven schools in the Little Village/North Lawndale and DuSable campuses) had incoming achievement levels that were more similar to non-CHSRI schools than to redesigned CHSRI schools.

As Figure 1B and Table 2 indicate, the two sets of schools created by the two CHSRI strategies were serving quite different populations of students. While the redesigned schools served a very vulnerable population, some of the risk factors of students in the new-start schools looked more like non-CHSRI schools than their fellow redesigned CHSRI schools. In some ways, the redesigned schools were at a double disadvantage: they were started under a process that was widely seen as more difficult and they were serving a population of students with more challenging backgrounds.

Given these demographic and prior achievement differences, it would not be surprising if students at CHSRI new-start schools had stronger outcomes than students at CHSRI redesigned schools. Table 3 illustrates these differences by presenting some of the outcomes this initiative was trying to impact for students in redesigned schools and new-start schools.

In conclusion, the students served by CHSRI schools did change over time as this initiative employed different strategies for school creation. And, while the new-start schools seemed to have stronger outcomes, they also started out with stronger students. The next chapter examines (1) whether the performance differences between redesigned schools and new-start schools remain after we consider their populations and (2) whether CHSRI schools overall perform better than other schools after we take the differences in their students into account.

TABLE 3

Students at CHSRI new-start schools have stronger outcomes than students at CHSRI redesigned schools

	2004-05	2005-06	2006-07	2007-08
Freshmen Absences–Days/Year				
• Redesigned Schools	22.6 (1,195)	21.7 (1,368)	N/A	N/A
• New-Start Schools	7.4 (232)	6.0 (523)		
Freshmen Core GPA				
• Redesigned Schools	1.58 (1,274)	1.55 (1,370)	1.60 (1,168)	1.57 (1,004)
• New-Start Schools	2.15 (239)	2.21 (714)	2.27 (708)	2.24 (769)
On-Track to Graduate				
• Redesigned Schools	52.9% (1,248)	52.3% (1,366)	52.6% (1,155)	51.8% (977)
• New-Start Schools	77.8% (234)	78.0% (710)	77.4% (707)	72.7% (763)
Junior Year Test Scores–ACT				
• Redesigned Schools	14.8 (490)	14.6 (721)	14.8 (737)	14.8 (875)
• New-Start Schools	N/A	15.4 (48)	16.2 (275)	16.2 (724)

Note: Numbers in parentheses are the number of students in each group.

Chapter 2

Average CHSRI Effect Over Time

Table 3 showed that there were differences in outcomes between redesigned schools and new-start schools. However, those differences largely disappeared after we included the differences in the incoming students served by the two groups of CHSRI schools as part of our analyses; we found that while students in the new-start schools did slightly better than similar students in the redesigned schools, these outcome differences were not large enough to be statistically significant. This means that if we compare students who were similar in their special education status, their age relative to their grade, their mobility prior to high school, their race/ethnicity, and their prior achievement, but who differed in whether they attended a new-start or a redesigned CHSRI school, there is no appreciable difference in their number of days absent, their likelihood of being on-track, their core GPA, or their ACT score.[13]

While there are no significant differences in outcomes among similar students in the two types of CHSRI schools, there are indeed significant differences among students who attend CHSRI schools and similar students who attend non-CHSRI schools serving a similar population. In this section, the graphs show CHSRI raw scores in blue. These scores represent an average across all CHSRI students—those at redesigned schools and those at new-start schools. The black line represents outcomes achieved by similar students at similar non-CHSRI schools.

Freshman Year Absences

In every year for which we have absence data (from 2002 to 2006), first-time freshmen at CHSRI schools have been absent about 10 fewer days per year than students attending similar non-CHSRI schools (see Figure 2). In each year, this gap is statistically significant, meaning it is highly unlikely that the difference could have happened by chance. Although CHSRI ninth-graders are absent fewer days than students with similar backgrounds at other schools, they still miss between three and four weeks of school each year.

Freshman Core Grade Point Averages

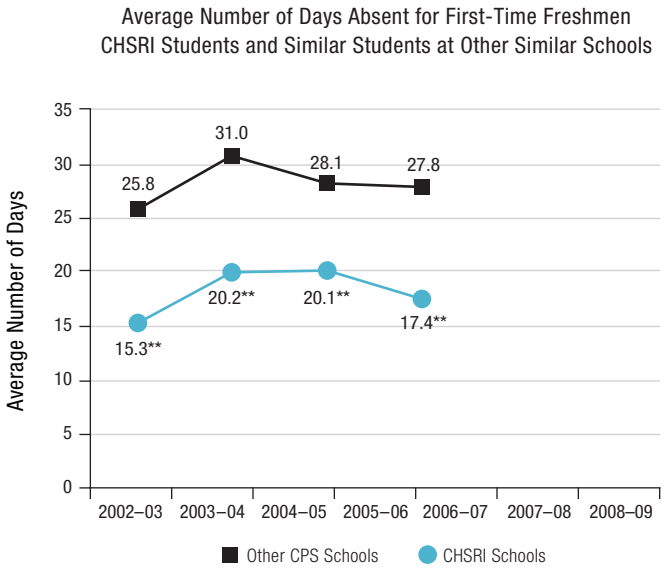
Over time, core GPAs for first-time freshmen at CHSRI schools have been slightly higher than those earned by similar students at similar non-CHSRI schools, averaging between about 1.7 and 1.9, which is slightly less than a C average. In most years the difference between CHSRI and similar non-CHSRI students, although very small, is large enough that it is statistically significant (see Figure 3).

Freshman On-Track Rates

The freshman on-track rate is a key performance indicator that shows whether students are on a path toward graduation. Students are "on-track" if they have earned five credits and have received no more than one semester F in a core course. Previous CCSR research has found that students who were on-track at the end of their freshman year were four times more likely to graduate in four years than off-track students.[14] Historically, CHSRI ninth-graders have had higher on-track rates than similar students at similar non-CHSRI schools, although the difference typically has not been statistically significant (see Figure 4). Furthermore, the difference has been shrinking over time. In 2007-08, the on-track rate of freshmen in CHSRI schools (61.0 percent) was almost the same as the rate for similar students at similar non-CHSRI schools (60.7 percent).

FIGURE 2

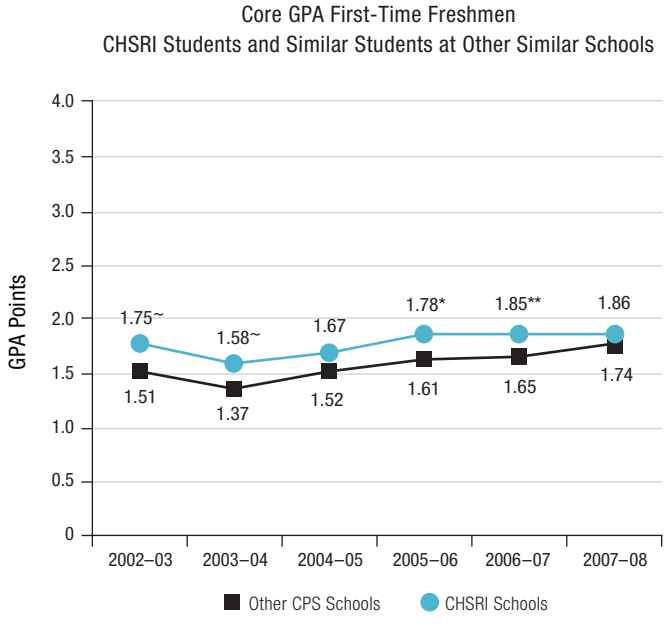
Freshmen at CHSRI schools were absent fewer days than similar students at similar non-CHSRI schools



Note: ** p<0.01; * p<0.05; ~ p <0.10

FIGURE 3

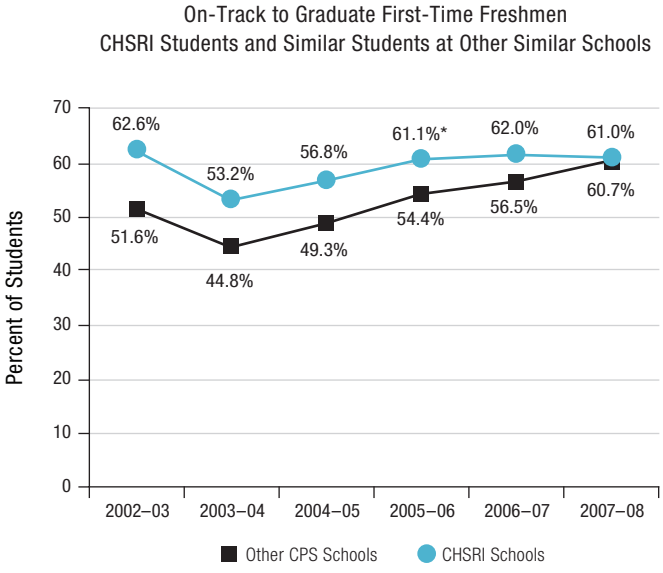
Although the average core GPA in CHSRI schools was higher than in similar schools, it remained less than a C average



Note: ** p<0.01; * p<0.05; ~ p <0.10

FIGURE 4

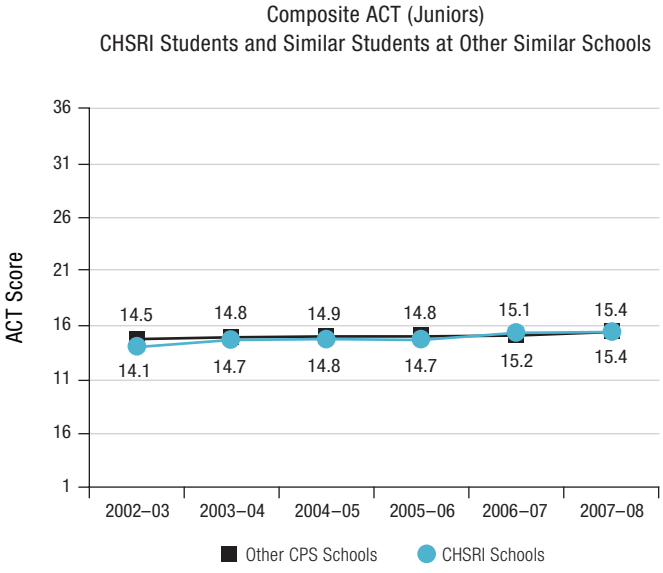
CHSRI ninth-graders had better freshman on-track rates than comparable students until 2007, when the on-track rates converged



Note: ** p<0.01; * p<0.05; ~ p <0.10

FIGURE 5

ACT composite scores among CHSRI juniors were no different than scores for similar students, and they remained well below college readiness benchmarks



Note: ** p<0.01; * p<0.05; ~ p <0.10

Junior Year Test Scores

All CPS juniors take the ACT as part of the state's No Child Left Behind high school test, the Prairie State Achievement Exam (PSAE). ACT scores have been empirically linked to college performance and can be used to predict the likelihood that students will succeed in college-level courses. As such, ACT scores have become a crucial metric for students and schools alike.

In every year since this initiative started in 2002, the average ACT score for students at CHSRI schools has been almost identical to the average ACT score for similar students at similar non-CHSRI schools, averaging between 14.5 and 15.4 (see Figure 5). Although there has been a slight increase, these scores remain low. For context, in 2008 the average ACT composite scores were 17.6 at CPS and 20.6 in Illinois.[15] ACT's college readiness benchmarks range from 18 for English to 24 for science.[16]

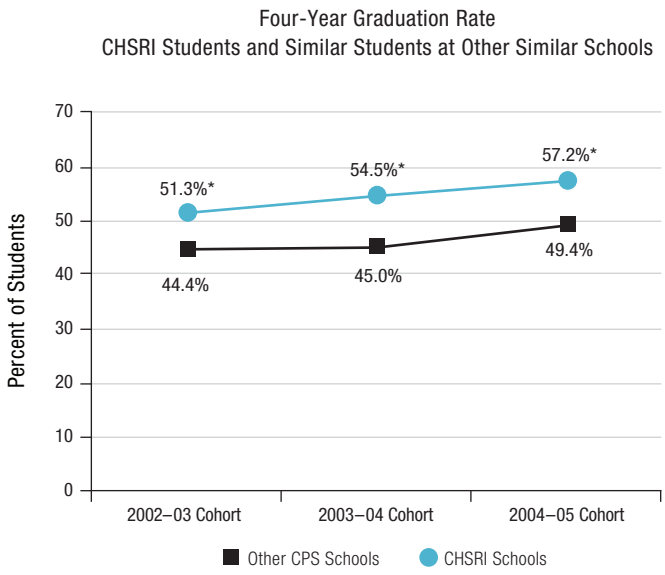
Four-Year Graduation Rates

We show graduation data for the first three cohorts of CHSRI schools: students who started as freshmen in 2002, 2003, and 2004. Cohort one consisted of five redesigned schools. Cohort two consisted of the original five redesigned schools, plus four additional redesigns and two new-start schools.

By the time the 2004 cohort entered high school, there were freshmen at 12 redesigned schools and four new-start schools. Regardless of the number of schools in the cohort or the ratio of new-start schools and redesigned schools, the four-year graduation rate increased steadily across cohorts, and the difference between CHSRI schools and similar non-CHSRI schools was statistically significant at all three time points. Figure 6 presents the graduation rates for the first three cohorts.

FIGURE 6

CHSRI students were more likely to graduate than similar students at similar non-CHSRI schools



Note: ** p<0.01; * p<0.05; ~ p <0.10

Earlier reports on this initiative have noted this positive trend. Even when we only had three-year cumulative dropout rates for two cohorts and four-year graduation rates for one cohort, it was evident that students at CHSRI schools persisted in school at higher rates than similar non-CHSRI students.[17] Now that we have more years of data, we see that the second cohort (nine redesigned schools and the two very small Big Picture new-start schools) continued to follow this same pattern, as did the third cohort (11 redesigned schools and four new-start schools). As Figure 6 shows, the positive difference for CHSRI schools, when compared to statistically similar students and schools, has ranged from 7 percentage points to more than 9 percentage points. However, as Figure 6 also shows, these graduation rates remained below 60 percent for all cohorts.

Chapter 3

Focusing on Graduation Rates: Beyond "Average"

In Chapter 2, we concentrated on whether there was a "CHSRI effect" on a number of student outcomes. That analysis provided the average effect on each outcome across all CHSRI schools.

In this section, we move beyond the average CHSRI effect and dig more deeply into high school graduation. Whether students persist to graduation is of vital importance both for the individual and for society as a whole. High school graduates earn more than $260,000 more than dropouts over their lifetimes;[18] in the aggregate, dropouts from the class of 2008 will cost the country more than $319 billion in lost wages.[19] Young people who have dropped out of school are far more likely to be incarcerated than young people who have finished high school. In fact, among youths who were 16 to 24 years old in 2006-07, more than six times as many high school dropouts were institutionalized than high school graduates—a result with both individual and societal ramifications.[20]

Yet, the graduation rate in the United States for the class of 2002 has been estimated at only 71 percent; for students of color, it was 56 percent.[21] Among a cohort of students in Chicago who were followed from age 13 until they were age 19 in 2002, 56.4 percent had graduated; only 50.3 percent of African Americans in the cohort finished high school.[22] Thus, it makes sense to probe more deeply into the details surrounding CHSRI's positive graduation effect.

Differences in Graduation Rates Across Schools

We began by exploring the degree to which individual CHSRI schools had stronger (or weaker) than predicted graduation rates after taking into account the characteristics of the students they served. Schools in which graduation rates are more than approximately two standard deviations away from predicted values are, by our definition, doing either "better than expected" or "worse than expected."

Figure 7 provides the degree to which individual schools are doing better or worse at graduating their students than we would have predicted, given the students they serve. Figure 7 presents the whole distribution of CPS schools for students who were freshmen in 2004, the last year for which we have graduation data.[23] Redesigned CHSRI schools are marked in blue; new-start CHSRI schools are marked in light blue. The length of the bars represents the degree of difference in graduation rates between each individual school and other schools that are serving similar students, measured in standard deviations.

There were 15 CHSRI schools included in the 2004-05 cohort: 11 were redesigned schools and four were new-start schools. As Figure 7 shows, most of them had graduation rates that were greater than or about equal to what we would have expected, based on the incoming characteristics of their students. Two schools had significantly lower graduation rates than expected. Both of these were redesigned schools, and both were converted into a turnaround school in fall 2008. Five schools had graduation rates that were significantly higher than we would have predicted, based on rates of other CPS schools. Two of these schools were redesigned; three of these schools were new-start schools (see Table 4 for a list of schools).

FIGURE 7

Most CHSRI schools have graduation rates that are higher than or equal to what would have been predicted

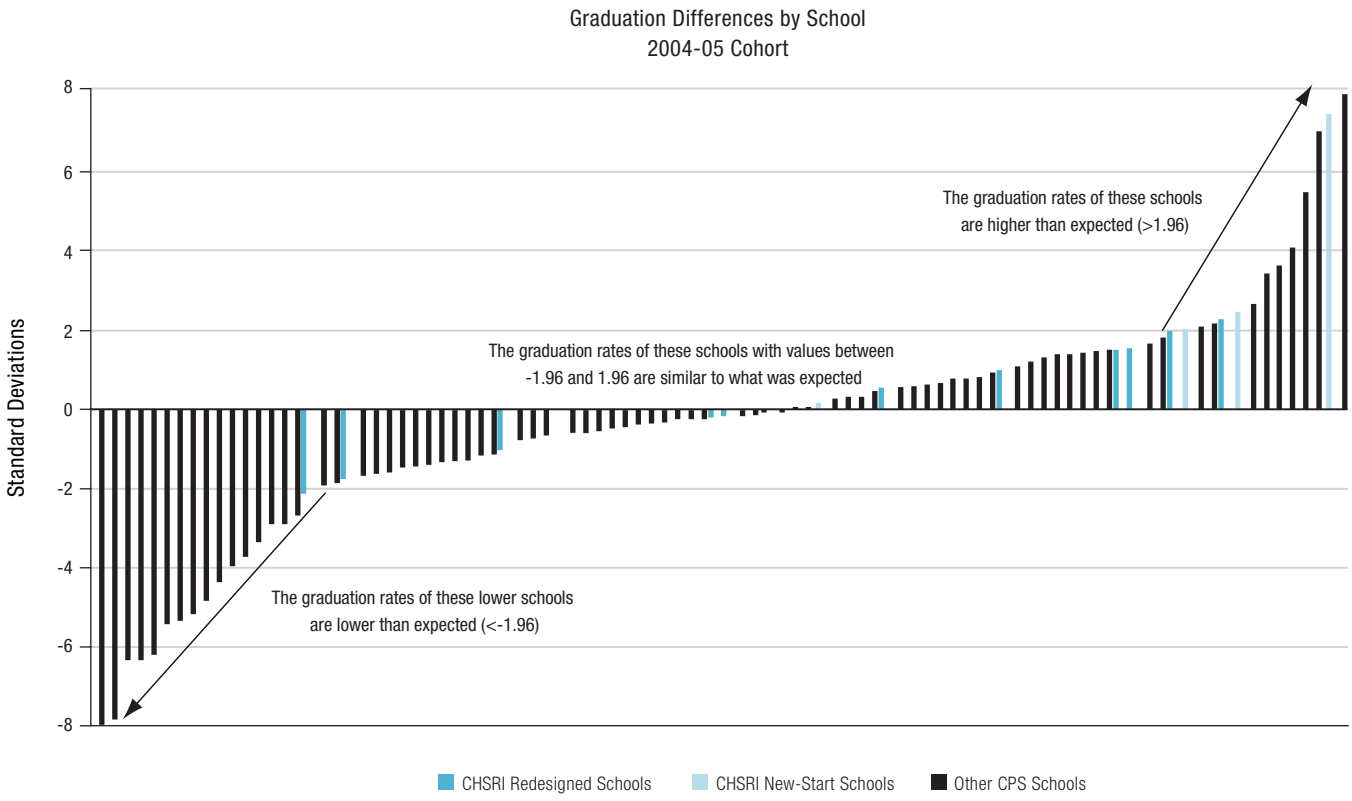


TABLE 4

Schools with graduation rates that were greater than or less than expected, given the students they served

	Less Than Expected	Greater Than Expected
2002–03 Cohort		
2003–04 Cohort	• Mose Vines Academy (Redesigned)	• School of Technology (Redesigned)
2004–05 Cohort	• Mose Vines Academy (Redesigned) • EXCEL (Redesigned)	• School of Technology (Redesigned) • Chicago Discovery Academy (Redesigned) • Al Raby (New-Start) • Chicago Academy (New-Start) • Big Picture-Williams (New-Start)

TABLE 5

Distribution of students by likelihood of graduating

2004-05 Cohort		
	CHSRI Schools	Other CPS Schools
Stratum 1: The Least Likely to Graduate	33.8%	18.4%
Stratum 2	30.2%	19.7%
Stratum 3	19.2%	20.5%
Stratum 4	12.1%	20.5%
Stratum 5: The Most Likely to Graduate	4.7%	21.0%

The story is similar in earlier cohorts: most CHSRI schools had graduation rates that were either greater than expected or about the same as expected.

Therefore, we can say that there are differences among CHSRI schools in their ability to graduate their students. Furthermore, the overall positive difference in graduation rates across CHSRI schools is not limited to a few schools; by the third cohort, all but two schools had graduation rates that were at least as high as schools serving similar students.

Differences in Graduation Rates Across Students

In this section, we focus on the question of whether CHSRI schools were equally effective in graduating all types of students. We focused on the 2004 cohort to carry out this analysis.[24] We explored variation across students in the three steps described below.

First, we grouped students according to background characteristics that are known to be related to graduation. Looking across all CPS eighth-graders from spring 2002 to spring 2004, we computed each student's probability of graduating, based on background characteristics (race, gender, socioeconomic status, eighth grade achievement, age at the end of eighth grade, and changing elementary schools) immediately prior to entering high school.

Second, we then divided all CPS students into five equal-sized groups, or strata, according to their graduation probability. Thus, each group was composed of students with a very similar likelihood of graduating, based on their background characteristics. Each group contained about 20 percent of the total number of students.

Third, we then subdivided each stratum into CHSRI and non-CHSRI students. Table 5 shows the percent of CHSRI and non-CHSRI students in each category. Note that CHSRI students are proportionately over-represented in the lower two categories and proportionately under-represented in the upper two categories. This distribution is consistent with Figure 1A and Table 2, which showed that CHSRI students entered high school with lower achievement and more risk factors.

Finally, we looked at the actual graduation rates of both CHSRI and non-CHSRI students in each of these strata. These actual graduation rates are plotted in Figure 8. As would be expected, the likelihood of graduating increases as the strata increase.

Remember that students in each subgroup, whether CHSRI or non-CHSRI, had about the same likelihood of graduating, based on their pre-high school characteristics.

What Figure 8 shows is that students in CHSRI schools were more likely to graduate than their peers in non-CHSRI schools, whether these students entered high school with high, medium, or low probabilities of graduating. Students with low probabilities of graduating, based on their background characteristics, benefited more than students who entered high school with characteristics that would indicate they were more likely to graduate. Among the lowest quintile (Stratum 1), the difference in graduation between CHSRI and non-CHSRI students was slightly more than six percentage points; the difference in the fifth quintile (Stratum 5) was about two percentage points. This indicates that although CHSRI schools were effective in graduating students across all categories, they were slightly more effective for students who entered with the lowest probability of graduating.

Similar analyses for the two earlier cohorts of graduates showed that although there was an overall positive CHSRI effect, it was not equally distributed across students. Indeed, CHSRI schools were not very effective with some students (see Table 6).

Although going to a CHSRI school had an average positive effect on whether students graduated, our analyses showed that CHSRI schools were consistently more effective at graduating their most vulnerable students than other CPS schools. The relative advantage of attending a CHSRI school was more limited for students who entered high school with fewer risk factors. Indeed, in earlier cohorts, CHSRI schools were actually less effective than other CPS schools at graduating these students.

FIGURE 8

2004-05 cohort graduation rates by type of student

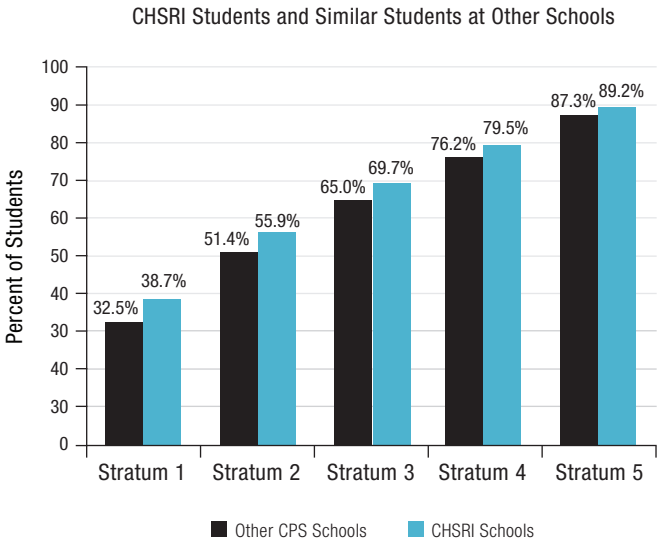


TABLE 6

Graduation rates by stratum, earlier cohorts

	2002-03 Cohort		2003-04 Cohort	
	CHSRI Schools	Other CPS Schools	CHSRI Schools	Other CPS Schools
Stratum 1: The Least Likely to Graduate	33.0	28.9	36.1	28.8
Stratum 2	42.2	47.9	56.8	52.0
Stratum 3	59.1	61.7	67.3	64.8
Stratum 4	78.7	73.8	76.4	77.1
Stratum 5: The Most Likely to Graduate	82.8	86.0	78.8	88.4

Conclusion

As this report shows, CHSRI did accomplish much—but not all—of what it was intended to do. First, it created and supported schools serving at-risk students, especially through the redesigned schools. The new-start CHSRI schools are more similar to CPS non-selective schools in general, but neither set of CHSRI schools serves CPS students who enter high school with strong academic skills or advantaged backgrounds.

Second, students in CHSRI schools—whether redesigned or new-starts—performed as well as or better than similar students in similar non-CHSRI schools on a number of important outcomes. Whether they went to redesigned or new-start schools, CHSRI freshmen were engaged enough to have better attendance than their peers (although, on average, they still missed almost a month of school a year) and to earn better grades in core subjects than similar students (although their average was still slightly below a C). They have typically been more likely to be on-track to graduate than similar freshmen, although this difference is very small in the most recent year. And cohorts of CHSRI students have been more likely to persist to graduation, although their graduation rates have remained less than 60 percent.

Nevertheless, even after six years, this initiative did not succeed in raising student test scores. In earlier reports, CCSR researchers found that this initiative was successful at creating schools where students reported having better relationships with their teachers and where they felt more supported by adults in the building than students in similar non-CHSRI schools. And, again in earlier reports, we found CHSRI was successful at creating schools where teachers reported a context marked by more trust, collaboration, and shared leadership than teachers in other similar schools. However, all of these positive features did not spark the types of instructional improvement activities that make a visible difference in students' test scores.

These findings may signal that some mechanisms for improving student performance impact particular outcomes, while other mechanisms impact others. The stronger relationships between students and teachers documented in our earlier work may improve absences, dropout rates, and even graduation rates, while the fact that we did not find substantial differences in instruction may help explain the lack of growth in test scores.

This report moved beyond examining CHSRI schools and students and the average CHSRI effect on outcomes to focus on the crucial outcome of high school graduation. While there were differences in graduation rates across CHSRI schools, almost all CHSRI schools graduated at least as many students as statistically comparable schools. Future work could tease out the common elements across all of these disparate schools to see what most strongly impacts graduation—whether it is, for example, school size, student-teacher relationships, peer relationships, or instructional leadership styles.

Furthermore, this report points out that the difference in graduation rates between CHSRI students and their peers was largest among students with the lowest probability of graduating. In fact, if students from the two quintiles least likely to graduate had all gone to schools with the same graduation rates as the CHSRI schools attended by their peers, CPS would have produced 435 additional graduates from among its most at-risk students in a single year. If students across all quintiles had attended schools with the same graduation rates as their CHSRI peers, 832 more would have graduated.

CHSRI, along with similar initiatives in many other school districts, set out to create schools that would accelerate learning to the point where under-performing students would be college ready in the span of four years. Countless researchers and practitioners are searching for a replicable, scalable method to accomplish this formidable task. The CHSRI schools have gotten at least part of this equation: their students are more likely to persist in school and graduate. Indeed, those who entered school with the lowest probability of persisting did so at greater rates than similar students at similar non-CHSRI schools.

This positive effect on graduation makes CHSRI highly relevant to the national reform discourse, even as small schools have taken a backseat to other reform models. U.S. President Barack Obama and Secretary of Education Arne Duncan have aggressively promoted a "turnaround" reform model, a massive infusion of federal money for states and districts to create or restart new schools or to overhaul the staff and organizational structure of their existing lowest-performing schools. They have called with special urgency for turnarounds at high schools with very low graduation rates. Yet, despite the attention the turnaround model has garnered, it remains largely untested. CHSRI was similarly an attempt to radically transform how low-performing schools operate, and its experience can provide insights for those planning and implementing turnarounds of high schools both in Chicago and nationally. CHSRI's success graduating vulnerable students—while a partial success—should be embraced and built upon as funders, practitioners, policymakers, and the school reform community continue the search for powerful new ways to improve the nation's lowest-performing high schools.

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Appendix A:
CHSRI Theory of Action

Appendix A describes the theory of action behind CHSRI and presents a pictorial depiction of it (see Figure A). The framework explains the mechanisms through which the features, contexts, and players interact to promote the desired environments for teachers and students in these schools and how these elements promote curricular change and desired outcomes. This theory of action was developed by conducting interviews with key stakeholders (funders, district leaders, reform staff, teachers, and principals) and by examining written documents associated with the reform agenda (such as the request for proposal to create small schools and district statements regarding this initiative).

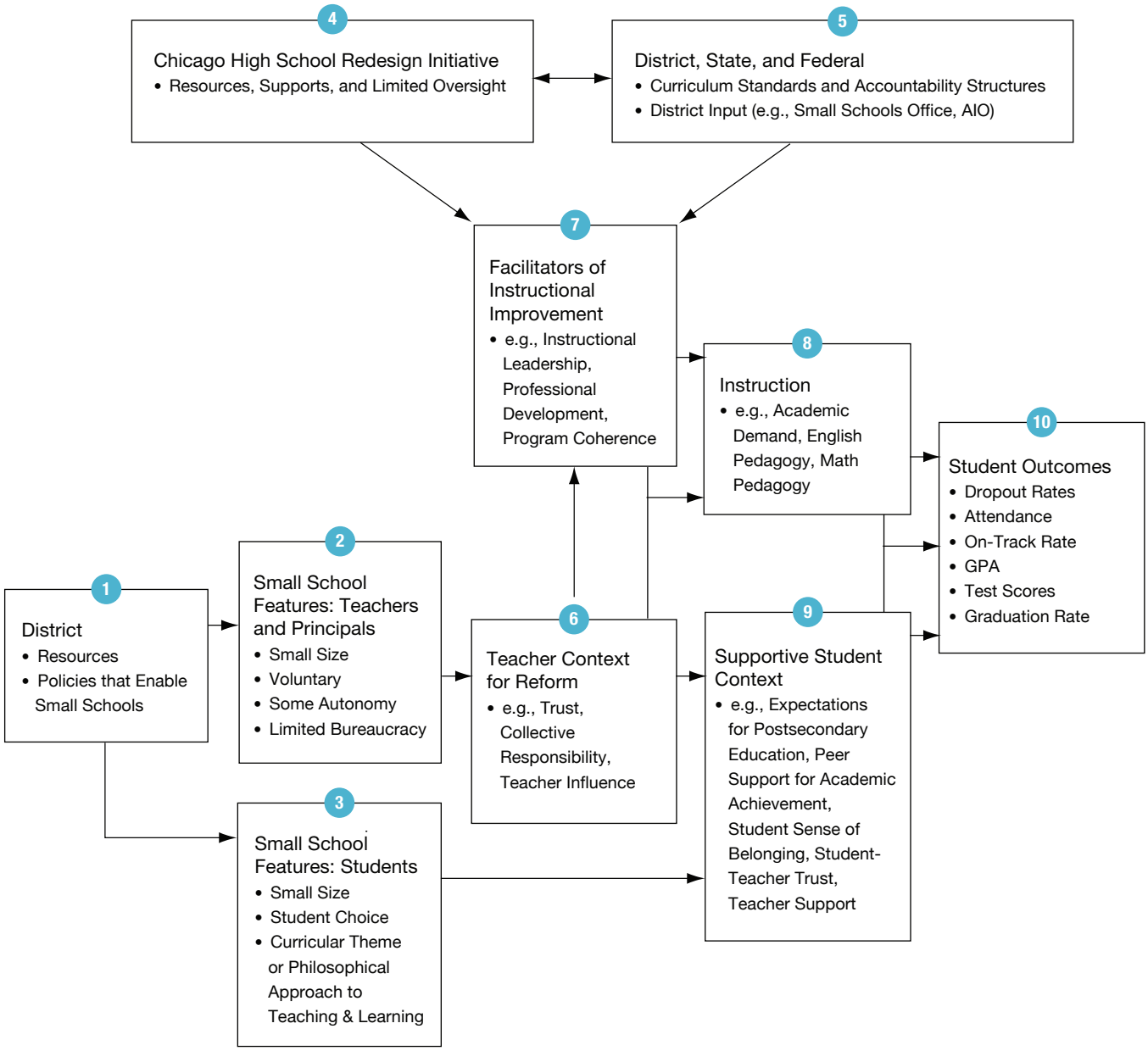
The theory suggests that improved student outcomes result from numerous factors, both inside and outside the small schools. First, reformers assumed that if a district (Box 1) provided appropriate resources and policies, it could create small, voluntary schools, in which teachers and principals experience limited bureaucratic regulation (Box 2). This, in turn, would help create a desirable teacher context for reform (Box 6) characterized by, for example, trust, collective responsibility, and teacher influence. This improved context for teachers would help spur instructional improvement activities (Box 7).

At the same time, resources and supports from both the CHSRI staff and the district staff (Boxes 4 and 5) would encourage instructional improvement activities (Box 7) by balancing their need to provide support, direction, and accountability systems with their need to protect the small schools' autonomy and flexibility—since autonomy and flexibility are core components of the rationale for small schools. Reformers hoped that instructional improvement activities would lead to meaningful changes in instructional practice (Box 8), and this would lead to improvements in student outcomes (Box 10).

Reformers also believed that by choosing to be part of a school and sharing an interest in a common curricular theme or instructional focus (Box 3), students' sense of support and belonging would be enhanced and a supportive student environment (Box 9) would be created. These more personal relationships, knowledge of students' needs and interests, and shared sense of community, combined with the ability to keep track of all students, were expected to help teachers provide greater academic and personal support, while holding all students to higher expectations (Box 9). Even though this is important by itself, it was expected that being combined with high-quality instruction would make desired student outcomes more likely (Box 10).

FIGURE A

CHSRI Theory of Action



Appendix B:
Statistical Models and Variables Used

Estimating the CHSRI Effect

Freshmen Outcomes and Graduation

To examine whether student outcomes at CHSRI schools are different from student outcomes at similar non-CHSRI schools, we use a two-level hierarchical model that we adjust for individual students' characteristics and school-level characteristics. Level one represents students and level two represents schools.

At level one, we control for previous performance as measured by the EXPLORE test that students take at the beginning of ninth grade, the social status in the census block where the student lives, the concentration of poverty in the student's block, the student's gender, the student's race, whether the student has special education status, and whether the student is young or old for grade at the beginning of high school. We also include variables related to students' mobility in elementary school and whether they attended a CPS school immediately prior to becoming ninth-graders. These slopes do not vary randomly at the school level. At level one, there are also six dummy variables indicating the year the data represents. These six year variables are going to be a function of school characteristics for that year, and they are allowed to vary randomly at level 2. The school characteristics include an indicator of whether or not the school was a CHSRI school, the average incoming achievement level of all current students, the achievement level squared, and the school's average student socioeconomic status.

These models have no intercept. Therefore, each of the six year variables represents the mean for that year for the variable analyzed, adjusted for students' and schools' characteristics. Since we center all the variables around CHSRI students and CHSRI schools, the means for each year are the means for schools similar to CHSRI schools with similar students.

The models and the variables in each level are described as follows:

$$\begin{aligned}\eta_{ij} = {} & \beta_{1j}\,(\text{Student Prior Achievement})_{ij} + \beta_{2j}\,(\text{Student Prior Achievement}^2)_{ij} + \beta_{3j}\,(\text{Social Status})_{ij} + \\ & \beta_{4j}\,(\text{Concentration of Poverty})_{ij} + \beta_{5j}\,(\text{Male})_{ij} + \beta_{6j}\,(\text{White})_{ij} + \beta_{7j}\,(\text{Asian})_{ij} + \\ & \beta_{8j}\,(\text{Native American})_{ij} + \beta_{9j}\,(\text{Latino})_{ij} + \beta_{10j}\,(\text{Special Education})_{ij} + \beta_{11j}\,(\text{No Economic Data})_{ij} + \\ & \beta_{12j}\,(\text{No Student Prior Achievement})_{ij} + \beta_{13j}\,(\text{Young Began HS})_{ij} + \beta_{14j}\,(\text{Months Old Began HS})_{ij} + \\ & \beta_{15j}\,(\text{Slightly Old Began HS})_{ij} + \beta_{16j}\,(\text{Moved 1 Time During ES})_{ij} + \beta_{17j}\,(\text{Moved 2 Times during ES})_{ij} + \\ & \beta_{18j}\,(\text{Moved 3 Times during ES})_{ij} + \beta_{19j}\,(\text{Year 02–03})_{ij} + \beta_{20j}\,(\text{Year 03–04})_{ij} + \beta_{21j}\,(\text{Year 04–05})_{ij} + \\ & \beta_{22j}\,(\text{Year 05–06})_{ij} + \beta_{23j}\,(\text{Year 06–07})_{ij} + \beta_{24j}\,(\text{Year 07–08})_{ij} + r_{ij}\end{aligned}$$

$$\beta_{pj} = \gamma_{p0} \text{ for p = 1 through 18}$$

$$\beta_{19j} = \gamma_{190} + \gamma_{191}(\text{CHSRI 02–03})_j + \gamma_{192}(\text{Mean Student Prior Achievement 02–03})_j + \gamma_{193}(\text{Mean Student Prior Achievement 02–03}^2)_j + \gamma_{194}(\text{Mean Social Status 02–03})_j + u_{19j}$$

$$\beta_{20j} = \gamma_{200} + \gamma_{201}(\text{CHSRI 03–04})_j + \gamma_{202}(\text{Mean Student Prior Achievement 03–04})_j + \gamma_{203}(\text{Mean Student Prior Achievement 03–04}^2)_j + \gamma_{204}(\text{Mean Social Status 03–04})_j + u_{20j}$$

$$\beta_{21j} = \gamma_{210} + \gamma_{211}(\text{CHSRI 04–05})_j + \gamma_{212}(\text{Mean Student Prior Achievement 04–05})_j + \gamma_{213}(\text{Mean Student Prior Achievement 04–05}^2)_j + \gamma_{214}(\text{Mean Social Status 04–05})_j + u_{21j}$$

$$\beta_{22j} = \gamma_{220} + \gamma_{221}(\text{CHSRI 05–06})_j + \gamma_{222}(\text{Mean Student Prior Achievement 05–06})_j + \gamma_{223}(\text{Mean Student Prior Achievement 05–06}^2)_j + \gamma_{224}(\text{Mean Social Status 05–06})_j + u_{22j}$$

$$\beta_{23j} = \gamma_{230} + \gamma_{231}(\text{CHSRI 06–07})_j + \gamma_{232}(\text{Mean Student Prior Achievement 06–07})_j + \gamma_{233}(\text{Mean Student Prior Achievement 06–07}^2)_j + \gamma_{234}(\text{Mean Social Status 06–07})_j + u_{23j}$$

$$\beta_{24j} = \gamma_{240} + \gamma_{241}(\text{CHSRI 07–08})_j + \gamma_{242}(\text{Mean Student Prior Achievement 07–08})_j + \gamma_{243}(\text{Mean Student Prior Achievement 07–08}^2)_j + \gamma_{244}(\text{Mean Social Status 07–08})_j + u_{24j}$$

For on-track to graduate indicator,

$$Y_{ij} \mid \varphi_{ij} \sim B(1, \varphi_{ij}) \text{ and } \eta_{ij} = \log\left(\frac{\varphi_{ij}}{1-\varphi_{ij}}\right)$$

for the number of days the student is absent during the year,

$$Y_{ij} \mid \lambda_{ij} \sim P(1, \lambda_{ij}) \text{ and } \eta_{ij} = \log(\lambda_{ij})$$

and for the analysis of core GPA, $\eta_{ij} = \text{core GPA}_{ij}$.

The analysis on graduation rates follows the same model as described before, but the year dummy variables represent the entering cohort for that year. Graduation can only be analyzed for the first three cohorts; therefore, only three dummy variables (one for each cohort) are included in the model. For graduation outcome,

$$Y_{ij} \mid \varphi_{ij} \sim B(1, \varphi_{ij}) \text{ and } \eta_{ij} = \log\left(\frac{\varphi_{ij}}{1-\varphi_{ij}}\right).$$

Eleventh Grade Test Scores

To examine whether students' test scores in eleventh grade at CHSRI schools are different from students' test scores at non-CHSRI schools, we use a two-level hierarchical linear model adjusting for individual students' characteristics and school-level characteristics. As before, level one represents students and level two represents schools.

$$\eta_{ij} = \beta_{1j}(\text{Student Prior Achievement})_{ij} + \beta_{2j}(\text{Student Prior Achievement}^2)_{ij} + \beta_{3j}(\text{Social Status})_{ij} + \beta_{4j}(\text{Concentration of Poverty})_{ij} + \beta_{5j}(\text{Male})_{ij} + \beta_{6j}(\text{White})_{ij} + \beta_{7j}(\text{Asian})_{ij} + \beta_{8j}(\text{Native American})_{ij} + \beta_{9j}(\text{Latino})_{ij} + \beta_{10j}(\text{Special Education})_{ij} + \beta_{11j}(\text{No Economic Data})_{ij} + \beta_{12j}(\text{No Prior Score})_{ij} + \beta_{13j}(\text{Old})_{ij} + \beta_{14j}(\text{Year 02–03})_{ij} + \beta_{15j}(\text{Year 03–04})_{ij} + \beta_{16j}(\text{Year 04–05})_{ij} + \beta_{17j}(\text{Year 05–06})_{ij} + \beta_{18j}(\text{Year 06–07})_{ij} + \beta_{19j}(\text{Year 07–08})_{ij} + r_{ij}$$

$$\beta_{pj} = \gamma_{p0} \text{ for p = 1 through 13}$$

$$\beta_{14j} = \gamma_{140} + \gamma_{141}(\text{CHSRI 02–03})_j + \gamma_{142}(\text{Mean Prior Achievement 02–03})_j + \gamma_{143}(\text{Mean Prior Achievement 02–03}^2)_j + \gamma_{144}(\text{Mean Social Status 02–03})_j + u_{14j}$$

$$\beta_{15j} = \gamma_{150} + \gamma_{151}(\text{CHSRI 03–04})_j + \gamma_{152}(\text{Mean Prior Achievement 03–04})_j + \gamma_{153}(\text{Mean Prior Achievement 03–04}^2)_j + \gamma_{154}(\text{Mean Social Status 03–04})_j + u_{15j}$$

$$\beta_{16j} = \gamma_{160} + \gamma_{161}(\text{CHSRI 04–05})_j + \gamma_{162}(\text{Mean Prior Achievement 04–05})_j + \gamma_{163}(\text{Mean Prior Achievement 04–05}^2)_j + \gamma_{164}(\text{Mean Social Status 04–05})_j + u_{16j}$$

$$\beta_{17j} = \gamma_{170} + \gamma_{171}(\text{CHSRI 05–06})_j + \gamma_{172}(\text{Mean Prior Achievement 05–06})_j + \gamma_{173}(\text{Mean Prior Achievement 05–06}^2)_j + \gamma_{174}(\text{Mean Social Status 05–06})_j + u_{17j}$$

$$\beta_{18j} = \gamma_{180} + \gamma_{181}(\text{CHSRI 06–07})_j + \gamma_{182}(\text{Mean Prior Achievement 06–07})_j + \gamma_{183}(\text{Mean Prior Achievement 06–07}^2)_j + \gamma_{184}(\text{Mean Social Status 06–07})_j + u_{18j}$$

$$\beta_{19j} = \gamma_{190} + \gamma_{191}(\text{CHSRI 07–08})_j + \gamma_{192}(\text{Mean Prior Achievement 07–08})_j + \gamma_{193}(\text{Mean Prior Achievement 07–08}^2)_j + \gamma_{194}(\text{Mean Social Status 07–08})_j + u_{19j}$$

Where for the analysis of test scores, $\eta_{ij} = \text{ACT Score}_{ij}$.

Description of the Variables Used in the Models

TABLE B1

Student-Level Variable Used in Analyses

Variable Name	Description	Where Used
Student Prior Achievement	**Students' elementary achievement** was constructed based on each student's composite EXPLORE score in 9th grade (for freshmen and graduations analyses) or reading scores on the Iowa Tests of Basic Skills in eighth grade (for eleventh grade test scores).	**All Analyses of Student Outcomes**
Male	**Gender** was indicated by the variable MALE.	
Latino, White, Native American, Asian	**Race/ethnicity** was indicated by a set of dummies. African American Students were the omitted category.	
Social Status, Concentration of Poverty	**Socioeconomic status** included two variables. Both were based on data from the 2000 U.S. Census information on the census block group in which students lived. Students' home addresses were used to link each student to a particular block group within the city, which could then be linked to census data on the economic conditions of the student's neighborhood. Four indicators were used to construct these variables: (1) log of the percentage of families above the poverty line, (2) log of the percentage of men employed in the block group, (3) the average level of education among adults over age 21, and (4) log of the percent of men in the block group employed as managers or executives. The first two of these were reversed coded and combined into the variable called Concentration of Poverty, while the other two indicators were combined into the variable called Social Status. The census data allow for a more accurate indicator of students' economic status than a simple indicator of whether the student qualifies for free or reduced-price lunch. The vast majority of students in CPS qualify for free or reduced-price lunch, and there is wide variation in the economic status of students who qualify as low-income. Furthermore, by the time students reach high school age, proportionately more parents fail to apply for free and reduced-price lunch, and different schools treat this phenomenon differently.	
Special Education	**Whether a student was receiving special education services**, based on administrative records.	
No Economic Data, No Test Data	**Missing values.** If students were missing values on the socioeconomic variables or on their prior achievement, they were given values at the sample mean and given a dummy value of 1 on these two variables.	

Variable Name	Description	Where Used
Young Began HS, Months Old Began HS, Slightly Old Began HS	**Age on entry into high school** was distinguished for first-time ninth-graders by these variables. "Young Began High School" is a dummy variable indicating whether a student was younger than age 14 at the start of high school. "Months Old Began High School" gave the number of months older than 14 years, 8 months that a student was as of September 1 of the academic year. Students older than 14 years, 8 months should have started school with the previous cohort if they were to follow school-system guidelines. "Slightly Old Began High School" is a dummy variable that indicates students between 14 years and 9 to 11 months old when they began high school.	**Additional Variables: Analyses of First-time Freshmen and Graduation**
Move 1 Time During ES, Move 2 Times During ES, Move 3 Times During HS	**School mobility in elementary school** was included in the models as a proxy of educational stability. Three dummy variables were constructed identifying students who moved once, twice, or three or more times in the three years prior to entering high school. More than 30 percent of students had moved once, 9 percent had moved twice, and 2 percent had moved three or more times during their immediately prior three years of schooling.	
Old	**Whether a student was old-for-grade** was indicated by a dummy variable to indicate whether a student was older than what would be expected based on school system guidelines.	**Additional Variables: Eleventh Grade Test Scores**

TABLE B2

School-Level Variable Used in Analyses

Variable Name	Description	Where Used
CHSRI	Whether or not a school was a CHSRI school was indicated with the dummy variable CHSRI.	**All Analyses**
Mean Achievement	School level achievement was computed by averaging the 9th grade composite EXPLORE scores (freshmen and graduation analyses) or 8th grade ITBS reading score (eleventh grade test score analysis) of all current members of a school's student body, adjusting for cohort effects.	
Mean Social Status	A description of how this variable was created at the individual level can be found in Table C1. The school level indicator was an average of the social status of all students in the school based on the census block in which each lived.	

Estimation of Differences in the Effects of Redesigned Schools and New-Start Schools

To examine whether the effect of redesigned schools is different from the effect of new-start schools, we used the same model presented in the previous section where we add a dummy variable at the school level for each year when there are new-start schools. This variable takes a value of 1 if a CHSRI school was a new-start. The estimates on these dummy variables measure whether there are differences between the redesigned schools and new-start schools.

Estimation of Individual School Effects

To examine the individual school effects for graduation instead of the aggregate CHSRI effect, we used the main model presented before with one exception: the CHSRI dummy variable is removed from the model. The school-level random variation (u_{19j}, u_{20j}, and u_{21j}) that can be estimated for each of the three cohorts in the graduation analysis after controlling for students' characteristics and schools' characteristics represents the individual school effects. These effects measured what schools contribute to students' likelihood of graduating after taking into account the students that schools serve. These effects are plotted in Figure 7 after transforming them into standard deviation units.

Measuring the CHSRI Effect by Type of Student

To explore whether there was variation of the graduation CHSRI effect across different types of students, we estimated a propensity score model. This model estimates the probability of graduating for students, based on their achievement and background characteristics before joining high school. The model is as follows:

$$\begin{aligned}\Pr(\text{Graduating in 4 Years} = 1)_i = {} & \beta_1(\text{8th Grade Achievement})_i + \beta_2(\text{8th Grade Achievement}^2)_i + \\ & \beta_3(\text{Social Status})_i + \beta_4(\text{Concentration of Poverty})_i + \beta_5(\text{Male})_i + \\ & \beta_6(\text{White})_i + \beta_7(\text{Asian})_i + \beta_8(\text{Native American})_i + \beta_9(\text{Latino})_i + \\ & \beta_{10}(\text{Special Education})_i + \beta_{11}(\text{No Economic Data})_i + \\ & \beta_{12}(\text{No 8th Grade Score})_i + \beta_{13}(\text{Young Began HS})_{ij} + \\ & \beta_{14}(\text{Months Old Began HS})_i + \beta_{15}(\text{Slightly Old Began HS})_i + \\ & \beta_{16}(\text{Moved 1 Time During ES})_i + \beta_{17}(\text{Moved 2 Times During ES})_i + \\ & \beta_{18}(\text{Moved 3 Plus Times During ES})_i + \beta_{19}(\text{Cohort 02–03})_i + \\ & \beta_{20}(\text{Cohort 03–04})_i + \beta_{21}(\text{Cohort 04–03})_i + r_i\end{aligned}$$

Each student gets an estimated propensity of graduating in four years that is a function of their achievement and measurable characteristics. Students are grouped in five strata with 20 percent of the students in each, based on their propensity score. Table B3 shows the distribution of students into these five strata by cohort and by whether they attended CHSRI schools or other CPS schools.

Finally the graduation rate was calculated for each of these groups of students and compared for CHSRI and non-CHSRI students within each stratum, since students within each strata have similar propensities of graduating in four years before the start of high school.

TABLE B3

Distribution of students by propensity of graduating

	2002-03 Cohort		2003-04 Cohort		2004-05 Cohort	
	CHSRI Schools	Other CPS Schools	CHSRI Schools	Other CPS Schools	CHSRI Schools	Other CPS Schools
Stratum 1: The Least Likely to Graduate	28.5%	19.9%	37.5%	20.0%	33.8%	18.4%
Stratum 2	27.4%	19.2%	26.0%	20.1%	30.2%	19.7%
Stratum 3	23.7%	20.0%	18.8%	19.6%	19.2%	20.5%
Stratum 4	12.6%	20.4%	14.0%	20.0%	12.1%	20.5%
Stratum 5: The Most Likely to Graduate	7.8%	20.5%	3.8%	20.4%	4.7%	21.0%
Total Number of Students	372	20,723	880	20,276	1,375	21,475

Note: CHSRI students are proportionately over-represented in the lower two categories and proportionately under-represented in the upper two categories.

Endnotes

Executive Summary

1. Students are on-track to graduate if they have successfully passed five courses and have no more than one semester failing grade in a core course. See Allensworth and Easton (2005, 2007).

Introduction

2. Kahne, Sporte, and Easton (2005); Kahne et al. (2006); Kahne et al. (2008); Kahne et al. (2009); Sporte, Correa, Kahne (2004); Sporte et al. (2003); Stevens (2008); Stevens with Kahne (2006); Stevens et al. (2008).
3. See Appendix A for more detail and for a graphic representation of this theory of action.
4. Mitchell et al. (2005); Rhodes et al. (2005); Shear et al. (2005).
5. Zimmer et al. (2009).
6. Greene and Symonds (2006); Robelen (2006).
7. See, for example, Chicago Public Schools (2006); Reid (2005).

Chapter 1

8. Of the 23 schools created by CHSRI, six were no longer in existence in 2008. Of the four redesigned schools on one campus, one moved out into its own location in fall 2005; the other three were recombined and reconfigured as a large turnaround school in 2008. Two of the new-start schools were phased out; due at least in part to economic challenges caused by their very small size, they closed when their first class graduated in 2009.
9. See Hess (2003) for details about these earlier attempts at reform.
10. Robelen (2006); Shear et al. (2005, p. 5).
11. CPS, Office of Small Schools (2002).
12. There were two new-start schools in 2003-04, but they did not have EXPLORE scores that year. Also one new-start school in 2004-05 did not have EXPLORE scores. Phoenix Academy is not included in the analysis starting in 2005 when it moved to a new location and no longer considered itself part of CHSRI.

Chapter 2

13. See Appendix B for details about all models and methods used in this section.
14. Allensworth and Easton (2005, 2007).
15. Illinois State Board of Education (2008).
16. When we look at overall PSAE scores in reading and math, the results are the same. Although there has been a slight increase in PSAE scores among CHSRI students, there is no difference between PSAE scores among students at CHSRI schools and their peers at similar non-CHSRI schools.
17. Kahne et al. (2006).

Chapter 3

18. Rouse (2005).
19. Alliance for Excellent Education (2008).
20. Sum et al. (2009).
21. Greene and Winters (2005).
22. Allensworth (2005, pp. 12 and 21). Follow-up analyses as personal communication with authors.
23. See Appendix B for an explanation on how these school effects are calculated.
24. See Appendix B for a detailed description of the analysis.

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