J.C. Nalle Community School: A Study of a School Turnaround Effort

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Child TRENDS

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Introduction

Background

Rising test score proficiency

J.C. Nalle students achieved significant gains in standardized test reading and math scores in 2012-13. In the 2012-13 school year, the students at John Carroll Nalle Elementary School (J.C. Nalle) achieved the highest increase in math proficiency rates and the fifth highest increase in reading proficiency rates among all District of Columbia Public Schools. These increases were particularly impressive given that an external organization contracted by DC's Office of the Deputy Mayor for Education in 2011 to provide recommendations for school closures had classified J.C. Nalle as a Tier 4 school, indicating that it was performing at the bottom quartile of schools serving similar grades within the District of Columbia (both traditional DCPS and charter schools) (IFF, 2012). The report recommended that J.C. Nalle either be closed or targeted for significant turnaround efforts.

A package of interventions

J.C. Nalle implemented a number of interventions in 2012-2013 targeting academic achievement. During the same year that the test scores improved, the school experienced a number of significant changes, including a $6.8 million dollar building renovation and the introduction of several interventions intended to improve academic performance. These interventions focused on expanded learning opportunities and increasing students' access to technology as a tool to enhance teaching and learning.

The school used technology to enhance teaching and learning. The school increased students' access to technology by purchasing tablet computers for use in grades three through five and additional laptop computers for use in primary classrooms, as well as by acquiring licenses for online educational programs designed to build math skills—Spatial-Temporal Math (ST Math)[1] and First in Math.[2] In the school year following the large increases in DC CAS reading and math scores, J.C. Nalle also purchased Lexia,[3] an online educational program focused on reading. As a part of the building renovation, each classroom was equipped with an interactive whiteboard.

The school day was extended. In the spring of 2012, the school was awarded a $275,000 grant through the school system's *Proving What's Possible* grant program. The funds were used to extend student learning time by approximately 75 minutes for students in grades three

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[1] Spatial-Temporal Math (ST Math) is an online program that uses mainly visual, language-and-symbol free animations to expose students to math concepts. Progression through the ST Math activities occurs at the rate each student can master the material; students will not move on past an activity on which they are struggling.

[2] First in Math (FIM) is an interactive, online program designed to reinforce basic math skills from addition and subtraction to exponents and early algebra. Students can also use FIM to practice other math-related concepts such as measurement and problem solving. Divided into six different modules, FIM content is generally numbers-based and increases in difficulty with grade level.

[3] Lexia Reading (also referenced as Lexia) is a structured, sequential program designed to support the development of students' foundational reading skills in six areas. Lexia operates through an online platform coupled with independent student practice and direct teacher instruction.

through five. After breakfast, students received uninterrupted core academic instruction from 8 a.m. to 1 p.m. After recess and lunch, students attended ”special” classes in art, music, physical education and other subjects from 2 to 4:30 p.m. Students also received specialized instruction in reading and math during this time, which was provided by subject matter specialists, allowing students extra time to learn and reinforce skills. Students who were struggling were sometimes provided additional individual and small-group instruction throughout the day.

An academic program was offered on Saturdays. In addition, the Freddie Mac Foundation provided funds to the National Center for Children and Families to provide Saturday School programming for students in grades one through five, with a focus on assisting underperforming students by encouraging students and their parents to work together on strengthening academic skills.

Building on a community school approach

At first glance, it may be tempting to attribute the increase in test scores entirely to the interventions described above, but that story fails to acknowledge J. C. Nalle’s experience as a community school. The new interventions described above were not introduced into a vacuum. Rather, they were implemented in a school with a long history, numerous pre-existing programs, a strong community partnership with the National Center for Children and Families among other partners, and a school climate that was amenable to change. In 1997, J.C. Nalle became the first community school in Washington, DC. As figure I.1 suggests, any explanation of the turnaround in test scores must reflect the investments that the school and its community partners have made to meet the academic and non-academic needs of students and their families over the past fifteen years. In order to understand what has happened at J.C. Nalle, it is important to understand the nature of community schools.

As a community school, J.C. Nalle offers a range of supports to students and their families. The advent of community schools reflects the growing consensus among educators, policymakers, and others that to help children in vulnerable populations achieve academic success, it is not enough to focus solely on what goes on in a particular classroom or school. One must also focus on the socioeconomic forces outside the school environment that can affect children’s abilities and willingness to learn and achieve. This is the premise of community schools: they partner with nonprofit organizations and local agencies to provide a menu of integrated student supports (ISS). These supports can include health care; academic enrichment (e.g., tutoring, mentoring); other youth development activities; mental and behavioral health services; and services for parents and families, such as parent education, family counseling, food banks, and employment assistance (Bireda, 2009; Moore & Emig, 2014). Community schools target a variety of student-level and family-level outcomes, increase community access to the school as an important anchor of the community, and help community partners reach the children and families who need their services. In other words, a community school is both a place and a set of partnerships between the school and community resources (Blank, Melaville, and Shah, 2003).

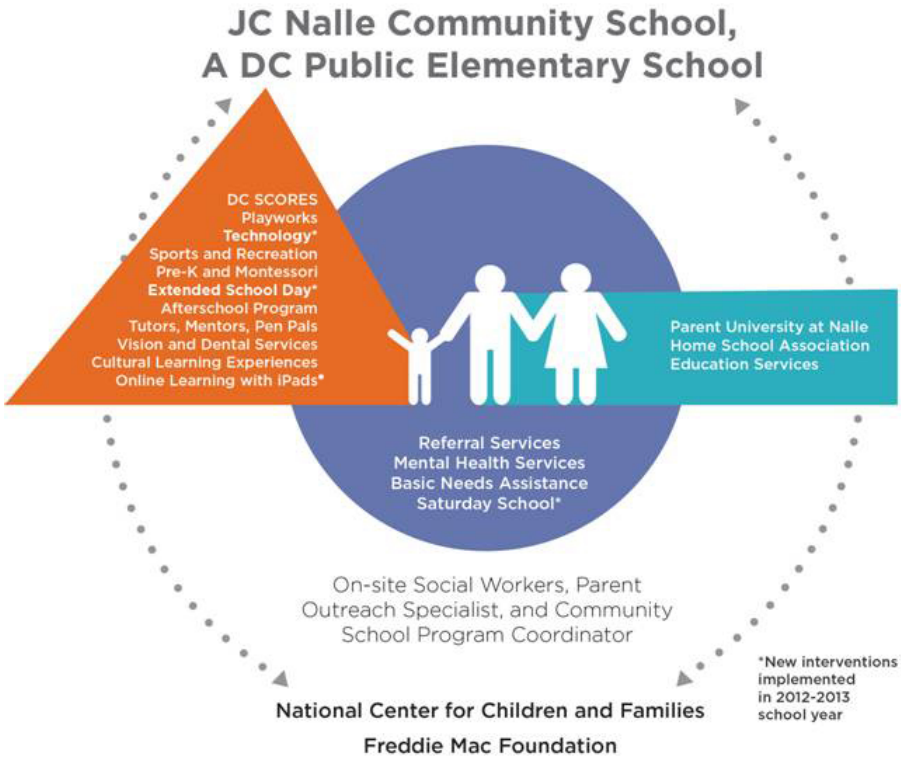
Community schools work to address barriers, both inside and outside of the classroom, to learning. Few evaluations of community schools have examined the links between how well—or poorly—they are implemented and how well—or poorly—students perform academically. While the evaluation basis for ISS is best described as emerging, the approach is firmly grounded in research on child and youth development and wholeheartedly embraces the “whole child” perspective. A recent review of ISS models for improving educational outcomes for at-risk students (including a number of community school models) highlighted findings from both quasi-experimental and experimental studies suggesting that such models can contribute to student academic progress as measured by decreases in grade retention and dropout, and increases in attendance, math achievement, reading and overall GPA (Moore & Emig, 2014).

Citywide education reforms

The District of Columbia Public Schools has implemented a number of education reforms. The reforms implemented at J.C. Nalle in recent years occurred during a time of transition across the District of Columbia Public Schools (DCPS). A number of citywide reform initiatives were implemented during this time, many of which were the result of changes that resulted from the passage of the DC Public Education Reform Amendment Act (PERAA) in 2007, which placed DCPS under the leadership of a mayor-appointed Chancellor of Schools. More recently, DCPS also began implementing a five-year strategic plan in 2012 to support new and innovative programs in a number of its schools. Ten million dollars in *Proving What's Possible*[i] grants were awarded to 59 schools— including each of the 40 lowest-performing schools—for targeted interventions. These interventions included afterschool and extended learning time programs, use of technology in the classroom, and professional development for teachers. As mentioned, J.C. Nalle received a grant for $275,000, which was used to fund the technological innovations and extended day program.

A city-wide trend of improving test scores. It is also important to consider J.C. Nalle student performance in the context of recent gains in standardized test scores district-wide. In the 2007-2013 period, the number of students scoring proficient or advanced on the District of Columbia Comprehensive Assessment System (DC CAS) increased by 12 percent in reading and by 22 percent in math. On the National Assessment of Educational Progress (NAEP) Trial Urban District Assessment, which is used to compare student achievement across large urban areas, DCPS students have consistently performed below the national average for large urban school districts. However, DCPS students also have seen a 15-point increase in math scores, compared with an increase of five points in other urban school districts, and a nine-point increase in reading, compared with an increase of four points in other urban school districts.[ii]

Figure I.1. A Model of Academic and Non-Academic Supports at J.C. Nalle



Overview of study design

J.C. Nalle demonstrated impressive improvements in DC CAS reading and math proficiency rates in the 2012-2013 school year following concerted efforts and investments by DCPS, the school, and its partners, the Freddie Mac Foundation and the National Center for Children and Families, to turn around students' academic performance. In January 2014, the Freddie Mac Foundation provided a grant to Child Trends to make an independent assessment of the J.C. Nalle Community School, focusing on the following questions:

- How does the reading and mathematics performance of J.C. Nalle students compare with performance of matched comparison students from similar neighborhood schools?
- How do gains in reading and mathematics performance among J.C. Nalle students compare with gains of matched comparison students from similar neighborhood schools?
- Did differences in academic outcomes between J.C. Nalle students and matched comparison students change after the introduction of recent interventions at J.C. Nalle?
- What did the efforts to turn around the school include?
- What is likely to have contributed to changes in students' academic achievement?
- What did the effort to turn around the school cost? That is, how do expenditures in J.C. Nalle change from the period before the interventions were introduced as compared to the period afterwards?

To carry out this work, we conducted an outcome evaluation and an implementation evaluation. The process involved using a mix of quantitative and qualitative methods to determine the

school's effects on students' academic outcomes, any changes in these outcomes over time, and the likely reasons for the change in these outcomes.

Outcomes study

More specifically, in the outcomes evaluation, we used statistical methods to investigate the school's effect on students' reading and mathematics achievement and gains on the DC CAS in grades 3-5. To do this, we examined how J.C. Nalle students compared with matched comparison students in reading and mathematics performance and gains, as well as whether the differences in academic outcomes changed after the introduction of interventions at the school in 2011-12. The analysis used rigorous statistical matching and growth analysis techniques (*propensity score matching* and *difference-in-difference analyses*).

Implementation study approach

The implementation study seeks to identify the factors that contributed to the changes in J.C. Nalle students' test scores. It examined how J.C. Nalle operates as a community school; what school improvement efforts were put into place in the past few school years; what factors seem to have contributed to changes in students' academic achievement; and what the effort to turn around the school cost. To explore these questions, we collected information from different types of respondents— including current and former J.C. Nalle staff and teachers, parents of J.C. Nalle students, and representatives of the Freddie Mac Foundation and the National Center for Children and Families, the school's major partners. The methods we used in this undertaking ranged from in-depth interviews and focus groups to surveys, document reviews, and observations of school and program activities.

Overview of the report

This report of evaluation findings begins with an introduction to the J.C. Nalle Community School, including information on its background and history, student and family demographics, the circumstances leading up to the formation of the J.C. Nalle-Freddie Mac Foundation-National Center for Children and Families partnership, and the services offered through the partnership. Next, it discusses the results of the outcomes evaluation, describing the methods employed, patterns of achievement findings for J.C. Nalle students versus the matched comparison group, and implications of these findings. Following this discussion, the report focuses on the results of the implementation study, including an overview of the methods employed, stakeholder perspectives on the improvement of student outcomes, and the various challenges faced by the school. The report concludes with a summary of all findings and their implications for sustained and expanded improvements.

Background on J.C. Nalle Community School

Characteristics of J.C. Nalle students and community

J.C. Nalle serves an at-risk student population. J.C. Nalle is a Community School located in the Marshall Heights neighborhood of Ward 7 in Washington, D.C. The school serves more than 350 pre-kindergarten through fifth grade students. The vast majority of J.C. Nalle students are African American and come from low-income families – although the proportion of low-income students has decreased in recent years. While the school experienced steady declines in enrollment between 2007 and 2012 – dropping from 421 to 330 – J.C. Nalle experienced a surge in enrollment in 2013-14 with the addition of nearly 40 students. Approximately one in ten students enrolled in the school receive special education services, which is slightly lower than the average for DCPS schools in Ward 7 (14 percent) and slightly over half (55 percent) are in-boundary (i.e., J.C. Nalle is their assigned school according to DCPS). The student population is also fairly transient, with a student mobility rate in recent years of around 20-25 percent.

The community has experienced economic changes in recent years. The community in which J.C. Nalle is located, historically one of the more economically disadvantaged areas of the city, has experienced a number of changes in recent years. Ward 7 was especially hard-hit by the recession with large increases in the numbers of people who were unemployed or receiving public benefits. However, the community also saw increases in the percentage of adults with college degrees and decreases in the number of adults who had not completed high school. At the same time, the neighborhood around the school has experienced fewer violent and property crimes in recent years –a trend that is similar to many other D.C. neighborhoods during this same timeframe.

History of J.C. Nalle community partnerships

The Freddie Mac Foundation explores community schools as a way to support J.C. Nalle. In 1994, the Freddie Mac Foundation began to explore the possibility of developing a community school model in partnership with J.C. Nalle. After conducting some research on promising models, the foundation selected the Children's Aid Society (CAS) community school model as one that seemed to be a good fit for implementation in Washington, DC. That well-developed model had been implemented effectively in New York City beginning in the 1990s. Key components of the CAS model included formal education; parental education and support; on-site health and dental care; counseling; before and afterschool care; and summer camps.[iii] These programs and services sought to meet the needs of the whole child, while also integrating parental involvement into their children's learning and the school.[iv]

In 1996, the Freddie Mac Foundation made its first investment in CAS and began to facilitate planning meetings with representation from the foundation, the school principal, and the school's initial community school partner, the Marshall Heights Community Development Organization. Soon thereafter, the foundation selected the National Center for Children and Families to serve as the primary community partner, in part due to their ability to offer the broad range of services and supports required for the CAS model. The foundation made its first substantial investment in the National Center for Children and Families in 2000. Children's Aid Society continued to function as a partner and consultant for several years, receiving foundation grants through 2005.

J.C. Nalle becomes D.C.'s first public community school in 1997. J.C. Nalle, which has been in operation since 1950, became the first full-service public community school in Washington, D.C. in 1997. This milestone, as noted, resulted from a fruitful partnership among the Freddie Mac Foundation, the District of Columbia Pubic Schools (DCPS), and the National Center for Children and Families (NCCF). As a community school, J.C. Nalle provides formal education from Pre-K through grade 5, academic enrichment activities, structured out-of-school time activities, mental health counseling and community referrals, parenting workshops, and emergency supplies (e.g., seasonally appropriate clothing and nonperishable food) for high-risk children and their families. Key programs and services offered through the community school partnership are described in more detail below.

Partnership programs and services

Community partners provide a wide spectrum of supports for students and their families. Community partners are a key element of the J.C. Nalle Community School model, providing wrap-around services, afterschool and Saturday School programming, mental health support, and open events for the community. Specific offerings are explained in further detail below to demonstrate how J.C. Nalle functions as a community school.

Afterschool program

The afterschool program provides a range of enrichment activities, particularly for younger students. NCCF staff work with school staff to operate and coordinate the afterschool program; which serves between 150 and 200 students annually. Prior to the 2012-13 school year, NCCF was responsible for planning and implementing afterschool programming for all students from 3:15 to 5:30. Since the introduction of the Extended Day schedule for grades two through five, the afterschool program begins at 3:15 for Montessori through first grade students and 4:30 for students in grades two through five. *Proving What's Possible* funds are used to fund the afterschool program for younger students while older students remain in Extended Day programming. The program consists of classroom instruction, which is preceded by supper. During instructional time, students are divided into groups by grade and activity. Staff communicate with parents about the individual needs of students and one-on-one support is provided to address both academic and nonacademic needs of students. Students receive homework assistance and are sometimes able to complete their assignments before going home. NCCF social workers are available to help with behavioral and mental health concerns as needed during the program. Play time is provided for younger children and older children participate in activities such as cheerleading, student government, and safety patrol are offered.

Saturday School

Saturday School provides all students, especially those who are struggling academically, with additional opportunities to learn. Saturday School is an enrichment program attended by 40-50 first through fifth grade students – and approximately 20 parents – annually. The program began in the 2012-13 school year and is coordinated by NCCF staff with funding from the Freddie Mac Foundation. While all students are welcome to attend, the program primarily targets third through fifth graders who are underperforming by asking teachers to encourage struggling students to attend. The program is divided into seven-week quarters that take place from 10 a.m. to 12:30 p.m. on Saturdays between October and April or early May. To encourage attendance, compensation of $150 for parents and $30 for students is provided for those who attend at least eight out of the ten Saturday sessions for each quarter. To provide additional learning experiences and to reward participation, students and parents who have each

attended at least two quarters are invited to attend a trip out of town; past trips have been to New York City and Philadelphia.

Saturday School makes learning relevant and fun for students and their families. Each Saturday, the program offers a mix of academic and nonacademic activities for students, as well as a variety of supports for parents. The day begins with breakfast for all attendees. This is followed by icebreakers, which include camaraderie-building activities such as dances and chants, as well as academically focused games and competitions. Students are divided into grade-level groups for instruction, during which time school day teachers sometimes work one-on-one with struggling students. Parents may attend parenting workshops (through a program called Parent University) or participate in their children's academic enrichment activities where they work as a team on ongoing projects throughout Saturday School. Parent University workshops are offered on topics such as financial literacy, occupational skills, health promotion, and Parenting Matters (a curriculum designed to aid parent-child communication). Parent activities are designed to increase the ability of parents to oversee the personal and academic success of their children. It should also be noted that Parent University began in the 2009-2010 school year with sessions offered during evening hours or weekends, which were incorporated into Saturday School when it began in 2012-13.

Mental and behavioral health support

NCCF staff work with many students one-on-one. A number of mental and behavioral health services are offered to the students at J.C. Nalle including: individual, group, and school-wide supports. NCCF mental and behavioral health staff has varied across the years, but generally includes two social workers and two to three interns. Mental health and behavioral support are woven throughout the school day, extended day, and Saturday School programs. NCCF staff provide individual supports that may include regularly scheduled one-on-one counseling sessions, behavioral supports as needed to help de-escalate behavioral crises, or classroom observations to support students' progress on behavioral goals. Social workers are in contact with families to monitor progress and discuss issues on a continual basis. NCCF staff also attend weekly behavior team strategy meetings, along with DCPS staff, to discuss behavioral issues and plans by grade level to collaboratively develop and monitor behavioral intervention plans for 50 to 80 students annually. The total number of students receiving behavioral and/or mental health support from NCCF staff has increased dramatically in recent years —from fewer than 100 in 2010-11 to more than 250 in 2013-14. While the intensity of services varies by student, NCCF staff have direct contact with the majority of students in the school.

NCCF staff work across school settings to foster a supportive school climate. NCCF staff provide small group or classroom-based mental health and behavioral supports. For example, social workers conduct prevention programming through small group and classroom-based activities including character education groups and workgroups for students on topics such as self-esteem, conflict resolution, problem solving, anger management, and leadership. NCCF staff recognize improved behavior by issuing a "Shining Star" award to students at the end of each month. Select students are trained as peer mediators (12 students were trained during the 2013-2014 school year). NCCF staff also provide school-wide supports. For example, when emotionally taxing events have taken place in the community, NCCF social workers have offered grief or trauma counseling to students. NCCF staff also support teachers in their role as promoters of mental health and positive behaviors. During the 2013-2014 school year, NCCF staff and school administrators partnered to develop de-escalation training for teachers and supported the creation of some in-class discipline and reward systems. School and partner staff alike work together to ensure that the mental health needs of the school community, including families, are met both through the removal of barriers to learning and by promoting mental health and positive behavior through a variety of interventions.

Supports for parents and family members

NCCF staff promote parent engagement. While parent engagement is a school-wide effort, NCCF staff take a leading role in communicating with families and providing programming to help address their needs. NCCF hired a parent outreach coordinator in 2013-2014 to help connect families with resources that could aid their child's academic progress, including providing referrals to external agencies. The parent outreach coordinator plays a key role in facilitating activities for students' families that inform parents about the school curriculum and the technology used in classrooms in fun and engaging ways like Saturday School, Family Game Night and "academic nights" that are organized by grade level. The parent outreach coordinator also works to increase parent attendance at parent-teacher conferences throughout the year. NCCF has also facilitated grandparenting groups, parent-teacher socials and breakfasts, computer and résumé writing workshops, parent cooking classes, and meetings focused on particular school problems, such as truancy. NCCF also makes a concerted effort to engage fathers. In 2008, they began hosting a program called Men in Motion, a support group for fathers who were former offenders who are integrating back into the community.

Families have increased access to a range of services. NCCF has a wide reach when it comes to families, averaging nearly 300 parent contacts annually across all their programming and events. In addition to facilitating increased family engagement at the school, NCCF social workers also refer families to various resources that can provide assistance with housing problems, truancy concerns, behavioral health issues, and employment needs. These resources include area shelters, the Department of Regulatory Affairs, the D.C. Tenant Council, and the East River Family Collaborative for assistance with housing issues, truancy concerns, behavioral health issues and unemployment needs. Any issues influencing truancy identified in these meetings, or through day-to-day interactions with families, are addressed by the combined support staff at J.C. Nalle, including school administrators, NCCF staff, and social workers from the East River Family Collaborative. Since 2010-11, NCCF staff have worked with an average of 170 families annually, conducting home visits and intervening to support families when possible (such as helping a family get to a scheduled medical appointment) to promote family stability and consistent school attendance. In the past, based on troubling events in the community, NCCF staff members have also offered trauma and grief counseling sessions and domestic violence workshops. In order to promote both parent and community engagement, NCCF organizes an annual Parent Summit for J.C. Nalle families that is open to all Marshall Heights community members. This event brings a variety of vendors to J.C. Nalle who offer information on relevant services including: DCPS happenings, housing, GED/ABE completion, financial management and credit, health (including on-site dental, eye, blood pressure, and diabetes screenings). The Parent Summit also allows parents who are entrepreneurs to showcase their products.

Summer enrichment program

J.C. Nalle students can attend a free summer enrichment program. Through DCPS, students at J.C. Nalle are eligible to attend a free six-week summer enrichment program that offers academic and cultural enrichment activities, and activities such as counseling, character education training, and information on drug and violence prevention. Campers go on field trips and participate in recreational activities ranging from tennis and basketball to tap dancing and drumming. In some years, including as recently as 2013, the program is based at J.C. Nalle. If it is not offered at J.C. Nalle, then students often attend the summer program at a nearby school. Regardless of where the program is held, NCCF staff help to run the afternoon summer enrichment program serving J.C. Nalle students (often in addition to children from other schools) from 1:00 to 5:00 p.m. during the summer months.

Cultural learning experience

Students have increased access to cultural opportunities. Since 2006, J.C. Nalle has been able to provide a selected group of fourth- and fifth-grade students the chance to participate in the Cultural Learning Experience, a five-day trip to a destination outside the continental United States during the summer. NCCF coordinates the trips and the Freddie Mac Foundation finances them. The experience is meant to be transformational for students, some of whom may have never left Washington D.C. The trip is a reward for students who have met the following criteria: achieved 90 percent school attendance, received consistently good behavior reports from both day and afterschool teachers, earned a C average, participated in Saturday School, and had parent involvement in school activities, including Saturday School and pre-trip meetings. Fourth- and fifth-grade students in the afterschool program study the culture and customs of the country or U.S. territory to be visited during the school year that precedes the trip. In past years, J.C. Nalle teachers and NCCF staff have accompanied students to Puerto Rico, England, and Costa Rica.

Freddie Mac Foundation services

Freddie Mac Foundation funds community school services at J.C. Nalle. The foundation funds the community school services that NCCF provides at J.C. Nalle. In addition to programs and services that are offered regularly throughout the year, the foundation also sponsors special programs that NCCF coordinates, such as a Thanksgiving gift basket giveaway. It also provides a direct annual grant to the school ranging between $20,000 to 25,000 that can be spent flexibly to meet whatever needs exist in a given year. At the same time, the foundation offers many services directly to the school community.

Freddie Mac Foundation staff volunteer their time. Volunteers from the Freddie Mac Corporation and foundation have served as tutors for second- and third-grade students selected by the principal each year for several years. Foundation volunteers went to the school twice a year to provide individual and group tutoring. Tutors monitored students' progress with the goal of improving test scores. The principal identified six to 10 children a year who suffered from low self-esteem but who also have an interest in building their skills to go to Freddie Mac's headquarters to develop a speech and present it in a contest that gave them a chance to win prizes. Freddie Mac has also sponsored annual school supply, uniform, and holiday drives, providing students with a variety of needed supplies, including backpacks and winter coats. Foundation volunteers also participated in a buddy program, working with at-risk students and their parents who were identified by the principal. In particular, Foundation volunteers worked with the students to improve practical skills such as counting and budgeting. Foundation volunteers also participated in a pen pal program that was open to all students, helping with penmanship, writing, spelling, and grammar. Every year, Freddie Mac volunteers have staffed field day at the school, providing a day of fun, structured outdoor activities.

Other partner services

J.C. Nalle partners with a wide array of community stakeholders. J.C. Nalle partners with a number of organizations in addition to Freddie Mac and NCCF to provide a range of activities and resources for students and their families. For example:

- ***DC Smiles*** provides free dental screenings for students during the school day.
- College students from Georgetown University tutor J.C. Nalle students two days per week during the school day and two days per week after school, as part of the ***DC Reads*** program.
- ***Lens Crafters*** has provided free eye exams and glasses.

- An ***individual donor***, Lawrence Freedman, has worked with NCCF to sponsor several events at the school, including the annual holiday party for more than 200 students and parents. This event includes gifts for students, games, holiday treats, and meetings with Santa.
- The school participates in the ***Kennedy Center's DC Partnership Schools Initiative*** in which instructors come to the school and provide arts instruction, students attend performances at the Kennedy Center, and musical ensembles perform at the school.
- Another key community school partner, ***DC SCORES***, runs an afterschool program that fosters team building and academic development through physical fitness, self-expression, and service- learning activities for third- through fifth- grade students.
- The nearby ***First Baptist Church*** provides parent meeting space and has in the past provided students with school supplies, coats, uniforms, and Thanksgiving baskets.
- The school participates in the ***Embassy Adoption*** program, through which fifth-grade classes are paired with embassies that they visit; in turn, J.C. Nalle hosts embassy staff at the school.
- Staff from the nonprofit organization ***Playworks*** oversee structured activities during recess.
- ***Duke Ellington School of the Arts*** students provide arts, dance, and drama instruction.
- The ***Fillmore Arts Center*** collaborated with NCCF to put on a school play in 2013 that highlighted the achievements of students and help from community partners.
- NCCF organizes "Safe Fridays" during the extended day program, providing students the opportunity to discuss safety concerns with officers from the ***Metropolitan Police Department***.
- ***The D.C. Rape Crisis Center*** has partnered with the NCCF counseling team to provide educational sessions for third- and fourth-grade students on sexual abuse prevention

Outcome Study

Introduction

Purpose and research questions

Via an outcomes evaluation, we investigated J.C. Nalle student performance in grades three through five and J.C. Nalle's effect on fourth and fifth grade students' growth in reading and mathematics achievement, compared with matched comparison students. An increase in math and reading proficiency rates from one year to the next is not sufficient to determine whether the introduction of a package of reforms is effective. After all, from year to year the students taking the tests change, test difficulty may vary, and the community and district environment may shift. Each of these changes can influence apparent school performance. Furthermore, changes in proficiency rates are a coarse measure of school success. They describe the proportion of students scoring above a certain cut-point on a test, but they say little about the broader distribution of student test scores or how much individual students are learning in any given year.

Therefore, through our outcomes study design, we were able to avoid these problems and determine the effect of the package of reforms introduced with the school's turnaround effort. In our outcomes evaluation, the primary outcomes of interest were fourth and fifth grade student growth in math and reading—that is, students' standardized math and reading scores accounting for the prior year's scores. We based the study on two years of pre-intervention data (2010-11 and 2011-12) and two years of post-intervention data (2012-13 and 2013-14). Our analysis used a rigorous approach that coupled propensity score matching and difference-in-difference designs. For each year of data, we matched J.C. Nalle students to comparison students first on the basis of whether or not they were attending their assigned school and then on whether they had the same or similar home neighborhoods, baseline test scores, and demographic characteristics. We then compared the difference between J.C. Nalle and matched comparison students' average annual growth in each subject before and after the interventions. By doing so, we were able to determine the effect of the reforms on student learning at J.C. Nalle.

The specific research questions addressed in our outcomes evaluation included:

- How did J.C. Nalle students in grades three through five perform in reading and mathematics, and how did the performance of J.C. Nalle students change over time from 2009-2014 as measured by the percentage of students attaining various achievement levels, average scale scores, and average gain scores?
- Among fourth and fifth graders, how did the annual academic growth of J.C. Nalle students in reading and mathematics compare with the annual academic growth of matched comparison students from the same or similar neighborhoods *before* the intervention?
- To what extent did the intervention change J.C. Nalle's effect on fourth and fifth grade student reading and mathematics growth?
- Among fourth and fifth graders, how did the annual academic growth of J.C. Nalle students in reading and mathematics compare with the annual academic growth of matched comparison students from the same or similar neighborhoods *after* the intervention?

Outcomes of interest

The outcomes evaluation focuses on student performance in reading and mathematics. In answering our first research question, which is wholly descriptive in nature, we will present data

on third through fifth grade student performance levels, average scale scores, and average gain scores in reading and mathematics in 2009-2014. In answering research questions two through four, which seek to evaluate the effectiveness of J.C. Nalle and the package of interventions J.C. Nalle introduced, we will focus on covariate-adjusted annual student growth in mathematics and reading for fourth and fifth graders in 2010-2014. These outcomes of interest are all based on student scores on the Washington, DC Comprehensive Assessment System (DC CAS), which is used for accountability purposes in the District. Washington, DC's Office of the State Superintendent for Education (OSSE) provided individual-level student data for each of these outcomes to Child Trends for the purposes of this evaluation. We present details on each of our outcomes of interest in the Methodology section.

Unexamined outcomes

Because of the grades in which students participated in the DC CAS, we did not describe J.C. Nalle student reading and mathematics performance in pre-kindergarten through second grade, and we were unable to explore the effect of J.C. Nalle on student growth in reading and mathematics in pre-kindergarten through third grade.[4]

It is important to reiterate that J.C. Nalle Community School seeks a variety of outcomes beyond improving student academic achievement in reading and mathematics, including boosting student knowledge and skills in science and social studies, building student character, providing students with cultural enrichment, and helping students and their families access health and social services.

Although measuring J.C. Nalle's direct impact on these additional academic and social-behavioral outcomes is outside the scope of the present outcomes evaluation, readers should keep in mind that the overall effectiveness of J.C. Nalle cannot be adequately described by focusing only on reading and mathematics growth in the later elementary grades. The present outcomes evaluation does not seek to assess the overall effectiveness of J.C. Nalle. Rather, it focuses on how well the school is doing in two grades and two subjects, over time.

Population of interest

For our descriptive analyses of student performance levels and average scale scores, the target population was J.C. Nalle students enrolled in third, fourth, or fifth grade in the 2009-2014 school years. Students were only included in this analysis if they had both reading and mathematics scores for the year in question, if they attended J.C. Nalle for a "full year" in the year of interest, and if the students' test scores in the relevant year were not excluded for accountability purposes because of medical exemptions, test security violations, filling out fewer than five responses on the exam, or other reasons. Students were counted as attending for a "full year" if they were enrolled in J.C. Nalle on October 5th, on the date of the assessment, and at least 80 percent of the days in between.

For our analyses of student gain scores and student growth, three additional sets of students were excluded from the analysis: all third graders, any student who was held back in grade or who skipped a grade in the present year, and any student without prior year test scores in reading and math that met all of the conditions required for present year test scores described

[4] DC CAS included second grade reading assessments during some of the years we investigated. However, these results were not reported externally, and not used in rating schools' adequate yearly progress. As a result, we did not attempt to incorporate results from second grade in our analyses.

above.[5] We made these exclusions because we needed prior year test score data to generate student gain scores and growth estimates. The reason we excluded students who were held back in grade or who skipped a grade was that their gain scores were not directly comparable to other students.

School type

In our analyses of student growth in reading and mathematics, we compare J.C. Nalle students with similar matched comparison students drawn from the same or similar neighborhoods. Because key stakeholders for the evaluation were primarily interested in how J.C. Nalle students performed relative to students in other traditional public schools, the primary analyses of student growth in reading and mathematics that we present excluded charter school students from the analyses. There is a reasonable case to be made for this approach, considering that charter and traditional public schools operate under different sets of constraints. However, because parents are typically free to select charter school options for their children, and because roughly half of the students in the District of Columbia attend charter schools, we also ran a version of our analyses that included charter school students as potential matched comparison students. This analysis enabled us to perform a sensitivity check, to see if the key findings from our analyses excluding charter school students persisted when charter school students were included in the analyses. Results from this sensitivity check are included in footnotes.

Demographics

Students

From 2010 to 2014, the vast majority of third, fourth, and fifth graders attending J.C. Nalle were black (96 percent), while the balance of students were Hispanic (for more detail see technical appendix Table A.1). While an average of eight in ten J.C. Nalle third through fifth graders were economically disadvantaged between 2009 and 2014 (that is, they qualified for free-or reduced-price lunch or their parents received SNAP or TANF), the percentage steadily declined from 94 percent in 2009 to 75 percent in 2014.[6] Just over half of the students were female (58 percent), and on average students were 9.6 years of age. Additionally, for the years that homelessness data were available (2012-2014), approximately 7 percent of J.C. Nalle students were homeless. Students' special education status and English language learner (ELL) status were defined based on whether or not they received an accommodation on the DC CAS. Across all academic years included in the study, an average of 7 percent of J.C. Nalle students received a special education accommodations and hardly any students (0.2 percent) received ELL accommodations. Roughly 1 in 5 J.C. Nalle third through fifth graders (21 percent) attended a different school in the preceding academic year.

Community

From 2009-10 to 2013-14, roughly six in ten (61 percent) J.C. Nalle students lived within the J.C. Nalle attendance zone (technical appendix Table A.1). That is, J.C. Nalle was their assigned school. The J.C. Nalle attendance zone overlapped with five different neighborhoods, as defined by Census tracts. Among students living within the attendance zone, most (52 percent of in-boundary students) lived in the same neighborhood (Census tract) as the school itself, which we

[5] The number of students excluded for being held back in grade or skipping a grade was very small ($n<5$).

[6] Students initially coded as attending a "Community Eligibility Option" school were not counted as economically disadvantaged. Eighty-seven percent of JC Nalle students who were coded as attending a Community Eligibility Option in 2014 were categorized as paying for lunch in 2013.

refer to as J-2. Across all in- and out-of-boundary J.C. Nalle students, 72 percent lived in one of the five neighborhoods overlapping the attendance zone (J-1 through J-5) (not shown in figures or tables).

Overall, the demographic composition of these areas differed from those of Washington, D.C. writ large (see Table III.1), with residents in these neighborhoods being predominantly African American, and tending to have lower incomes and educational attainment. Across the five neighborhoods in 2008-12, median family income ranged from $27,000 to $58,000 (in 2012 inflation-adjusted dollars), the vast majority of residents were black (92 to 98 percent), relatively few adults ages 25 and above had a bachelor's degree or higher (5 to 22 percent), and between 26 and 60 percent held a white collar job. While three of the five neighborhoods were comprised of very similar populations, one neighborhood had residents who had higher incomes and a higher proportion of residents with a college degree, and another had residents with comparably lower incomes and a lower proportion of residents with a college degree. The demonstrated variation in neighborhood demographics highlights the importance of taking into account neighborhood characteristics when evaluating the effect of J.C. Nalle on student outcomes. See technical appendix Figure A.1 for a summary of how many J.C. Nalle students lived in each neighborhood.

Characteristics of students included in analyses

In our evaluation of J.C. Nalle's effect on student outcomes, we are limited to examining student growth among fourth and fifth graders in years 2011-14. This is because we need baseline scores in order to evaluate student growth. Of course, not all fourth and fifth graders have eligible current and prior year and grade scores in both reading and math. Of the 299 fourth and fifth grade students with eligible reading and mathematics scores in 2011-14, 258 (86 percent) had eligible prior year and prior grade scores in the same subject. These latter students made up our analytic sample for research questions two through four. No significant differences were apparent between the analytic sample and the total sample of J.C. Nalle fourth and fifth graders with respect to grade, year, attendance zone, demographics, or student achievement (see Table A.2).

Table III.1. Characteristics of J.C. Nalle neighborhoods (Census tracts): 2008-12

Neighborhoods (Census tracts)	Median income (to nearest $1,000)[1]	Percent		
		BA degree or higher[2]	Black	White collar[3]
Washington, DC (Total)	**64,000**	**29**	**35**	**21**
JC Nalle				
J-1 (Tract 99.03)	58,000	22	96	60
J-2 (Tract 99.04)	34,000	15	92	29
J-3 (Tract 99.05)	39,000	14	98	25
J-4 (Tract 99.06)	42,000	10	97	25
J-5 (Tract 99.07)	27,000	5	96	26

[1]Median family income in 2012 inflation-adjusted dollars.

[2]Educational attainment for population 25 years and over.

[3]Percent of employed civilian population ages 16 and over who are in management, professional, and related occupations.

NOTE: JC Nalle neighborhoods are those Census tracts that overlap with the school's attendance zone.

SOURCE: Child Trends tabulations using American Community Survey, 5-year estimates, 2008-12; Census TIGER/Line shapefiles; and attendance zone information based on data from the DC Office of the Chief Technology Officer and the DC Office of the Deputy Mayor for Education.

Outcomes study methodology

Overview

To answer our first research question, we use purely descriptive analyses to generate the percentage of J.C. Nalle students scoring in various performance levels, average scale scores, and gain scores over time. In order to answer our second through fourth research questions—to investigate the influence of J.C. Nalle on its students' academic outcomes over time—we need to construct a counterfactual. In other words, we need to estimate how J.C. Nalle's students might have done if they had not gone to the school.

The ideal approach to determining J.C. Nalle's effect on academic and social-behavioral outcomes would be through an experiment in which students are assigned randomly to attend either J.C. Nalle or another school. Experimental studies provide the most unbiased evidence of programs' effectiveness, but they are not feasible in the present case. As a neighborhood school, J.C. Nalle enrolls all the students from its attendance zone whose families wish them to attend, along with some students living outside the zone whose families choose the school. Currently, there is no waiting list for students in grades K-5. As a result, there is no mechanism to randomly assign students to attend J.C. Nalle.

In the absence of random assignment, any evaluation faces the problem of selection bias. In the present evaluation, selection bias presents as the extent to which J.C. Nalle students or their context differ systematically from comparison students in ways that influence their academic outcomes. Some differences may be observed. For example, information is available on the race and ethnicity of students attending all schools in the District of Columbia. Other differences may be unobserved. For example, students attending J.C. Nalle may be more or less motivated than other students. The challenge of a non-experimental evaluation is to minimize selection bias to the greatest extent possible.

In order to minimize selection bias, we make use of a sophisticated analysis plan that couples a two-stage propensity score matching approach with a difference-in-differences analysis. In the first stage of our propensity score analysis, we identify groups of students on the basis of their neighborhood and whether or not they attend an assigned school. In the second stage of our propensity score analysis, we match within these groups according to students' propensity score—a score for each student that predicts the propensity, or likelihood, that a student will attend J.C. Nalle based on a wide array of student and family characteristics.

Finally, we perform a difference-in-differences analysis. That is, we compare the difference between J.C. Nalle students' academic growth and matched comparison students' academic growth both before and after J.C. Nalle instituted its package of reforms. We then are able to see if the difference between J.C. Nalle and matched comparison students' scores changed following the introduction of J.C. Nalle's package of reforms.

We discuss our methods pertaining to research questions two through four in greater detail below, after describing our data and key variables we used in our analyses.

Data

Data used in this outcomes evaluation originated from six different sources and spanned a total of five academic years (2009-10, 2010-11, 2011-12, 2012-13, and 2013-14). Hereafter, each academic year will be referred to by the calendar year of the spring term (e.g., the 2013-14 academic year will be referred to as 2014). The primary data source used in this evaluation was a data file provided by Office of the State Superintendent of Education (OSSE). This file provided us with data on students' (1) school enrollment, (2) standardized test scores (i.e., DC CAS mathematics and reading scale scores and proficiency levels, test accommodations, and test eligibility), (3) homelessness, and (4) addresses. Because this data file only included student address data for 2013 and 2014, student address data for the 2010-2012 academic years was collected by OSSE from DCPS and the District of Columbia Public Charter School Board and forwarded to Child Trends. Finally, supplementary data sources used in this evaluation included (1) census tract data from the American Community Survey, (2) latitude and longitude coordinates for all addresses within the District of Columbia, and (3) elementary school attendance zone shape files and maps for D.C. public and charter schools. See technical appendix Table A.3 for a detailed list of data sources.

Merging relevant data sources enabled us to obtain neighborhood characteristics for each individual student and to identify whether the student lived in or out of the school boundary of the school he or she attended. We describe our data cleaning and merging processes in the technical appendix.

Variables

Below, we present information on the outcome variables used in our analyses, along with the key independent (predictor) variables of interest. Details on control and other variables used in our analysis are provided in the technical appendix.

Outcome variables

Performance levels

Based on their DC CAS scores, students are categorized into one of four broad performance levels (from lowest to highest): below Basic, Basic, Proficient, and Advanced. These performance levels are mutually exclusive and based on cut-scores on the overall score distribution.

Scale scores

Standardized math and reading scores were derived for each student with a mean of zero (i.e., a positive score is above average and a negative score is below average). This allowed us to make more meaningful comparisons across grade levels and across years because the scale scores are based on expected (i.e., average) performance levels. See Appendix XX for a more detailed description of the procedure for calculating standardized scores.

Gain scores

In our descriptive analysis, we present findings on student gain scores. These scores are a student's score in one subject in one year and grade minus the student's score in the same subject in the previous year and grade. Because of the way that the DC-CAS scales were constructed (and thus how our scale scores were constructed), gains may be negative, zero, or positive. A negative score indicates that in a given year, the student is performing worse than they were in the prior year, relative to students at their tested grade level. A score of zero indicates that the student is performing equivalently in the current year to the prior year, relative to students at their tested grade level. A positive score indicates that a student is gaining ground—moving up in the score distribution. On average, across all students the expected gain score is zero.[7]

Student growth

In our analysis of the effectiveness of J.C. Nalle, we utilize a covariate adjusted model to measure student growth in academic achievement. In other words, we used students' prior year scale score (along with other covariates) as a predictor of their current year scale score. Thus, we estimated the prior year score's effect on the current year's score. Throughout this report, we refer to results from our analyses using a covariate adjusted model as student growth.

Key independent variables

Nalle

The primary independent variable of interest indicates whether or not an individual student attended J.C. Nalle for a full year in a given year.

Post

Post indicates whether or not an observation is from before or after J.C. Nalle's introduction of their package of reforms. Including both variables allows us to look at the interaction between J.C. Nalle and Post (i.e., does the effect of attending J.C. Nalle change after the introduction of the package of interventions?).

[7] Again, the expected gain score was slightly different from zero in our analyses due to student exclusions.

Propensity score matching

To mitigate selection bias via propensity score matching, it is necessary to think through how students are "selected" into J.C. Nalle or other schools and how this selection process could be related to our outcomes of interest. In Washington, DC, students may attend any traditional public school in the district or any charter school, if there is space. Students living in the attendance zone (also sometimes referred to as catchment area) of a given traditional public school have the right to attend that school. Because of school closures, in some neighborhoods, students may have multiple schools to which they have the right to attend. As discussed above, roughly six in 10 J.C. Nalle students are attending their assigned school.

Parents may consider a wide range of factors when selecting a school, including school performance and climate, student demographics, and convenience, among others. Parents may make an active or a passive choice regarding their student's school. That is, they may actively choose to send their child to their assigned school, to another traditional public school, to a public charter school, or to a private school. Or they may just send their child to their assigned school without considering the strengths or weaknesses of the school or any alternatives.

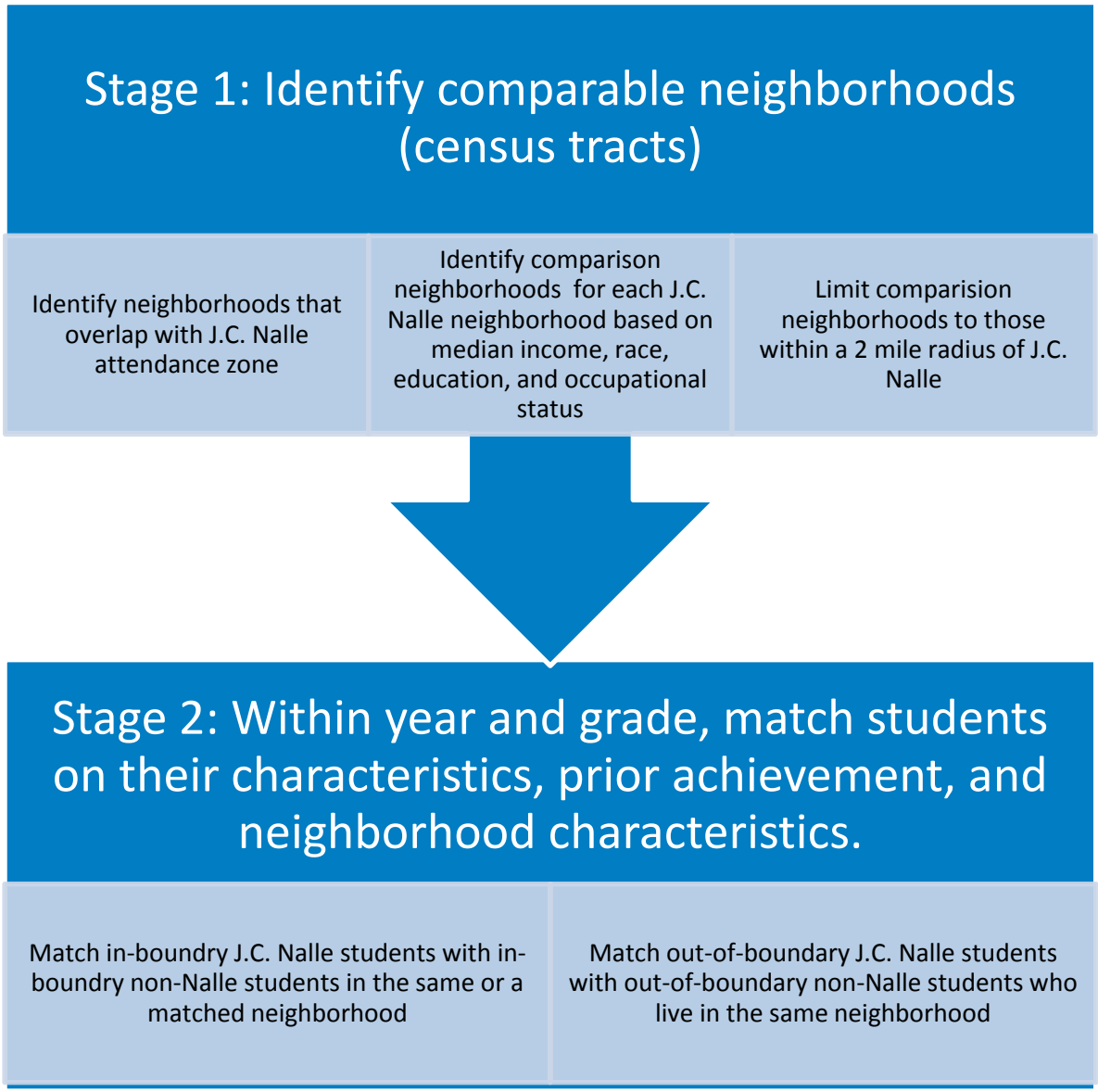
It is reasonable to assume that parents who make active choices for their child's schooling may be more involved in their child's education and may stress the importance of education more so than parents who make a passive school choice. As a result, we might expect that students attending out-of-boundary schools may score higher than students attending in-boundary schools.

At the same time, neighborhood plays a key role in schooling quality. Oftentimes, in neighborhoods with concentrated poverty, schools lack the resources they need to meet the demands placed on them by a very high-needs population. Conversely, in well-off neighborhoods, schools often look like high-performers, regardless of the learning that takes place in school, because students are entering school well-prepared and have the benefit of numerous extras like private tutoring, educational trips, and extracurricular activities. Matching students based on neighborhood makes sense because it is related to how parents make schooling choices and to student outcomes. Importantly, it helps to account for any unobserved differences between students that vary by neighborhood (e.g., social capital).

Our analysis sought the best of both worlds: the ability to match students based on whether or not they were in boundary and to match based on neighborhood. This raised a conundrum: if we defined neighborhood as school attendance zone, it would be impossible to match an in-boundary J.C. Nalle student with an in-boundary non-Nalle student in the same neighborhood. Our solution was to define neighborhood based on Census tracts, and to find neighborhoods with similar characteristics to those overlapping with J.C. Nalle's attendance zone so that we could match in-boundary J.C. Nalle students with a sufficiently large set of non-Nalle students in the same or similar neighborhoods who were also attending their assigned school (i.e., in-boundary).

Our propensity score matching process involved two stages (see Figure III.1). The first stage was to match at the neighborhood (census tract) level. That is, we matched each of the five neighborhoods that overlapped with the J.C. Nalle attendance zone to one or more neighborhoods within two miles of J.C. Nalle. We matched neighborhoods based on median family income in 2012 inflation-adjusted dollars, the percentage of the population ages 25 and over with a bachelor's degree, the percentage of the population who were black, and the percentage of the employed civilian population ages 15 and over who were in management, professional, and related occupations.

Figure III.1. Two-stage propensity score matching design



The second stage was to match at the student level. First we determined each J.C. Nalle student's home neighborhood and whether the student was in- or out-of-boundary for J.C. Nalle. For in-boundary J.C. Nalle students, we identified a pool of potential comparison students from the same or a matched neighborhood who did not attend J.C. Nalle but who did attend their assigned school. For out-of-boundary J.C. Nalle students, we identified a pool of potential comparisons students from the same neighborhood who attended a school to which they were not assigned that was not J.C. Nalle.[8] Then, within year and grade, we matched J.C. Nalle students with comparison students from the relevant pool.

[8] In our sensitivity analysis, we considered all students attending charter schools to be out of boundary.

To execute the match, we employed logistic regressions to predict a propensity score for each student, defined as the conditional probability of being enrolled as a student at J.C. Nalle given the student's value on a full set of the aforementioned covariates. Then, each student who did not attend J.C. Nalle (henceforward non-Nalle students) was selected to match each student who attended J.C. Nalle (henceforward J.C. Nalle student) that had the same or very similar propensity scores. We employed statistical techniques that are commonly used for propensity score matching (see technical appendix for a more detailed explanation)

Assessing the matching quality

We used three approaches to assess matching quality. First, we calculated and compared the standardized mean differences (henceforward SMDs) of the covariates between matched pairs after propensity score matching. Then we calculated the SMDs of propensity scores of the J.C. Nalle and non-Nalle groups. Finally, we calculated the ratio of the variances of the propensity scores in the two groups. For results based on propensity score matching to be trustworthy, the absolute SMD of propensity scores should be less than 0.25 and variance ratios should be between 0.5 and 2 (Rubin, 2001).

Difference-in-differences analysis

A difference-in-differences analysis is ideal for investigating the effect of a newly-introduced intervention given to one group but not another. In our case, J.C. Nalle students are being exposed to additional district funding, an extended day, increased technology, and Saturday programming in the current time period that they were not being exposed to previously (prior to 2012-13). Our matched comparison students will most likely not have been exposed to this same package of interventions in either time period. A difference-in-differences analysis will allow us to compare the gains shown by J.C. Nalle students over time with the gains shown by matched comparison students over time. Like propensity score matching, this approach helps to remove selection biases in comparisons between J.C. Nalle and comparison students. It also accounts for changes over time that are not due to the intervention, such as natural student development or varying levels of difficulty across two different assessment occasions. It is possible that some students from comparison schools have been exposed to similar interventions as J.C. Nalle students, particularly because many schools received a similar grant to that which J.C. Nalle received. To the extent that this is the case, our estimates of the effect of the interventions are more conservative. See Appendix C for a more detailed description of our difference-in-differences analysis.

Outcomes study results

Below, we discuss the results of our descriptive analyses, followed by the results of our matched sample analyses, which provide estimates of the effect of J.C. Nalle and its newly introduced package of reforms.

Descriptive results

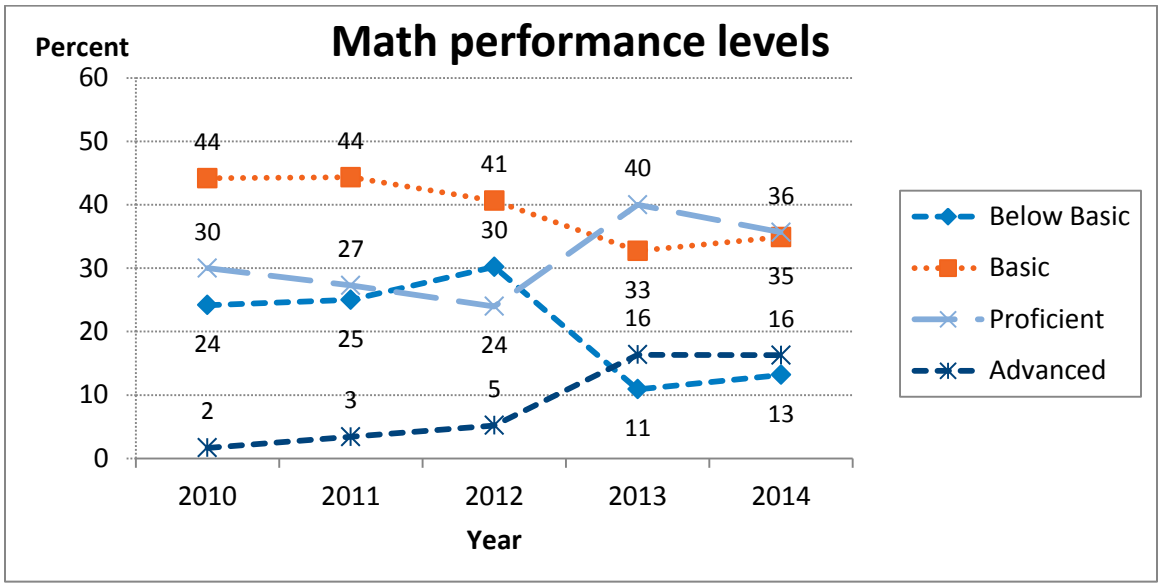
Figures III.2 through III.7 summarize J.C. Nalle students' math and reading performance on the DC CAS across all academic years included in the evaluation (2010-2014). As described previously, scale scores represent the number of points on the DC CAS that J.C. Nalle students are scoring above (positive value) or below (negative value) the district average, and gain scores represent whether J.C. Nalle students' performance on the DC CAS improves (positive value) or declines (negative value) from year to year relative to the overall distribution of scores. Annual

trends in math and reading performance before and after the J.C. Nalle intervention are described in detail below.

Math performance

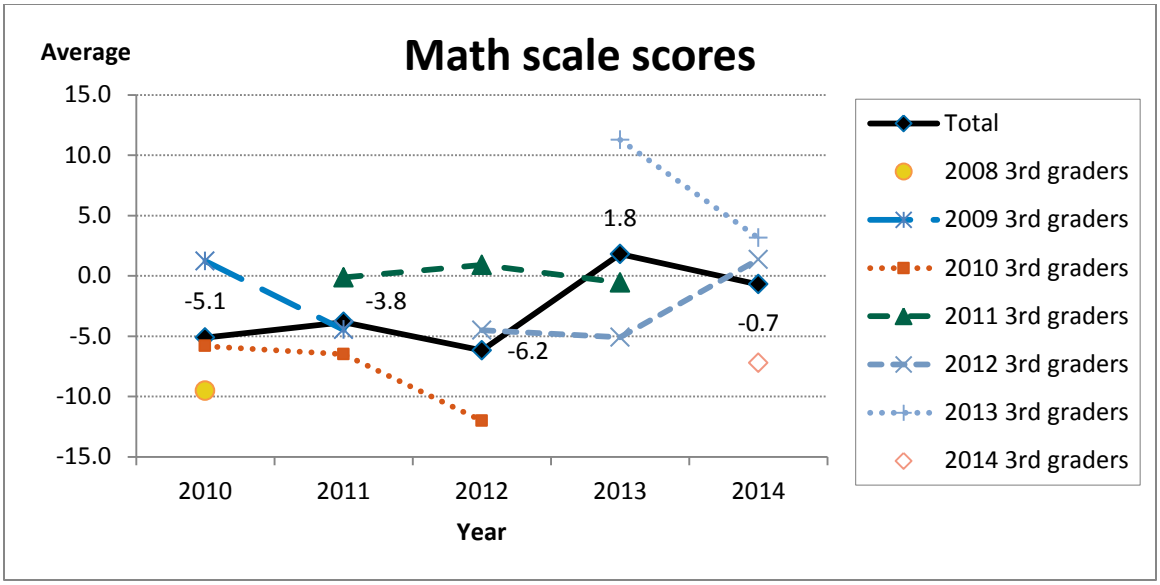
In the two years following the introduction of a package of reforms (school year 2012-13) Nalle student performance in mathematics improved with respect to all measures we examined. This included student performance levels, average scale scores, and annual gain scores in math (see Figures III.2 through III.4). Overall, the percentage of J.C. Nalle students scoring proficient or above increased from 29 percent in 2012 to 56 percent in 2013 and 52 percent in 2014 (see Figure III.2). J.C. Nalle students' scale scores and gain scores demonstrated similar patterns. Prior to the intervention, J.C. Nalle students were scoring an average of 4 to 6 points lower in math than the district average. However, immediately following the set of interventions, J.C. Nalle students scored much closer to the district average (two points higher in 2013 and one point lower in 2014) (figure III.3). Finally, prior to the intervention J.C. Nalle students' math scores were decreasing by approximately two to three points, on average, each year, and following the intervention J.C. Nalle students' gain scores improved, increasing their scores by an average of one to two points a year (see Figure III.4).

Figure III.2. Percentage of J.C. Nalle students in grades 3-5 scoring Below Basic, Basic, Proficient, or Advanced in mathematics by year: Spring 2010-2014



SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

Figure III.3. Average mathematics scale scores among J.C. Nalle third, fourth, and fifth graders by cohort and year: Spring 2010-2014



NOTE: Student cohorts include different students over time as students transfer in and out of J.C. Nalle, or get held back in grade. For ease of presentation, cohorts are referred to according to when the vast majority of students in the cohort were in third grade. For example, the "2010 3rd graders" appear on the graph as all students who were third graders in Spring 2010, all students who were 4th graders in Spring 2011, and all students who were 5th graders in Spring 2012.
SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

Table III.2. Descriptive statistics for J.C. Nalle students by grade and year: 2009-2014 school years

	Total						Grade 3						Grade 4						Grade 5					
		Year[1]						Year[1]						Year[1]						Year[1]				
	Total	10	11	12	13	14	Total	10	11	12	13	14	Total	10	11	12	13	14	Total	10	11	12	13	14
Demographics																								
Age (avg.)	9.6	9.6	9.6	9.7	9.4	9.7	8.6	8.7	8.6	8.7	8.4	8.5	9.5	9.5	9.6	9.6	9.6	9.5	10.6	10.7	10.5	10.7	10.5	10.7
Econ. Disadvantage[2] (%)	80	94	89	71	73	75	81	95	82	63	74	87	81	91	94	78	71	73	79	95	89	74	73	67
ELL[3] (%)	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0
Homeless (%)	7	—	—	7	8	6	8	—	—	6	11	8	6	—	—	4	7	5	8	—	—	11	7	6
Male (%)	42	37	42	44	46	43	43	39	46	40	58	33	46	38	44	39	40	63	39	33	36	50	40	37
Race/Ethnicity																								
Black (%)	96	96	94	96	95	97	96	100	96	94	92	97	95	91	97	96	95	97	96	95	89	97	100	96
Hispanic (%)	4	4	6	4	5	3	4	0	4	6	8	3	5	9	3	4	5	3	4	5	11	3	0	4
School mobility[4] (%)	21	—	13	20	25	23	—	—	—	—	—	—	19	—	16	17	21	22	20	—	11	20	23	24
Special education[3] (%)	7	4	1	5	8	12	5	9	4	3	3	5	9	3	0	9	12	18	6	0	0	5	10	13
Attendance Zone[5]																								
In-boundary	61	64	59	61	58	61	60	64	56	54	59	64	60	61	58	62	61	59	62	65	63	66	53	60
Neighborhood J-1	2	1	0	4	4	2	2	0	0	6	3	3	1	0	0	0	5	0	3	2	0	5	3	2
Neighborhood J-2	32	35	36	31	29	32	32	38	33	29	28	31	33	35	33	33	29	32	33	30	41	32	30	33
Neighborhood J-3	5	7	4	4	5	5	4	4	4	0	5	8	4	3	6	8	2	3	7	14	4	5	7	4
Neighborhood J-4	12	13	13	12	10	12	13	13	15	17	10	13	14	19	11	8	15	14	9	9	15	11	3	10
Neighborhood J-5	9	7	6	9	11	11	8	9	4	3	13	10	9	3	8	12	10	11	10	9	4	13	10	12

—Not available.

[1]Year labels refer to the spring of the school year (e.g., "10" refers to the 2009-10 school year).

[2]Students were characterized as economically disadvantaged if they qualified for free-or reduced-price lunch based on their family income or because their parents received SNAP or TANF.

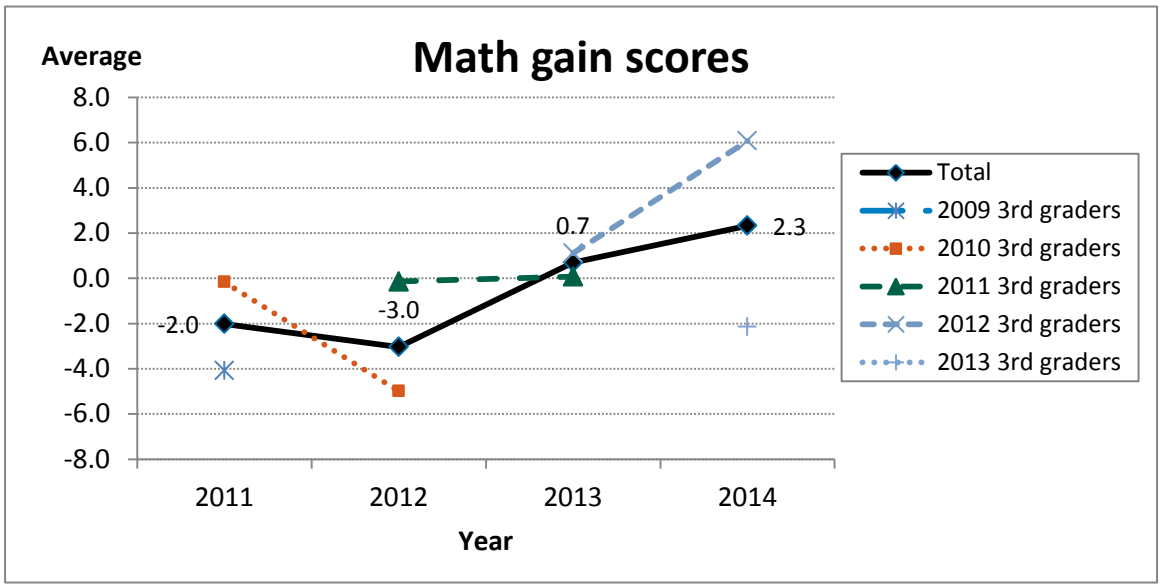
[3]Students were coded as ELL or Special Education based on whether they received accomodations on the assessment for these reasons in a given year.

[4]School mobility involves being listed as attending a different school in the prior school year than in the current school year. A small number of students who were held back in grade 3 are included in the total estimate for school mobility, but not reported separately.

[5]Data on in-boundary students may differ than that reported by the District of Columbia Public Schools because of student address cleaning Child Trends performed for this project. Neighborhoods J-1 through J-5 refer to Census tracts 99.03 through 99.07, which are those tracts that overlap with Nalle's school attendance zone.

SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Office of the Chief Technology Officer, DC Office of the Deputy Mayor for Education, and U.S. Census TIGER/Line Shapefiles.

Figure III.4. Average mathematics gain scores among J.C. Nalle fourth and fifth graders by cohort and year: Spring 2010-2014



NOTE: Student cohorts include different students over time as students transfer in and out of J.C. Nalle, or get held back in grade. For ease of presentation, cohorts are referred to according to when the vast majority of students in the cohort were in third grade. For example, the "2010 3rd graders" appear on the graph as all students who were 4th graders in Spring 2011 and all students who were 5th graders in Spring 2012.
SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

By grade and year

Inconsistent patterns emerge when examining the changes in J.C. Nalle students' math performance before and after the intervention by grade level. For example, in 2013 the percentage of students who scored Proficient or above increased by 50 percent for third graders and 43 percent for fifth graders, and decreased by four percent for fourth graders. However, in 2014 the percentage of students, who scored Proficient or above, decreased by 50 percent for third graders, and increased by 28 percent for fourth graders, and 11 percent for fifth graders.

One potential explanation for these conflicting patterns is that the number of students within J.C. Nalle is very small, and because of this, percentages and averages are likely to fluctuate over time. Another potential explanation for this inconsistency is cohort effects, where different classes of students (e.g., the class of students who were third graders in 2010, fourth graders in 2011, and fifth graders in 2012) happen to have different demographic characteristics or academic backgrounds. Variability in teacher effectiveness may also influence results by grade over time. Teachers looping with students can compound these effects.

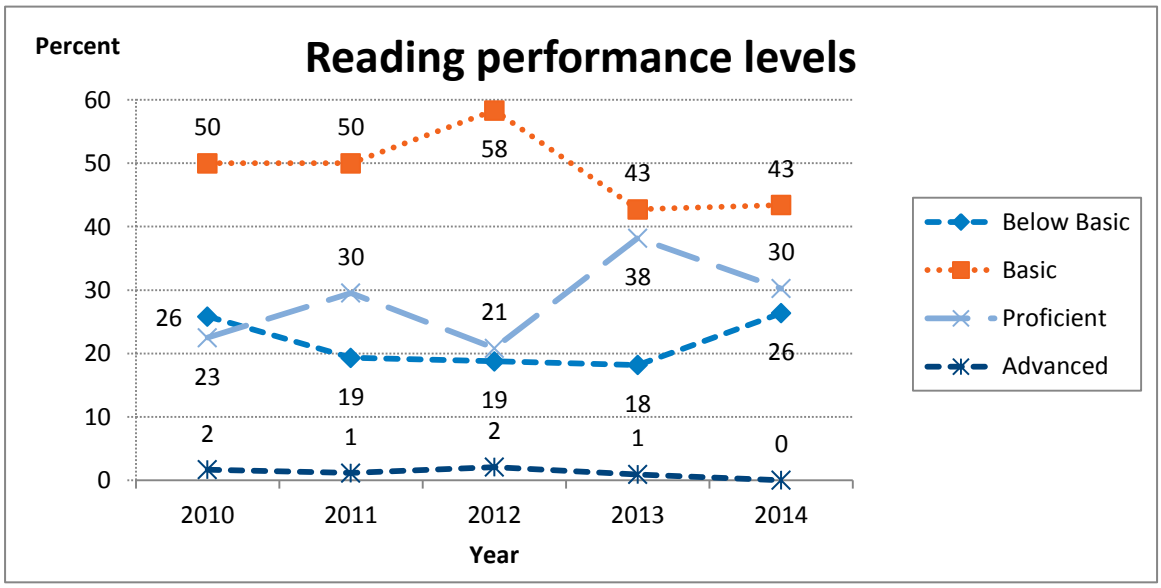
Figures III.3 and III.4 present results for average mathematics scale scores and gain scores by 3rd grade cohort. For ease of presentation, cohorts are referred to according to when the vast majority of students in the cohort were in third grade. For example, the "2010 3rd graders" that appear on Figure III.3 are all students who were third graders in Spring 2010, all students who were fourth graders in Spring 2011, and all students who were fifth graders in Spring 2012. Note

that there are changes in the composition of the cohorts over time as students transfer in or out of school or when students are held back in grade. It is difficult to draw firm conclusions based on cohort findings, because there are relatively few cohorts, the size of each cohort is small, and the cohorts are tracked for a relatively short period of time. Nonetheless, Figures III.3. and III.4 suggest that certain cohorts drove improvements in mathematics. For example, 2012 third graders boosted total average mathematics gain scores as 2013 fourth graders and 2014 fifth graders. The performance differences among cohorts of J.C. Nalle students underscore the importance of controlling for prior academic performance, grade, and year in any evaluation of student academic outcomes.

Reading performance

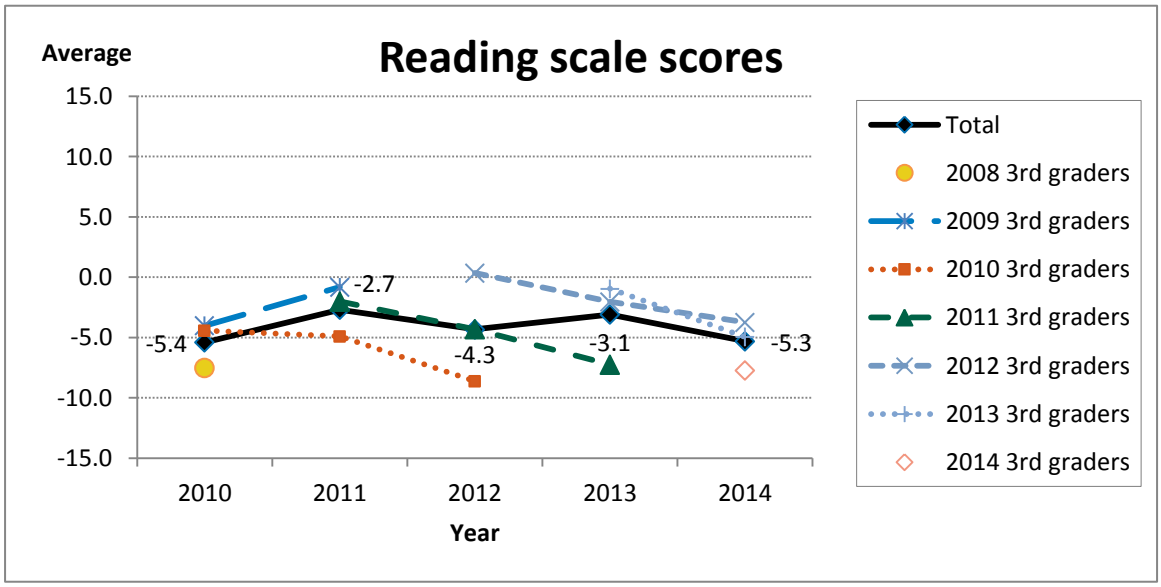
There were mixed findings across the measures of reading performance from before to after the intervention (see Figures III.5 through III.7). The percentage of students scoring Proficient in reading increased in 2012-13; however, that number decreased the following year while the percentage of students scoring below Basic increased. Average reading scale scores were relatively flat over time (see Figure III.6), while gain scores were trending somewhat downward (see Figure III.7).

Figure III.5 Percentage of J.C. Nalle students in grades three through five scoring Below Basic, Basic, Proficient, or Advanced in reading by year: Spring 2010-2014



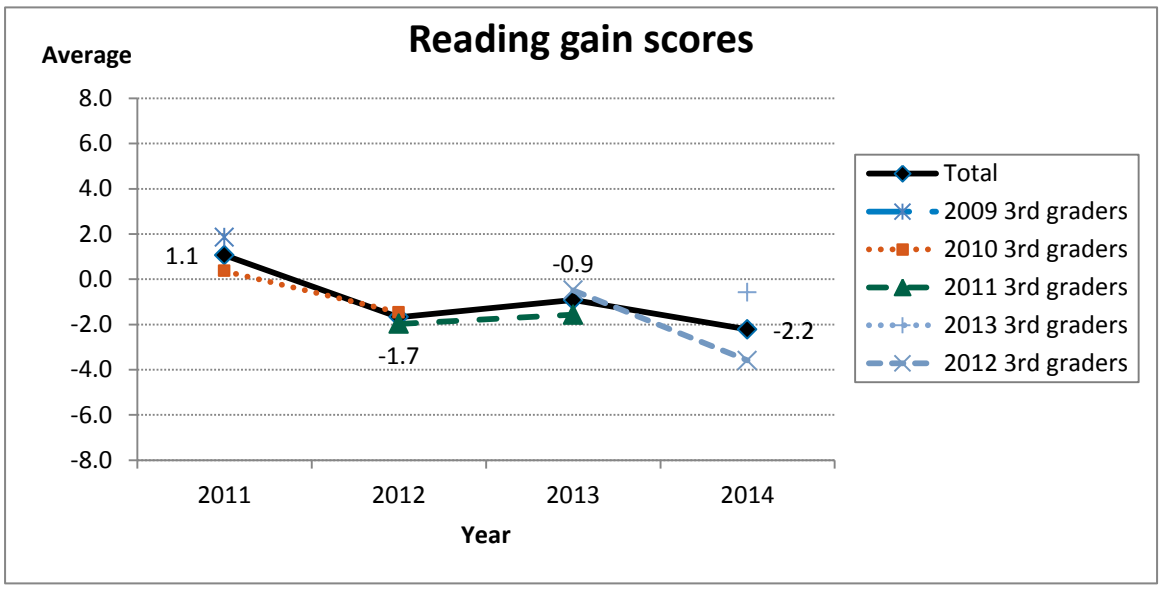
SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

Figure III.6. Average reading scale scores among J.C. Nalle third, fourth, and fifth graders by cohort and year: Spring 2010-2014



NOTE: Student cohorts include different students over time as students transfer in and out of J.C. Nalle, or get held back in grade. For ease of presentation, cohorts are referred to according to when the vast majority of students in the cohort were in third grade. For example, the "2010 3rd graders" appear on the graph as all students who were third graders in Spring 2010, all students who were 4th graders in Spring 2011, and all students who were 5th graders in Spring 2012.
SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

Figure III.7. Average reading gain scores among J.C. Nalle fourth and fifth graders by cohort and year: Spring 2010-2014



NOTE: Student cohorts include different students over time as students transfer in and out of J.C. Nalle, or get held back in grade. For ease of presentation, cohorts are referred to according to when the vast majority of students in the cohort were in third grade. For example, the "2010 3rd graders" appear on the graph as all students who were 4th graders in Spring 2011 and all students who were 5th graders in Spring 2012.
SOURCE: Child Trends' tabulations of Washington, DC Office of the State Superintendent of Education data.

Propensity score matching results

Neighborhood-level matching

As detailed in the technical appendix (see Table A.2), each J.C. Nalle neighborhood (Census tract) was matched with one to four non-Nalle neighborhoods based on four demographic characteristics: median family income, percentage of residents who were black, percentage of individuals ages 25 and above with a Bachelor's degree or higher, and percentage of employed individuals ages 16 and above in a white collar job). Following the matching, matched census tracts were comparable (within .15 standard deviation) on median income, educational attainment, and employment. Although we were unable to match census tracts within .15 of a standard deviation on the proportion of residents ages 16 and above in a white collar job, none of these differences were statistically significant, indicating balance between the matched J.C. Nalle and non-Nalle neighborhoods. We limited matched neighborhoods to those within a two-mile radius of J.C. Nalle.

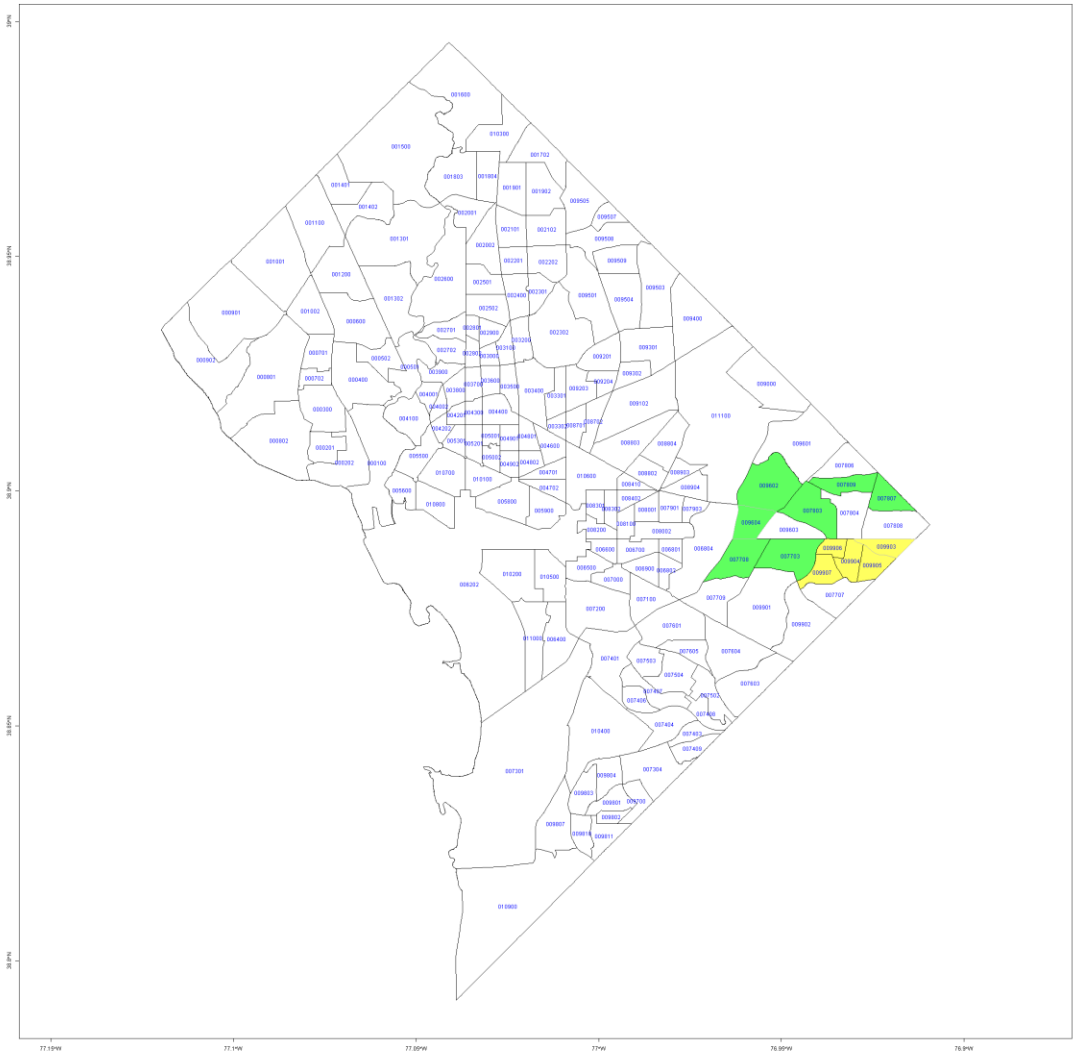
The matched neighborhoods are highlighted in Figure III.8, below. Details on matched neighborhood demographics are presented in the technical appendix (see Table A.3).

Student-level matching

Before matching, J.C. Nalle and non-Nalle students were significantly different with respect to economic disadvantage, race, school mobility, special education, and prior year reading and mathematics scores (technical appendix Table A.4). The largest difference was for the race category, where the difference between J.C. Nalle and non-Nalle students was nearing one standard deviation (0.79).

After matching, differences between J.C. Nalle and non-Nalle students on all covariates were under 0.15 standard deviations and none of the differences were statistically significant; this indicated balance between the matched J.C. Nalle and non-Nalle groups conditional on observed covariates. See the technical appendix, table A.4 for details.

Figure III.8. J.C. Nalle and matched comparison neighborhoods



NOTE: J.C. Nalle neighborhoods are those that overlap with the school's attendance zone. Neighborhood J-1 is matched with M-7; J-2 is matched with M-3 and M-5; J-3 is matched with M-1, M-2, M-3, and M-5; J-4 is matched with M-2 and M-5; J-5 is matched with M-4 and M-6.
SOURCE: Census TIGER/Line shapefiles; and attendance zone information based on data from the DC Office of the Chief Technology Officer and the DC Office of the Deputy Mayor for Education.

Difference-in-difference results

Tables III.3 and III.4, below, show regression results for samples after matching for mathematics and reading, respectively. As explained in the technical appendix, regressions were weighted to reflect the fact that one J.C. Nalle student could be matched to multiple comparison students who had exactly the same propensity score, and vice versa.

Table III.3. Regression results for mathematics growth after matching

	Scale Score		
	Estimate		Standard Error
Intercept	3.79		9.067
Nalle	-0.22		1.085
Post	1.19		1.422
Nalle*post	3.84	**	1.473
Prior year math scaled score	0.60	***	0.034
Prior year reading scaled score	0.30	***	0.042
In boundary[1]	-0.13		1.030
2011[2]	1.61		1.221
2013[2]	0.65		1.052
Grade 5	2.10	.	1.114
Age	-0.67		0.796
Economic Disadvantage[3]	0.48		1.052
Homeless	6.96	**	2.386
Male	-0.28		0.799
Black	-0.28		4.780
School mobility[4]	-1.70		1.329
Special Education[5]	-5.50	***	1.392

*p < 0.05

**p < 0.01

***p < 0.001

[1]Data on in-boundary students may differ than that reported by the District of Columbia Public Schools because of student address cleaning Child Trends performed for this project.

[2]Year labels refer to the spring of the school year.

[3]Students were characterized as economically disadvantaged if they qualified for free-or reduced-price lunch based on their family income or because their parents received SNAP or TANF.

[4]School mobility involves being listed as attending a different school in the prior school year than in the current school year.

[5]Students were coded as Special Education based on whether they received accomodations on the assessment for this reason in a given year.

NOTE: Neighborhood fixed effects are not presented in this table for brevity. They are available from the authors upon request.

SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Office of the Chief Technology Officer, DC Office of the Deputy Mayor for Education, and U.S. Census TIGER/Line Shapefiles.

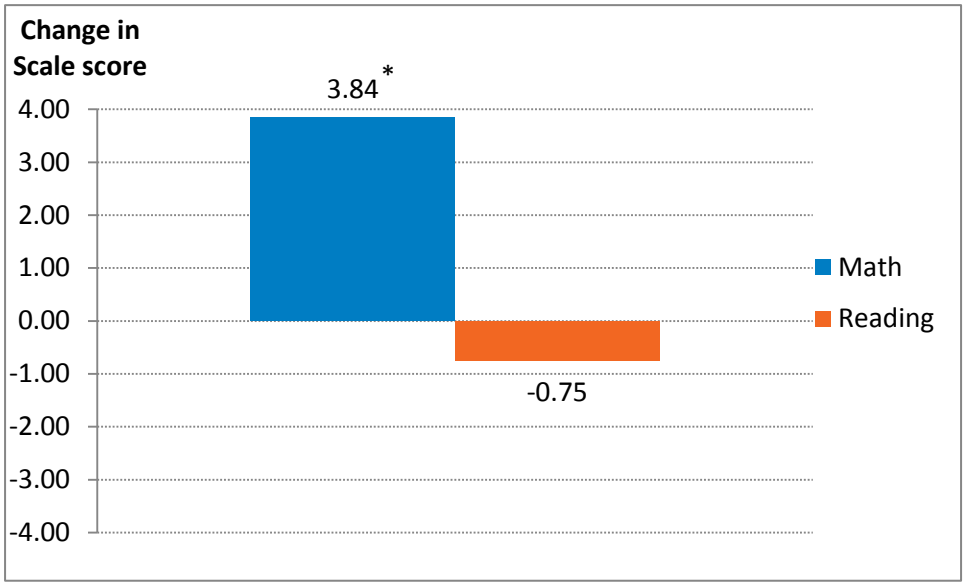
Mathematics growth

The key parameters of interest in Table III.3 are the coefficient on the variable for whether or not a student attended J.C. Nalle in the year of interest and the coefficient on the interaction term between this variable and a variable for whether or not the year of interest is after J.C. Nalle introduced its package of reforms (i.e., the change in the effect of attending J.C. Nalle after the introduction of the package of interventions).

The coefficient on the J.C. Nalle variable (*B*=-0.22) is not statistically significantly different from zero. This indicates that **before the intervention, there was no statistically significant difference between the average annual mathematics growth of J.C. Nalle students and matched comparison students, after controlling for neighborhood fixed effects and the variables included in table III.5**.

The coefficient on the interaction term between the J.C. Nalle variable and the post-intervention variable was 3.84, and was statistically significantly different from zero. This indicates that **J.C. Nalle students performed better in mathematics after the intervention than before the intervention, even after controlling for any changes in student characteristics.** After the intervention, J.C. Nalle students demonstrated annual academic growth in mathematics that was, on average, 3.84 points (0.23 s.d.) higher than J.C. Nalle students did prior to the intervention.[9]

Figure III.9. Effect of the intervention on J.C. Nalle students' mathematics and reading growth

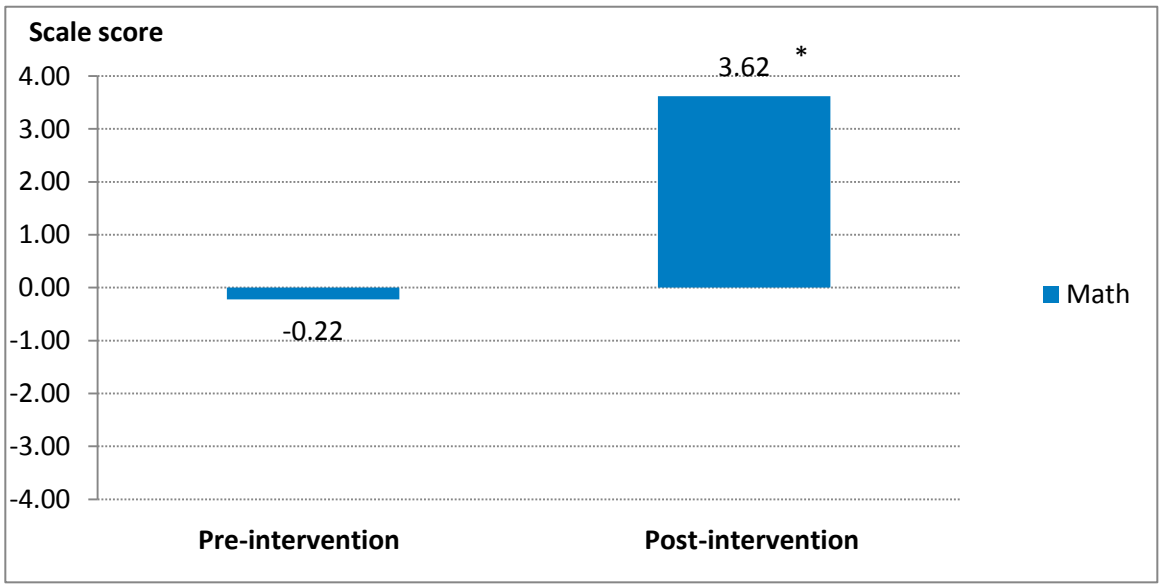


*p<.05. Statistically significantly different from zero.
NOTE: Effects were estimated using J.C. Nalle and matched comparison students. Student growth refers to covariate adjusted mathematics and reading scores that take into account prior year mathematics and reading scores. The pre-intervention time period includes the 2010-2011 and 2011-12 school years; post-intervention includes the 2012-13 and 2013-14 school years.

[9] In our sensitivity analysis that included charter school students, the effect of the intervention on J.C. Nalle student math growth was also statistically significant, and it was similar in magnitude and direction (4.08 points in the sensitivity analysis versus 3.84).

By linearly combining (i.e., adding together) these two coefficients, we can identify J.C. Nalle's average effect on students' annual mathematics growth after the intervention, relative to matched comparison students, controlling for all other variables in the regression. **After the intervention, J.C. Nalle students demonstrated covariate-adjusted annual academic growth in mathematics that was 3.62 points (0.21 s.d.) higher, on average, than matched comparison students (figure III.10)** (t=3.67, p<.01).[10]

Figure III.10. J.C. Nalle fourth- and fifth-grade students' mathematics growth in comparison to matched students, pre- and post-intervention: 2010-2014



*p<.05

NOTE: Effects were estimated using J.C. Nalle and matched comparison students. Student growth refers to covariate adjusted mathematics scores that take into account prior year mathematics and reading scores. The pre-intervention time period includes the 2010-2011 and 2011-12 school years; post-intervention includes the 2012-13 and 2013-14 school years.

The coefficient on the prior year's math scaled score was positive, and highly statistically significant, but it was also less than 1 (0.6). This signifies that utilizing a coefficient-adjusted academic growth model better fit the data than would using a gain score model that would fix the coefficient on the prior year's scaled score at 1.

The coefficient on the prior year's reading score was also positive and highly significant, indicating that reading ability helps predict mathematics growth. The magnitude of the coefficient was roughly half that of the lagged mathematics coefficient.

[10] In our sensitivity analysis that included charter school students, J.C. Nalle's post-intervention effect on student math growth was also statistically significant and positive. That is, J.C. Nalle students performed better than matched comparison students in mathematics in the post-intervention period when charter school students were included in the comparison group. Twenty-seven percent of comparison group students were charter school students in the sensitivity analysis.

The other statistically significant individual coefficients in Table III.3 were homeless status, which was positively related to mathematics growth, and receipt of special education accommodations, which was negatively related to mathematics growth. While the special education effect was in the expected direction, we believe the homelessness result to be a peculiarity of our analytic sample, likely driven by the very small number of homeless students included in the analysis.

Reading growth

As in the mathematics model, the parameters of interest in the reading model (Table III.4) are the coefficient on the variable indicating whether or not a student attended J.C. Nalle in the year of interest and the coefficient on the interaction term between this variable and the post-intervention variable.

Table III.4. Regression results for reading growth after matching

	Scale score		
	Estimate		Standard Error
Intercept	0.10		7.886
Nalle	-0.99		0.943
Post	2.85	*	1.237
Nalle*post	-0.75		1.281
Prior year reading scaled score	0.64	***	0.037
Prior year math scaled score	0.15	***	0.030
In boundary[1]	-1.82	*	0.896
2011[2]	4.06	***	1.062
2013[2]	0.52		0.915
Grade 5	0.89	.	0.969
Age	-0.12		0.692
Economic Disadvantage[3]	0.29		0.915
Homeless	1.60		2.075
Male	-2.36	***	0.695
Black	1.01		4.157
School mobility[4]	3.79	**	1.156
Special Education[5]	-1.86		1.211

*p < 0.05

**p < 0.01

***p < 0.001

[1]Data on in-boundary students may differ than that reported by the District of Columbia Public Schools because of student address cleaning Child Trends performed for this project.

[2]Year labels refer to the spring of the school year.

[3]Students were characterized as economically disadvantaged if they qualified for free-or reduced-price lunch based on their family income or because their parents received SNAP or TANF.

[4]School mobility involves being listed as attending a different school in the prior school year than in the current school year.

[5]Students were coded as Special Education based on whether they received accomodations on the assessment for this reason in a given year.

NOTE: Neighborhood fixed effects are not presented in this table for brevity. They are available from the authors upon request.

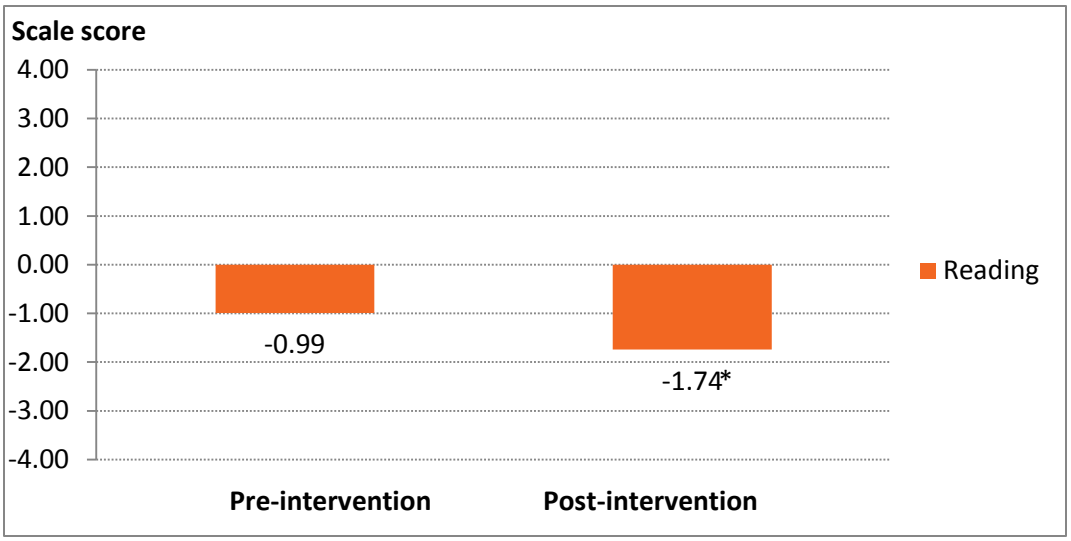
SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Office of the Chief Technology Officer, DC Office of the Deputy Mayor for Education, and U.S. Census TIGER/Line Shapefiles.

In the reading model, the coefficient on the J.C. Nalle variable (*B*=-0.99) was not statistically significantly different from zero. This indicates that **before the intervention, there was no statistically significant difference between the average annual reading growth of J.C. Nalle students and matched comparison students, after controlling for neighborhood fixed effects and the other variables included in table III.6**. This finding was similar to that for mathematics.

The coefficient on the interaction term between the J.C. Nalle variable and the post-intervention variable was -0.75, and was not statistically significantly different from zero. This indicates that, controlling for any changes in student characteristics, **J.C. Nalle's average annual student reading growth was not statistically significantly different after the intervention than it was before. This implies that the package of interventions did not improve student reading growth.**[11] This finding contrasts with the results for mathematics.

Nalle students' average annual student reading growth was 1.74 points (0.12 s.d.) lower than that of matched comparison students after the intervention (*t*=-2.04, p<.05).[12] This suggests that J.C. Nalle's underperformance relative to the district in reading was not just the result of their student population; their students were somewhat underperforming matched peers in the post-intervention period. Post-intervention, the magnitude of J.C. Nalle's reading effect was roughly half the magnitude of its mathematics effect.

Figure III.11. J.C. Nalle fourth- and fifth-grade students' reading growth in comparison to matched students, pre- and post-intervention: 2010-2014



*p<.05. Statistically significantly different from zero.
NOTE: Effects were estimated using J.C. Nalle and matched comparison students. Student growth refers to covariate adjusted reading scores that take into account prior year reading and math scores. The pre-intervention time period includes the 2010-11 and 2011-12 school years; post-intervention includes the 2012-13 and 2013-14 school years.

[11] Similarly, in our sensitivity analysis that included charter school students, there was no statistically significant effect of the intervention on J.C. Nalle student reading growth.
[12] Similarly, in our sensitivity analysis that included charter school students, J.C. Nalle students under-performed matched comparison students in the post-intervention period with respect to reading growth.

The coefficient on the prior year's reading scaled score was positive, and highly statistically significant (*B*=0.64). As with the mathematics model, the fact that this coefficient was less than one signifies that utilizing a coefficient-adjusted academic growth model was a more appropriate choice than using a gain score model that would fix the coefficient on the prior year's scaled score at 1.

The coefficient on the prior year's mathematics score was also positive and highly significant, indicating that mathematics ability helps predict reading growth. The magnitude of the coefficient (*B*=0.15) was roughly a quarter that of the lagged reading coefficient.

In our sample, students who were in boundary (*B*=1.82) and male students (*B*=-2.36) demonstrated lower academic growth in reading than did their peers, while students who had switched schools the prior year unexpectedly demonstrated higher growth in reading (*B*=3.79).

Summary and conclusions

The introduction of a package of reforms during the 2012-13 school year improved J.C. Nalle's performance with respect to mathematics growth, but did not have any statistically significant effect on reading growth. As a result, in the post-intervention period J.C. Nalle students outperformed matched comparison students on mathematics growth. In contrast, J.C. Nalle students underperformed with respect to reading growth. Because of our sensitivity analysis, we know that these findings generally held regardless of whether or not charter school students were included in the comparison group.

The magnitude of the positive effect of the package of reforms on J.C. Nalle's mathematics performance is substantial. An effect size of 0.23 standard deviations translates into roughly five months of learning above the average year's worth of learning in math for third through fifth graders.[13] Because J.C. Nalle students were roughly on par with matched comparison students from traditional public schools prior to the intervention, in the post-intervention period, holding all else equal, J.C. Nalle students are learning almost an additional five months' worth of learning in mathematics per year.

It is important to note that J.C. Nalle's mathematics effect increases as students spend more time in the school, but that it is also undercut by relatively poor reading performance. To demonstrate this, we simulate results for a typical (modal) J.C. Nalle student who was in fourth grade in 2013 and fifth grade in 2014.[14] We assume that her third grade scores were at the 50th percentile in both reading and mathematics. Based on the models we developed above, we would expect her mathematics score to improve to the 55th percentile in grade four, and the 59th percentile in grade five. In comparison, if she did not attend J.C. Nalle, we would expect her score to drop to the 46th percentile in both grade four and five. Thus, attending J.C. Nalle would lead to a nine-percentile point gain in one year, and a 15-percentile point gain over two years.[15]

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[13] Across six standardized mathematics tests, Bloom, Hill, Black, & Lipsey (2008) found an average effect size of 0.52 and 0.56 for average annual gains in mathematics for the transition from grade 3 to 4 and grade 4 to 5, respectively. By taking the midpoint (0.54) and dividing by 12 months, we get 0.045 s.d. per month. Dividing our estimate of 0.23 by 0.045, we get 5.1 months.

[14] We assume this student was an in-boundary, economically disadvantaged black female, aged 9.6 years old, living in the J-2 neighborhood. We further assume that, like most of her peers, she was not a special education student, not homeless, and she attended J.C. Nalle in grade 3.

[15] Note that Nalle's effect on reading diminishes mathematics gains in the second year in our model.

In reading, the typical J.C. Nalle student would expect a relative five-percentile point drop in reading in one year, with no relative change in year two.

Thanks to its recently introduced package of interventions, J.C. Nalle has turned around its mathematics performance, to the point where the school is substantially out-performing matched comparison students. The school's performance with respect to reading leaves room for improvement. The findings of our implementation study, presented in the next chapter, help explain what may have caused the pattern of results we found in the outcomes study with respect to mathematics and reading. We also provide some potential solutions for how to best help students who are struggling in reading.

Implementation Study

Purpose and overview of methods

While outcomes evaluations can tell us whether or not programs or school interventions lead to changes in children's outcomes, implementation evaluations can shed light on what particular efforts may have led to these changes. Implementation evaluations also provide important context, which is critical for understanding how interventions unfold as they do.

J.C. Nalle, Freddie Mac Foundation, and NCCF ascribed much of the school's academic success during the 2012-2013 school year to three activities funded through the DCPS *Proving What's Possible* grant and Freddie Mac Foundation grants shortly before increases in test scores were found: 1) technology investments in tablets, interactive online educational games and electronic white boards that were used to support individualized instruction; 2) the extension of the school day for students in grades 2 through 5; and 3) the Saturday School program targeted to low-performing students and their parents. **As such, the purpose of our implementation evaluation was to examine the extent to which these or other factors seemed to explain the changes in reading and math test scores.**

Implementation study findings in context

After being included on a list of schools at risk for closure in 2011, J.C. Nalle students' DC CAS reading and mathematics test score gains were among the highest in DC public elementary schools in 2012-2013. Results of Child Trends' independent analysis showed that improvements were sustained in math, but not in reading. In particular, when we examined data through a more rigorous comparison group study design, we found that math scores for fourth- and fifth-grade students from J.C. Nalle increased from 2010 to 2014, a timeframe covering the periods immediately before and after the introduction of the package of interventions described above. Furthermore, we found that in the years after the introduction of a package of interventions, J.C. Nalle students outperformed matched students from similar backgrounds in math. During this post-intervention timeframe, J.C. Nalle students continued to struggle in reading, performing slightly less well than their matched peers.

Implementation study design

Research questions

This section of the report addresses the following research questions:

- What factors are most likely to have contributed to changes in J.C. Nalle students' academic achievement?
- How much was invested to support J.C. Nalle and its turnaround effort? How might the effort be sustained?

Data collection and analysis

To respond to these questions, we relied on a variety of informational sources and data collection methods, including:

- in-depth interviews with the J.C. Nalle principal, current and former senior administrative staff, teachers, parents of enrolled students, and current and former staff of the Freddie Mac

Foundation and the National Center for Children and Families (totaling 20 interview respondents);
- focus groups with a sample of approximately 20 parents of enrolled students;
- focus groups with a sample of approximately 17 enrolled students;
- an online survey of a sample of four teachers;
- reviews of documents from J.C. Nalle and its partner organizations (e.g., materials related to the partnership establishment, program and school activities, parent engagement activities, and program costs);
- review of enrollment and attendance data for J.C. Nalle programs; and
- first-hand observations of the school and selected activities.

To analyze the large amount of data collected for this ambitious research endeavor, our research team used NVivo, a qualitative analysis software, to help identify themes running through our findings. SurveyMonkey software was used to analyze online survey data.

Implementation study findings

Based on interviews, surveys, and focus groups with all key stakeholders, as well as knowledge of the relevant research literature, Child Trends concluded that the following factors contributed to the improvement in math scores:

- increased individualized and data-informed instruction that resulted from the infusion of iPads, online educational games and other interactive technologies used to support learning inside and outside of the classroom; and
- the additional academic instructional time received by students through the extended and reconfigured school day as well as the supplemental academic enrichment activities received outside of the traditional school day, such as during Saturday School.

In addition to these key driving factors, our research suggests that the community school benefited from several foundational factors that fostered and supported student learning, including individualized supports for students with behavioral and emotional problems, a positive school climate, reduced school truancy, and other school-level factors, such as high academic expectations and retention of high-quality educational leaders and teachers. Our findings are summarized in greater detail below.

Key driving factors

Technology

Technology investments were used to effectively engage students in learning, through the use of iPads, online educational programs and electronic white boards in the classrooms.

These tools provided another platform for teachers to provide individualized and data-based instruction.

Students, parents, school teachers and administrators from J. C. Nalle and staff from the Freddie Mac Foundation and NCCF all reported that technology played a key factor in helping to boost Nalle's student achievement scores. As was noted in earlier sections of this report, the school used a significant portion of an influx of funds it received from the foundation and from the school district's *Proving What's Possible* grant in spring 2012 to invest in technology. This additional funding enabled the school to purchase computers, laptops, and iPad tablets for use inside and outside of classrooms; large-screen interactive Promethean whiteboards to help guide lessons in classrooms; and licenses for online educational programs designed to build math

skills, Spatial-Temporal Math (ST Math)[16] and First in Math.[17] In the school-year following the large increases in DC CAS reading and math scores, J.C. Nalle purchased Lexia, an online educational program focused on reading. Findings from our analyses suggest that the use of interactive online education programs, particularly those focused on building math skills, seemed to be a key factor in driving the improved math test scores. In addition, informants reported the use of tablets as an effective way to help support students' use of the online programs. Finally, the interactive, electronic white boards used in classrooms were noted as being effective in engaging students in learning as well.

Online educational programs were effective in engaging students in learning.

In particular, study participants mentioned ST Math and First in Math programs which were both introduced at the beginning of the 2012-2013 school year. Both programs are aligned with Common Core standards and cover a set of concepts in each grade level. Teachers use ST Math to produce reports on student needs, allowing them to provide more individualized instruction. Because it is based online, students can access ST Math from classroom computers as well as tablets and laptops. An online educational reading program, Lexia, was introduced a year later at the beginning of the 2013-2014 school year, but it was mentioned less frequently and by fewer students than the math programs. In addition, according to school administrative leaders, Lexia was not implemented with fidelity during the 2013-2014 school year, due in part to the fact that several reading teachers were on extended leave.

In one of the student focus groups, children were so excited to talk about the online math programs that they debated amongst themselves before deciding who would get to speak first. On the basis of comments from parents, teachers, staff, and the children themselves, it was obvious that the students were effectively engaged in using the online programs because they found them to be not only challenging and educational, but be fun.

In a sequence, children enthusiastically described how the math programs work, referencing them as "games," as opposed to programs: "*First in Math. It's a strategy game*." The children then went on to share the satisfaction they experience as they progress through different levels and reached the "Super Challenge." Parents who participated in interviews and focus groups also provided several examples of how the online educational programs were effective in engaging children:

> *"They set it up as games and they love it because it is games."*

Teachers who were interviewed also provided examples of how the programs help to engage students:

[16] Spatial-Temporal (ST) Math is a web-based program that uses mainly visual, language-and-symbol free animations to expose students to math concepts. Progression through the ST Math activities occurs at the rate each student can master the material; students will not move on past an activity on which they are struggling.

[17] First in Math (FIM) is an interactive, online program designed to reinforce basic math skills from addition and subtraction to exponents and early algebra. Students can also use FIM to practice other math-related concepts such as measurement and problem solving. Divided into six different modules, FIM content is generally numbers-based and increases in difficulty with grade level.

"[The] good thing about blended learning[18] is all the kids are interested in using the computer to solve problems. Students who struggle tend to give up easily. In that sense, it's really good… With math, it helped a lot."

Online educational programs help to engage students through rewards systems that foster healthy competition among students.

In addition to being fun, the students were enthusiastic about the reward systems in place through the game itself as well as in the classroom. Because teachers monitor students' progress, students receive recognition in the classroom as they reach higher levels. Interview respondents also reported that the children seem to enjoy the competitive aspect of the game, especially since it is linked to rewards. According to one staff member, the friendly competition among students can also sometimes translate into help:

"The ones that are higher [at a higher level], they will help the ones on the lower levels…they like to show each other –'that's not how you do it'…"

In addition to effectively engaging students in educational activities, respondents identified several reasons why the online educational games may help improve math test scores.

Some of the factors noted include that it is aligned with what they are learning in school; it is sequenced with progressively challenging games at each level; teachers can monitor students' progress and identify areas in which individual students need more help; and high levels of students complete the curriculum for their grade level by the end of the school year.

Students are provided with an individual account which allows the program to track their progress. In addition, teachers and students noted that the software assesses students' skills at baseline and presents students with various levels to complete. The program also allows teachers to control the types of skills that students can access. Teachers explained that the program allows them to track student progress and one teacher noted that it will "*throw up a red flag to let you know that something is going wrong*."

When students were asked how the programs help them to learn and do better in math, the children noted that the program is sequenced with progressively challenging material:

"[There are] video games at each level and you have to earn more games."

One teacher noted that the programs help to support student learning because they give students another way to learn what is happening in class:

"It's fun, it's like a game, learning an abstract way to learn the math. They hear us, see us do it. This is another access point."

School administrative and teaching staff also shared their perspectives on why the online educational programs seemed to boost student learning in math. A couple of informants linked the progress students made while playing the online math programs during the 2012-13 school year to improvements in math test scores. According to one respondent we interviewed:

"We had ST Math and First in Math, which provided kids with an alternative way to see math – spatially and pictorially – learning math without numbers. [This] filled a void, helped us to discover the root of difficulties. So in 2012-2013 when we saw the big jump

[18] "Blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home *and* at least in part through online delivery with some element of student control over time, place, path, and/or pace" (Horn & Staker, 2011).

in math [scores]… kids completed 100 percent of the curriculum for these online programs, which is unheard of. Most of the kids who completed the curriculum, it really helped their tests scores. "

Another noted:

"[The] year we had highest gain in math scores in the district, [we also] had highest ST Math completion in the District."

Children seem to benefit from being able to access the online educational games in different settings.

Findings from our interviews suggest that students may benefit from exposure to technology and educational games outside of the classroom. Although students are not permitted to take iPads and laptops home, they use them across multiple settings beyond the classroom, including in the afterschool program and at Saturday School. NCCF staff noted how the integration of online educational programs into afterschool and Saturday School helps to ensure that the academic supports provided are more closely linked to what is happening in the classroom than they have been in the past.

In addition, parents described how their children access the online educational programs across multiple settings, including at home:

"They give extra in Saturday School too [in case kids] didn't get it."

"At home [my daughter] uses my laptop, she likes that ST Math…they do here [at school]. It's a website where the teachers give her a password to use. There's two other programs that they do. My grandson in the first grade is doing it as well, which is awesome."

Children also seem to benefit from the interactive electronic tools in the classroom, including electronic white boards, tablets and laptops.

School teachers and administrative staff gave several examples of how technology is used to aid and enhance academic instruction in the classroom. A few staff members and teachers spoke about the use of large, touchscreen whiteboards that can be linked to the teacher's computer (or similar devices). Teachers use these Promethean whiteboards that were installed during the summer 2012 renovation to display instructions, videos, pictures, or other information to the whole class. The touch screen functionality enables teachers and students to demonstrate and practice lessons together.

When asked why test scores increased in 2012-13, in addition to referencing the online education programs or "technology" more generally, several teachers and staff members mentioned the Promethean boards:

"Definitely technology. Promethean boards. Kids are way more engaged. Every teacher has a MacBook."

A couple of parents also noted the benefits of the interactive electronic white Promethean boards for engaging students. As one parent stated:

"They have Promethean boards, [and are] able to be interactive— for him that's exciting. I love that. It helps."

In addition, several school staff members noted the value of the iPads:

"[We] used the money to [purchase] iPads – each grade had their own device to work on. Helped motivate our kids to do well and complete the curriculum."

Another teacher emphasized that iPads were only helpful when they were used to support learning. This teacher noted that there was only a "*…slight impact until we got an actual blended learning program on the iPads—an interactive online tool*."

Expanded learning opportunities

J.C. Nalle extended and reconfigured the school day to maximize academic instruction time.

Core academic instruction was moved to the morning when students were considered to be most alert and ready to learn. For students in grades three through five, the school added an extra 75 minutes to the regular school day. In addition, the school day was reorganized in an effort to minimize disruptions to academic instruction by using the extended day period in the early afternoon for arts and other non-core (non-academic) curricula.

Teachers reported that they benefited from the restructured school day because it gave them dedicated time to use for planning in the early afternoon. In addition, teachers and math and reading specialists used the extended day to provide individualized support to struggling students who needed more help. Research on extended learning time is clear that additional time does not translate into improved student outcomes if the time is not well used. More specifically, students benefit from extended school day schedules when they have increased academic instruction during the school day as well as more "time on task" focused on learning (Redd et al., 2012). Likewise, students are more likely to benefit from extended school day models when they integrate individualized instruction to support student learning. As we note here, evidence suggest that J.C. Nalle used the additional time effectively to support student learning. Taken together, findings from this study and literature on best practices for extended learning time suggest that the boost students experienced in math was likely produced, in part, by the effective use of the additional time gained from extending the school day.

When the extended school day ended, students did not stop learning.

Instead, the school provided additional opportunities for learning across multiple settings, including through the Saturday School program. In addition, J.C. Nalle and NCCF staff strongly encouraged parents to be engaged in their children's education both at home and at school.

Saturday School was redesigned to provide academic supports for struggling students and their parents.

A number of respondents noted that Saturday School seemed to be effective in helping students because of the decision to more strategically target those in need of help. According to an NCCF staff member:

> *"Saturday School was targeted for below and basic students – we recognized that those parents usually have literacy challenges also. The idea was…to build the parents' literacy skills while you help the kids with learning skills. We always celebrate our [high-performing] kids. The proficient kids could still come too, but [we] really targeted those [who were struggling]."*

For the students who attend, Saturday School provides several opportunities for students to receive individualized supports that were aligned with what was happening in the classroom. For example, one NCCF staff member noted that at Saturday School

> *"The teachers got a chance to see who was attending Saturday School and they [Saturday School instructors] could work with the teachers during the week to design the help [the students need]."*

This sentiment was reiterated by a parent:

"Well they kept us abreast of everything at Saturday School – what they were focusing on in the classrooms during the year – Saturday School would focus on what they were doing in the class."

Parents and students also noted that students are able to access tailored academic content during Saturday School using the same academic software programs that are available to students during the school day and at home. Some parents indicated that this advantage can be particularly important for students whose families lack Internet access at home. In addition to providing access to technology, Saturday School also provides parents with skills that will help them to be more effective in helping their child to engage with learning activities at home. One teacher noted that Saturday School, "*trains parents to tutor [their] kids*." Likewise, an NCCF staff member noted:

"With your struggling kids, it was a great help. Moved kids into a new category. We [also] had quite a few who weren't struggling and moved to advanced too."

As with the technology programs, parents and students described Saturday School as something that was fun and engaging for students while also providing extra opportunities for students to learn and catch up. As one parent noted:

"It's something that she likes and we like to go there with her. She loves to go to school on Saturdays – she'll wake you up and tell you it's time to go. We tell her we're going. She loves to go to that school."

<u>In addition to engaging parents in their students' education through Saturday School, parents were encouraged to support their students at home.</u>

Parents noted that they learned strategies for supporting their child's school success through parenting workshops offered at Saturday School. One parent said she learned some parenting skills and guidelines for things such as:

"when [their child should] go to bed, what to eat in the morning, how reading to your child can enhance school performance."

Recent research points to the role technology can play in supporting parent involvement in their young children's education. A recent study by RAND, for instance, describes several ways in which technology can be used to increase parent involvement, including: providing additional ways for teachers and parents to communicate about how children are progressing; providing schools with additional ways to share information about students; sharing information on different opportunities for parents to be involved in school; and supporting parents' home-based involvement in activities to help children learn basic reading and math skills (Daugherty et al., 2014).

To support parents' home-based involvement in their children's education, J.C. Nalle parents were offered a training through the school to help teach them how to help their children log onto the online educational programs and use them at home. Many parents spoke with pride about how they worked to support their children's skill development at home. One grandparent noted:

"*The youngest kids learn differently. Everything is computers. Before, it was only books. As a grandparent you have to have all this technology stuff because the grandkids relate to it*."

Likewise, a parent described how she supports her child's use of educational programming at home.

"… I try my best to keep mine [Internet] on at home. Spring break, summer, whenever they're home, I do my best so that they can use it. I bought [my daughter] a tablet for Christmas."

New interventions build on a strong foundation of support

Any explanation of the turnaround in test scores must take into account the foundation that was laid over a decade's worth of investments by the school and its community partners to meet the needs of students and their families. Based on interviews with multiple stakeholders –including school staff, NCCF staff, parents, and teachers– we have classified these foundational investments into two broad categories: academic press and a supportive learning environment. Academic press refers to high academic expectations. A supportive learning environment encompasses an array of perceptions about the school from efforts to foster students' positive relationships with teachers, peers, and parents to the quality of the physical environment (Wang & Eccles, 2012). In this report we refer to the academic expectations that are communicated by school administrators, classroom teachers, and other adults at the school as the academic climate (Lee & Smith, 1999). Because academic climate is a school-wide characteristic it requires strong leadership from administrators to support high teacher expectations. There is research to suggest that academic climate, behavioral and emotional supports, and the quality of the physical environment are positively associated with students' academic performance (Lee & Smith, 1999; Thapa et al., 2013; Uline & Tschannen-Moran, 2008). In addition, there is also evidence to suggest that academic press is most effective in schools where high levels of social support are present.

Administrators, teachers, and NCCF staff work together to foster a supportive learning environment.

J.C. Nalle focuses on more than just academics. Comments across multiple groups of informants highlighted multiple ways in which the J.C. Nalle Community School provides supports for students and their families. As a community school, J.C. Nalle has a long history of partnering with the Freddie Mac Foundation, the National Center for Children and Families, and other community-based organizations to address the academic and non-academic needs of students (i.e., the "whole child"). Some non-academic characteristics that have been identified in research as having an impact on academic achievement include physical health, emotional and behavioral health, and parenting behaviors (Child Trends, 2014). Parents' comments suggest that they value the school's emphasis on non-academic needs. One parent noted,

> *"I think for it to be a good school you can't just focus on academics. If you don't focus on social and personality things then they will not become better people—getting them active, and involved is so important—this school offers a lot and there are a lot of things that keep them motivated and occupied."*

Students also value the support and stability that the school provides. When asked about feeling safe at school, on student noted,

> *"There's a lot of things going on that happen mostly around the school building. Inside we feel safe."*

This section summarizes the views of various members of the J.C. Nalle community related to the learning environment. In particular, we focus on how J.C. Nalle and NCCF staff are perceived to contribute to a supportive learning environment; how the school supports parent engagement; and the role of the quality of the school building itself.

School staff

The school promotes an "open door" policy. According to one member of the school staff, J.C. Nalle's open door policy means that parents are welcome to come to the school at any time to talk about their concerns with staff, including teachers and the principal. Another member of

the school staff confirmed the existence of the open door policy and expanded upon it, noting that J.C. Nalle's leadership team wants to be perceived as family. This openness also seems to be perceived by parents. When asked what makes J.C. Nalle have a feeling of home, one parent noted,

> *"I know she [the principal] has interceded with kids that need help – even with school – she has tutored some kids who have problems – if they are having problems adjusting she will try to get them on track – she takes time out to tutor them – she has no problem giving you her personal cell phone number and will call you back….she will get to the bottom of whatever you are dealing with…very accessible and hands on…very nice person."*

Looping allows teachers to cultivate relationships over several years. One way that the school works to foster caring relationships is by allowing some teacher to "loop" with their students. Looping is the practice of having students remain with the same teacher when they progress to the next grade (i.e., their first grade teacher will be their second grade teacher the following year). While opinions on looping varied among teachers and parents, most parents in our focus groups and interviews had positive sentiments. The principal noted that looping capitalizes on the time spent by building relationships with students and their families by allowing those relationships to carry over to the next year.

School staff make an extra effort to help address non-academic needs. There seemed to be a consensus among parents, teachers, and administrators that teachers at J.C. Nalle were willing to do what it took to help children succeed, including going above and beyond job descriptions. This is significant because it indicates this perception was pervasive across the school. Parents recounted stories of teachers who met one-on-one with their child before or after school to work on specific skills and mentioned how the school fosters a "family environment."

In addition to the extra efforts of teachers, many parents indicated that they consider most of the teachers at J.C. Nalle to be dedicated, caring and very effective. Teachers also talked about some of their colleagues who stay late into the evenings to help students or who pick students up and bring them to school when needed. One stated,

> *"It is normal here to have connections with your students and students' families outside of school. [The principal] says, 'Do what you need to do.' Home visits are the norm here; it doesn't have to be for negative reasons."*

The efforts made by the school to meet families' needs were highlighted in the way that parents talked about the school, noting that J.C. Nalle feels like a family. This was also demonstrated by the fact that several grandparents attended our family focus group sessions. When asked what makes J.C. Nalle feel like a family, one parent noted,

> *"I've been at other schools and the interaction here I haven't seen it anywhere else – it's more of a family."*

<u>NCCF staff</u>

Behavioral health supports equip students with skills they need to engage in the classroom. Diverse informants mentioned behavioral health supports provided by NCCF staff help students to better engage in the classroom. In terms of individual impacts, several parents noted that behavioral health supports such as counseling services and the development of behavior plans had helped their own child to learn better. Teachers also spoke about the importance of behavioral supports for students. One teacher noted that,

> *"We have the counseling team through NCCF and DCPS, which are definitely needed. They are a great resource for us. You have students who need a couple minutes to talk to*

someone. They [the counseling team] help with crisis de-escalation and students can talk about family issues they don't feel comfortable talking to us about. Students have a special bond with that team."

NCCF staff members, who provide most of the behavioral support services, echoed comments made by the teachers. They stressed that their work is intended to help provide a supportive learning environment, explaining that they attend multidisciplinary team meetings to help identify tailored interventions and strategies for students' Behavior Improvement Plans (BIPs) and Individualized Education Plans (IEPs). Exemplifying this emphasis on the connection between mental and behavioral health and learning, one NCCF staff member remarked,

"The mental health team removes barriers so the kids can be open and ready for learning."

Behavioral health supports contribute to a better learning environment in the classroom. Some informants described how these supports benefited individual students, while others emphasized the broader impacts of these supports on classrooms and the school as a whole. For example, one NCCF staff member recounted how the counseling team had worked with a long-term substitute teacher to implement a classroom-wide behavior management system. The staff member stressed that the class went from having "*six to ten instances of students walking out of the classroom each day to zero*." Parents whose children had not received behavioral supports noted that the presence of such services helps to maintain a positive learning environment for all students. Teachers also mentioned the important role that behavioral supports play in creating a classroom environment that is conducive to learning. One teacher remarked,

"Sometimes if a child gets out of control, it messes up the entire class environment; a teacher may not be able to continue with instructions… having NCCF on site, [they] can pull them out and really counsel and talk to them."

In addition, because of the large number of students who have witnessed violence or experienced some other form of trauma, NCCF staff reported that they have also provided training to school staff related to the effects of trauma on children and different strategies that can be used to support the behavioral and learning goals of such children.

NCCF staff provide supports to families. Both NCCF staff and the principal also noted that members of the NCCF staff regularly conduct home visits to help identify any nonacademic barriers to learning, especially for students who are truant. The principal listed a number of supports that are provided by NCCF staff, including individual and small group counseling, grief counseling groups, support groups for children of incarcerated parents, parent support groups, and behavior interventions. She noted that through such supports NCCF staff have helped to stabilize the school environment, especially after the school received an influx of students from a local school that was closed. The teachers also commented on the comprehensive nature of school-wide supports offered by NCCF. When asked about the role that NCCF staff play in the school, one teacher noted,

"NCCF provides social services, but they also provide the needy kids with whatever they need like book bags. When families have needs they try to undergird those. All the needs that can't be filled by the in-house staff, NCCF fills in – wherever there is a need. We get wrap around services for our families – focus groups, small group sessions with parents, they counsel our kids, sometimes they pull them when they are having a behavioral issue, wherever there is a need."

Parents

J.C. Nalle welcomes parent participation in multiple ways. Parents are also an important component of ensuring that students experience a supportive learning environment, and there is evidence to suggest that many of the parents at J.C. Nalle are actively engaged with the school. In fact, in 2012 J.C. Nalle was awarded $3,000 by the United Black Fund for achieving a 78 percent parent-participation rate on the first day of school, the highest such rate among schools in Washington D.C. that year. Informants noted that family engagement occurs year-round at J.C. Nalle; teachers and administrators interact with parents and family members on a regular basis through in-person meetings and phone calls. The principal has also initiated a principal-father breakfast, *Donuts for Dads*, to engage fathers. The Home School Association (HSA), made up of parent volunteers, serves as an important link between parents and the school. HSA members gather ideas from parents to share with school administrators, as well as inform parents of messages from the school. NCCF staff plays an important role in ensuring that families are engaged and feel welcome. One school administrator noted,

> *"Parent education over the years has made the school a place where parents who may not have been welcome before, they can come. There are fitness, cooking, parenting skills, GED, pre-GED, and financial literacy type classes. There are also family game nights where families learn different games to help with literacy and math."*

Parents are engaged and value being a part of the J.C. Nalle family. It appears that the school's efforts to engage with parents have paid off. In general, the vast majority of parents and other stakeholders interviewed thought that parent involvement at J.C. Nalle is strong and has been increasing in recent years. Many parents described how they support their children's education by attending meetings, participating in activities like Saturday School, and maintaining close communication with their child's teacher. In fact, several parents noted that they have their child's teacher's personal telephone number. Teachers also remarked on parent involvement and communication at the school, noting that parents are generally willing to allow teachers to keep their child after school to provide additional academic support.

Among the parents who attend Saturday School, it appears that one of the aspects that they value most about the program is the way it helps them to feel more connected to the school. For example, parents or other family members learn about what children are studying during the week so that they can reinforce the knowledge at home. One grandmother noted,

> *"Well, they kept us abreast of everything at Saturday School—what they [children] were focusing on in the classrooms during the year, Saturday School would focus on what they were doing in the class."*

Families have multigenerational connections to J.C. Nalle. Many parents and some grandparents have an affinity for the school because they attended it themselves and have been involved in the community for their entire lives, which has helped create a communal atmosphere. Some of these parents no longer live within Nalle's boundary lines, but choose to send their children to J.C. Nalle either because of this affinity, or because their knowledge of the community allowed them to make an informed decision that the school offers high quality services and education. One parent who lived outside the neighborhood said that she sent her children to J.C. Nalle because:

> *"It is my family's tradition, so I know wherever I lived they would go here."*

Physical environment

The school building is updated and well-maintained. As mentioned earlier, there is research to suggest that the quality of the physical environment in a school can influence

students' academic performance (Uline & Tschannen-Moran 2008). In the summer prior to the 2012-2013 school year, J.C. Nalle undertook a $6.8 million renovation project that modernized the entire school building. This work upgraded both the interior and exterior design. The functionality of academic spaces was enhanced with improved instructional equipment, such as Promethean boards and rewired computers. New paint, improved lighting, and new air conditioning and heating systems have made the school building more comfortable and appealing.

Families and staff feel more pride in the school after the renovation. While a few informants said they did not believe that these changes made a difference, most felt that the changes were dramatic and welcome improvements. The overwhelming consensus among the informants was that the improvements increased their pride in the school. One parent noted that it "*made me feel a lot better about the school*" and a social worker said that "*everything felt neater, cleaner, and we felt more special*." The repainting seems to have made an especially large impact: Six people mentioned that new colors on the walls improved the school environment.

An academic climate that promotes high expectations is cultivated school-wide.

As previously mentioned, academic climate refers to a school-wide culture that values learning and promotes high expectations for student performance. School leaders have instituted policies aimed at promoting a climate of high academic expectations for students. All students are required to wear uniforms to school, which may foster a sense of unified identity. School and NCCF staff refer to students as "scholars," and they are also referred to as such in handouts distributed to families.

Strong leadership promotes high expectations school-wide. Research suggests that strong administrative leadership is critical to supporting teachers in setting high expectations and ensuring that a consistent message of high expectations is communicated across all school settings. While our interview protocols did not include specific questions about the school principal, a number of informants mentioned the principal in the context of their general impressions of the school. NCCF and school staff also mentioned the principal specifically in the context of the improved test scores and the general academic climate of the school. One NCCF staff member noted that the principal "*has been able to hold on to some really good teachers and stay on top of truancy*." Parents were overwhelmingly positive in their assessments of the principal. One parent noted, "*The principal is outstanding, she is so on hand [sic] with these kids*." Parents also mentioned the principal when asked to talk specifically about what they think has contributed to the recent increase in test scores. For example, one parent remarked,

> *"I think that may have had to do with teachers stepping up their game and getting involved…I think the principal had a lot to do with that."*

School administrators create a positive working environment for teachers. Informants from J.C. Nalle and NCCF pointed to teacher retention as a potential factor behind recent academic gains. As the presence of looping would suggest, most informants said that the majority of teachers currently at J.C. Nalle had been there for the past couple of years. These more seasoned teachers were described as high quality with good classroom management skills. Despite some waves of turnover in the past, informants remarked that most teachers were committed to the work at J.C. Nalle, even during years when their efforts were not reflected in test scores. Respondents noted that high expectations among staff had been in place prior to the 2011-2012 school year and teachers "*remained consistent and stayed the course*," continuing to work at the school prior to and after the gains in test scores. Teachers also commented on how the strength of the principal's relationship with school staff creates a supportive working environment that allows teachers to do their job well. One teacher noted,

"[The principal] has a great relationship with most of the teachers. Most I can say really respect her. She really encourages us to work well with the students."

One way in which principals can have an effect on classroom expectations is through promoting teaching practices that support student learning. Several teachers noted that the school's collaborative environment encourages them to share with each other resources and advice for working with specific students. This push for collaboration and innovation in teaching methods was said to come both from the administration and from teachers themselves. When asked to compare working at J.C. Nalle to working at other schools, one teacher stated,

"the administration supports it [collaboration] and the people here share, discuss, ask and collaborate. The school that I came from that was not the culture."

Teachers expect all students to achieve. Because students spend most of their learning time at school in the classroom, teachers are critical to promoting high academic expectations. Multiple informants discussed the dedication that they have seen teachers demonstrate when it comes to helping students achieve academically. While parents appreciate high expectations, they also value the time and effort that teachers put into assessing each child's particular level, identifying academic strengths and weaknesses so that students are challenged but not to the point of feeling defeated. To illustrate this sentiment, one parent stated,

"Teachers don't give up on kid and say they are not smart enough – they push them to a level that they can be pushed."

Teachers also remarked on the benefits of looping when it comes to being able to help students to meet high academic expectations. Both parents and school staff noted that looping helps teachers to better tailor instruction to the levels of their students because the teachers have spent more time with the students and are thus more aware of their strengths and challenges. When discussing the benefits of looping one teacher noted,

"We knew what to expect of them [the students], we were able to really challenge them, not settle for less."

Students value academic challenges. A focus on academic expectations was evident in students' comments as well. Several informants reported that the children seem to enjoy the competitive aspect of the math-related computer programs, especially since some are linked to a rewards system. This competitive spirit played out during one of the focus groups when a few boys engaged in playful banter about who was on the highest level. One student then proudly touted that, at one point, he had received a necklace that he was allowed to wear at school indicating that he had achieved the highest score in his class for *First in Math*.

Students also seemed to value the extra learning time that is afforded through the extended day and Saturday School. When asked specifically about what they liked about the extended day, one student replied,

"You get more education and you get smarter by the minute."

While most students mentioned fun as a primary motivator for attending Saturday School, they also remarked on how it helps them academically. One student noted,

"Since I've started going to Saturday School I've gotten better and am better at making paragraphs."

Summary of implementation findings

Students seemed to benefit from the full package of interventions introduced to the school during or shortly before the 2012-2013 school year. In particular, students benefited from the

effective use of interactive online technology programs and tools that engaged children and were aligned with their curricular standards, as well as from extended and reconfigured time for learning.

These interventions occurred within the context of a community school which provided a foundation of supports that helped to foster a positive social and academic climate and address students' behavioral and emotional challenges. J.C. Nalle provided a range of additional opportunities for students to learn, especially those who were struggling the most. Students who were initially low performing were targeted to receive additional academic instruction and enrichment during the extended school day and during Saturday School. Online educational programs and electronic white boards enabled teachers to access data that was used to identify those children who were in most need of individualized and small-group instruction for those who needed it the most.

Continuity of supports was also achieved through school and program staffing. NCCF staff supported extended day, Saturday School, afterschool and summer enrichment programming. In addition, teachers were hired to help provide continuity in academic instruction and in staff-child relationships in these extended learning programs.

Finally, parents were encouraged to be actively engaged in their children's education through Saturday School, trainings, parenting workshops, as well as other activities targeted to parents.

Challenges

Over the years, J.C. Nalle has experienced some challenges that affect the delivery of formal education during the school day and the extensive package of additional services that it offers as a community school. These challenges touch on many different aspects of the school—from the quality of the partnership between J.C. Nalle and its community partners to identifying partners and staff who are adequately prepared to deal with children exhibiting behavioral problems. Here, we highlight challenges that seem to affect school and program operations in recent years, including some that occurred prior to the introduction of the new package of interventions.

J.C. Nalle and NCCF have experienced challenges in communication around programming.

Although J.C. Nalle and NCCF were observed as working alongside one another to support the needs of children and families rather seamlessly, the relationship has not been without some challenges, especially in its formative years. Over the years, the organizations and its leaders have learned to collaborate more effectively, but some lingering issues remain as might be expected in such a multi-faceted partnership. In more recent years, for instance, these challenges can commonly be attributed to insufficient communication and conflicts around roles and responsibilities.

Some of the J.C. Nalle and NCCF staff members whose views were tapped for our study acknowledged that both parties may not be communicating information to one another as effectively as possible about what is being taught during school and how afterschool or Saturday School programs can reinforce that instruction. As mentioned earlier in this report, NCCF staff has worked with DCPS and J.C. Nalle staff to produce an afterschool curriculum that is better aligned with curricular goals. Despite these efforts and the fact that some J.C. Nalle teachers are hired to help staff the afterschool program, some teachers we interviewed expressed frustration because they did not feel that afterschool program staff adequately informed about what is happening in their classrooms; thus, they are not convinced that afterschool and school-day curricula is sufficiently aligned.

Similar concerns were raised about the perceived lack of communication between regular teachers at the school and staff who worked in the Saturday School. On the other hand, interviewed respondents, including students, parents, and school educators who have observed or worked at Saturday School, provided examples of how Saturday School covers information that students learn in school. In this case, it may be that there is not clear communication with all teachers about what happens in Saturday School. More communication with teachers who are not available to work at Saturday School may help Saturday School staff better target the needs of the students in their classes.

School staff also noted instances when they were not aware that a NCCF staff person was absent until they were looking for them to help with a scheduled activity during the extended day. Because NCCF staff members who are based in the school report their absence to their supervisors who do not work in the school, there are sometimes gaps in communication about staffing availability.

Finally, NCCF staff who had helped to manage the afterschool program felt excluded from discussions about the redesign of the afterschool program in support of the extended day model. While the NCCF staff felt it important to note that they like the new afterschool model and continue to be heavily involved in managing it, they would have liked the opportunity to be engaged in the redesign discussions. They were also surprised to learn late about the introduction of new partner brought on to serve students during afterschool hours. Similarly, J.C. Nalle administrative leaders felt slighted when decisions were made to terminate a community school director, a position overseen by NCCF, without school input. Institutional rules and internal policies (such as nondisclosure rules regarding personnel issues) can inadvertently cause problems in communication.

NCCF and J.C. Nalle staff have had to clearly define the roles and responsibilities of each party when serving students and families.

Relationships can be challenged by lack of clarity around roles and responsibilities. In addition to the communication glitches that the partnership has encountered, disagreement about the roles and responsibilities of NCCF mental healthcare staff have persisted into recent years. Multiple past and former NCCF staff members interviewed explained that members of the NCCF mental health team believed that their primary role was to provide counseling to students during the school day. While NCCF staff don't mind being called on to provide staffing support, at times, there was concern that some requests of the mental health professionals conflicted with their role as social workers providing mental health counseling. When asked to supervise lunch, for instance, they may need to discipline children to help manage behavior which they feel conflicts with their role as a counselor. On the other hand, J.C. Nalle respondents noted that mental health staff should observe students throughout the school day (e.g., during lunch time) to get a good idea the types of behavior problems exhibited in a large groups setting. From their perspective, this information could provide ideas for solutions. That both NCCF and J.C. Nalle staff expressed this challenge and had some understanding of the alternate perspective suggested that this issue, like others, could be resolved.

Despite these issues in the working relationship, efforts to resolve conflicts and strengthen the partnership have been largely successful. In earlier years, officers from Freddie Mac Foundation helped to smooth over differences among leaders. Most J.C. Nalle and NCCF respondents now characterize the relationship as a good one overall. J.C. Nalle leaders, teachers and staff members expressed that NCCF provides services that are critical to help get students to a place where they were ready to learn, and the partnership has thrived. Likewise, NCCF staff held school staff and teachers in high regard, noting their dedication to students and families. Although the partnership has encountered difficulties in defining roles and responsibilities, there

was a widespread consensus among NCCF respondents that the principal has the ultimate decision-making authority and they have worked with her to develop mutually acceptable roles in the school for the NCCF team.

Some parents lacked a full understanding of the range of services that the community school offers, limiting their potential involvement.

Though the vast majority of all respondents reported that parent engagement has increased through the years, it is still a challenge to get parents involved in school activities or to take advantage of the services that J.C. Nalle and NCCF offer.

Roughly half of the respondents thought that parents may not attend school activities or take advantage of the services that the school offers because they may not be aware of the activities and range of services that the school offers. This observation was echoed in interviews with parents themselves. Among parents who participated in interviews and focus groups, all of them had were aware that J.C. Nalle is a community school that offers services to families. However, several had not visited the NCCF on-site office and were under the impression that interaction with NCCF staff happens only when needs for wraparound services or GED support arise. Furthermore, some parents who participated in interviews and focus groups had not heard of Saturday School, even though they sounded interested in attending once they learned more about it. It's possible, though, that these parents were not aware of Saturday School because they were not targeted for it or due to space limitations.

One school staff member shared an example of a family whose homeless status was discovered through a truancy meeting, suggesting the parent may not have realized that she could receive help finding secure housing through the school.

Staff and Teachers Find it Challenging to Serve Children and Families With Multiple Needs and Behavior Problems.

Although the goal of J.C. Nalle as a community school is to provide wrap-around services to meet the needs of the families it serves, the school and NCCF have faced many difficulties in helping families with multiple needs. The vast majority of staff respondents reported that many students and families have been exposed to traumatic situations at a young age. These difficult backgrounds may be manifested as behavioral problems in children and mental health challenges in parents, as well as lack of parental engagement. Though J.C. Nalle and NCCF staff understand that it is imperative to meet the needs of children and their family, they may not always have the capacity to meet the constellation of needs that a large number of children and families bring. From the staff perspective, this reality represents an especially difficult challenge because staff would like to meet the needs of *every* family and child to dismantle the barriers that children often face to develop to their full capacity.

The vast majority of J.C. Nalle and NCCF staff members interviewed noted that the school has a large number of students with behavioral problems and this situation poses challenges for instruction. Additionally, there was widespread sentiment expressed by parents that teachers are not necessarily skilled at handling behavioral problems, which plays out in how they respond to students' negative behavior. In addition to the problem of inadequate staff development, most parents and J.C. Nalle and NCCF staff agreed that staff turnover can be a challenge to serving students and families.

Behavioral problems can interfere with instruction. As noted above, a large number of the students at J.C. Nalle have experienced traumatic life experiences that are often connected to growing up in poverty. As a result, many of them exhibit behavioral problems which make providing effective classroom education especially challenging. Half of J.C. Nalle and NCCF

respondents reported that these problems escalated when the school absorbed a group of students with particularly high needs from nearby Fletcher Johnson Elementary School, which was closed due to poor academic performance. According to these respondents, many of the newly absorbed students had mental health difficulties that prevented them from learning and put them at risk for behaviors that disrupted classroom instruction. As a result, J.C. Nalle has had to deal with these students' social-emotional issues and resulting problem behaviors before teachers could work to improve their academic outcomes.

To address students' mental health difficulties, resources that the school had wanted to use to improve academic performance were diverted. DCPS and NCCF mental health staff worked extensively with the students from the Fletcher Johnson catchment area to integrate them into the school and foster a school environment conducive to learning. The school has overcome these challenges for the most part. After three years, the school environment improved and the mental health team was able to move beyond crisis response to offer targeted family services. Teachers have been able to focus more on academic advancement, though behavioral problems still pose a challenge to academic instruction.

Having skillful staff is important. Even though most parents we spoke with recognized that children with behavioral problems can cause problems in the classroom, they thought that teachers may not always have the behavioral management skills needed to curb these problems.

While the majority of parents appreciate the open door policy, the opportunities they get in Saturday School, and the nonacademic supports they receive, about half of the parents who participated in interviews and focus groups voiced concerns about the frequency of the phone calls they receive from the school. As one parent remarked,

> *"They [teachers] need to stop calling us every two seconds, every time they [children] even do anything tiny or act like they are about to be bad or whatever."*

Other parents agreed with the sentiment that teachers call parents too often and connected their perspective to the discipline policy J.C. Nalle follows, as one parent stated,

> *"Now they just call me and tell me to come get her [daughter]."*

According to these parents, teachers are quick to call parents and send children home when children display behavioral problems; consequently, parents viewed some teachers as lacking skills to manage children's problem behaviors and unwilling to establish a positive relationship with the parents because parents are only contacted for negative reasons. As a result, parents thought that teachers may need professional development opportunities to improve their ability to manage children's behavioral problems at school.

Staff turnover is a challenge. J.C. Nalle has had to face the challenge of high staff turnover in many areas. NCCF has had difficulty attracting committed professional mental health staff. During years in which NCCF experienced cuts in funding to support services they provide at J.C. Nalle, NCCF leaders made decisions to reduce the number of staff. In recent years, this has led to loss of the on-site community school director position and the use of interns who are studying to become social workers to provide additional support. Turnover has also affected the afterschool and arts programming staff (when positions were contracted to external partners).

The retention rate, particularly among teaching staff, has been relatively strong in recent years as pride in the school increased. According to an interview with a staff leader, retention among core staff over the past four years is approximately 95 percent. Current teachers attributed the increased retention levels to commitment to the school among their colleagues to the principal's engagement with staff, as well as behavioral improvements, and school renovations.

Collaborating with outside partners to staff the extended day has not been easy. In the 2013-2014 school year, an external organization was brought on to provide arts instruction during the extended portion of the day. These instructors were only at the school twice a week, and DCPS staff felt that as a result they had difficulty getting to know the children and learning to manage student behavior. This staffing challenge was compounded by the difficult schedule. Since the 2011-2012 school year, the school day has been structured so that arts "specials" take place in the afternoon once academic instruction has ended. Informants explained that this means students had concentrated on academic instruction for a long time before coming to arts activities, so they may have more difficulty focusing. This situation was made even more challenging because staff from the partner agency were well trained in their craft but not in how to manage behavior and provide discipline to students. Due to these challenges, the school is returning to the model of using DCPS teachers to teach arts classes as a way to make more effective use of the extended day time.

Substitute teachers were not as well skilled in providing instruction to students who were struggling in school.

During the 2013-2014 school year, more than three reading teachers were on extended leave. During these teacher absences, the school was provided substitute teachers. Substitute teachers needed time to get to know the students and their needs as well as how to effectively manage classroom behavior. Some substitute teachers were not considered to be as skillful in their reading instruction as the full-time teachers who were on leave.

Also, in 2013, the Lexia Reading online educational program was introduced. However, interview respondents from the school noted that it was challenging for substitute teachers to effectively implement a blended learning program.

Costs and financing

As seen in this report, the J.C. Nalle Community School provides a wide range of services and supports to its students and their families. These services complement the academic learning that takes place through traditional instruction in ways that can bolster cognitive and social development. Integrated Student Supports provided at J.C. Nalle are not possible without substantial and sustained funding investments from multiple sources. Since 1994, the Freddie Mac Foundation has provided approximately $11.1 million in funding to support J.C. Nalle and its key partners. This chapter is a retrospective cost analysis that focuses on the past four years which coincide with Child Trends' outcomes and implementation evaluations examining J.C. Nalle's student achievement in the context of concerted efforts to increase academic performance beginning in the 2012-13 school year. In this chapter we discuss the school's direct and indirect funding and how resources were utilized to deliver services between 2010 and 2014.[19]

It is important to note some of the limitations of the cost analysis presented in this report. Examining DCPS budgets over time and only from publicly available data sources resulted in possible discrepancies from year to year in what was included in J.C. Nalle's budget. This is particularly true for the 2009-10 school year in which the budget allocation was 62 percent greater than the next highest allocation. As a result, cross-year comparisons should be interpreted with caution. Another limitation of the data available for this analysis is related to the structure of the National Center for Children and Families' budgets. J.C. Nalle is considered a

[19] These years refer to DC's fiscal year. School years are also referenced through this section; the latter year in the school year aligns with the current fiscal year.

single project in the budgets used for this analysis, though NCCF operates several programs at the school. The consolidated budget provides useful information about overall funding and expenditures but does not allow for program-specific insights (e.g., what is the cost per-student per year of providing the Saturday School program?). Despite these limitations, the study still provides useful information about J.C. Nalle's sources of funding and support, changes in funding by year, and allocation of resources.

District of Columbia Public Schools funding

On average, DCPS allocated $ 3,432,832 to J.C. Nalle Elementary between school year 2009-10 and 2013-14.[20] During those years, enrollment ranged from 327 to 369, and per-pupil expenditures[v] averaged $12,012 (see Table V.1). While budget allocations were fairly similar between 2011 through 2014, they were considerably higher in 2009-10. As mentioned above, the 2009-10 budget was structured differently than those for more recent years and included different costs. For instance, the 2009-10 budget included line items for non-DCPS funded positions (e.g., nurses) as well as fixed costs (e.g., water, electricity) and central administrative services (e.g., CFO, HR). These items are not included in subsequent years' budgets. For the 2012-13 school year, in addition to its standard budget allocation, J.C. Nalle received a "Proving What's Possible" grant from DCPS for $ 275,000. The grant supported an extended school day; enhancement of a career and college readiness curriculum; and afterschool enrichment and intervention support.[vi] In the prior school year (2011-12), J.C. Nalle underwent a $6.8 million renovation. This funding is not included in DCPS' budget allocation, so it is not included in the table below. However, it is worth mentioning in that the structural quality of school buildings can affect students' morale and academic achievement.

Table V.1. DCPS budget allocations and per-pupil expenditures for J.C. Nalle (2010-2014)

School Year	Budget Allocation	Projected Enrollment	Actual Enrollment	PPA	PPE
2009-10	$6,554,835	358	352	$18,310	$18,622
2010-11	$3,374,934	347	327	$9,726	$10,321
2011-12	$3,516,105	336	327	$10,465	$10,753
2012-13	$3,308,761 +$280,990	311	335	$11,543	$10,716
2013-14	3,561,365	328	369	$10,858	$9,651
Average	**$3,432,832**	**336**	**342**	**$12,180**	**$12,012**

Source: DCPS historical financial records and grant award notice

To draw a comparison between J.C. Nalle and other similar schools in the District of Columbia, Child Trends' research team identified other Title I elementary schools in the District and

[20] Unless otherwise noted, amounts are presented in terms of 2014 dollars as calculated using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator: http://www.bls.gov/data/inflation_calculator.htm.

compiled the 2013-14 per-pupil allocation[vii] for each school. As shown in Table V.2, J.C. Nalle received a per-pupil allocation during the 2013-14 school year that was somewhat lower than the city average, compared with other similar elementary schools in the city. Although national data on per-pupil expenditures are not currently available for the 2013-14 school year, data from the 2011-12 school year indicate that DCPS provided nearly 130 percent of the national average ($10,834).[viii] Still, many schools are unable to provide supplemental supports and enrichment activities with allotted public funding. J.C. Nalle has been fortunate to leverage and sustain community partnerships that augment the financial support provided by DCPS.

Table V.2. DCPS comparative 2014 budget allocation among Title I elementary schools

	Total Budget Allocation 2013-2014	Per-Pupil Allocation
J.C. Nalle	$3,561,365	$10,858
Average Allocation	$4,370,221	$12,253
Minimum	$2,722,165	$9,734
Maximum	$6,355,315	$14,936

Source: DCPS historical financial records

Community partner funding and support

The National Center for Children and Families (NCCF) and the Freddie Mac Foundation are J.C. Nalle's primary community partners, as we have stated throughout this report. The Center receives support from the Foundation to provide complementary supports, programs, and services to J.C. Nalle's students and families. Freddie Mac's financial support to NCCF totaled $2,559,144 (unadjusted for inflation) between 2010 and 2014, along with $130,000 (unadjusted) that flowed directly to J.C. Nalle.[21] In addition, NCCF has received substantial support from other foundation and government funders, corporate and individual donors, and volunteers over the past five years in support of the Center's work at J.C. Nalle (see Table V.3 for inflation-adjusted figures).

This additional financial support allowed J.C. Nalle flexibility to tailor innovative solutions for its student population. For example, though itemized lists of expenses related to the Freddie Mac Foundation's grants were not available, qualitative findings suggest that the technological innovations instituted under the 2013 and 2014 grants were impactful, particularly with regard to mathematics learning.

[21] These numbers were drawn from the Freddie Mac Foundations historical record of NCCF expenses, including coverage of vendor services such as catering, transportation, etc. These expenses are disaggregated in Table V.4.

Table V.3. NCCF actual revenues for J.C. Nalle, by source - 2010 through 2014 (2014 dollars)

Revenue Source	2010	2011	2012	2013	2014
Grants	$744,994	$520,949	$529,260	$582,540	$581,756
Contributions	$43,385	$31,063	$55,379	$40,156	$49,811
Other Income	$62,423	$12,861	$1,384	$0	$9,371
In-Kind/Volunteer	$139,480	$49,418	$44,789	$47,101	$51,705
Satisfaction of Restrictions	$291,095	$0	$0	$0	$0
Total	**$1,281,378**	**$614,291**	**$630,811**	**$669,798**	**$692,643**

Source: Final audited budget comparison reports from NCCF (2014 report not yet audited at time of report submission)

Table V.4 below illustrates how NCCF used funds across five expense categories to support the students and parents of J.C. Nalle. As mentioned earlier, expenses are not disaggregated by the individual programs and services provided at J.C. Nalle; however, some notable patterns emerge.

Table V.4. NCCF actual expenses for J.C. Nalle, by category - 2010 through 2014 (2014 dollars)

Expense Category	2010	2011	2012	2013	2014
Staff and Consultants	$804,086	$516,087	$439,759	$406,485	$417,020
Travel	$28,733	$1,280	$13,569	$14,702	$6,969
Equipment and Supplies	$13,409	$2,734	$7,691	$13,768	$21,640
Indirect	$202,329	$82,570	$57,841	$59,511	$81,728
In-Kind/Volunteer Time	$139,480	$49,418	$44,789	$47,101	$51,705
Other	$80,849	$84,576	$70,877	$85,249	$119,522
Totals	**$1,268,887**	**$736,665**	**$634,525**	**$626,817**	**$698,584**

Source: Final audited budget comparison reports from NCCF (2014 report not yet audited at time of report submission)

First, NCCF consistently dedicated between 60 and 70 percent of annual expenditures on staff and consultants. These figures include fringe benefits as well as payroll taxes for eligible employees. Not surprisingly, as budget and expenditures decreased staffing was cut. In 2010 and 2011, seven staff plus consultants were employed, whereas five or six staff plus consultants were hired or retained in 2012 through 2014. The proportion of expenditures dedicated to staff costs is similar to that found in other research investigating the costs of out-of-school time programs. For example, Grossman and colleagues (2009) found that programs spent an average of 67 percent on staffing for various types of after-school programs.

Reduced overall spending in 2013 was driven by reductions in staffing costs. This reduction coincides with the *Proving What's Possible* grant from DCPS, which supported additional school-based staff and an extended school day. This apparent coordination seems to have allowed NCCF to continue to provide its complementary programs and roll out the Saturday School program while reducing its staff numbers in the same year. A similar pattern is noted in 2014; NCCF was able to spend relatively less on staffing, leveraging the support of J.C. Nalle instructional staff in its programming. This has the potential to accelerate academic gains for students as the involvement of trained instructional staff in supplemental programs like Saturday School may support greater alignment of during- and after-school learning.

Travel costs are attributable to J.C. Nalle's Cultural Learning Experience program, which allows students to learn about and experience first-hand cultures outside their own. The higher travel costs in 2010 reflects a more expensive Cultural Learning Experience trip and represents just two percent of total expenditures, similar to 2012 and 2013. Equipment and supplies consistently represented one to two percent of NCCF's expenditures, while indirect spending remained between nine and twelve percent across years, except 2010 when it reached 16 percent. In 2010 in-kind contributions and volunteer time accounted for about eleven percent of NCCF's expenditures related to J.C. Nalle. From 2011 to 2014 this type of support has remained between seven and eight percent. This expense category includes several supportive programs and services coordinated by NCCF and J.C. Nalle. In an earlier section of this report several contributions were noted: donated space at a local church; volunteer tutors from Georgetown University for the DC Reads Program; volunteer oral hygienists from DC Smiles; etc. These additional partnerships are valuable assets for J.C. Nalle; the school and its partners should continue to increase and sustain these relationships in the future.

To place NCCF's overall investment into context, Child Trends' team examined other sources related to the funding of community schools. The literature is sparse, but a recent case study of two community schools operated by the Children's Aid Society (CAS) provides useful information for comparison (Martinez & Hayes, 2013). The authors' analysis estimated an average annual investment by CAS and the New York City Department of Education of about $10.1 million in the elementary school included in their sample and an investment of about $5.9 million for the middle school.[22] After adjusting for inflation and cost of living differences between New York City and Washington, D.C., investments by NCCF and DCPS in the J.C. Nalle Community School fall between the investments cited for the two CAS schools (see Table V.5). It is unclear whether capital outlays such as the renovation to J.C. Nalle in 2012 were included in the analysis of costs for the CAS schools, so estimates including and excluding the renovation are provided.

[22] Costs were averaged from 2008-2010 and presented in terms of 2010 dollars.

Table V.5. Comparison of average annual investments in community schools (2014 dollars[23])

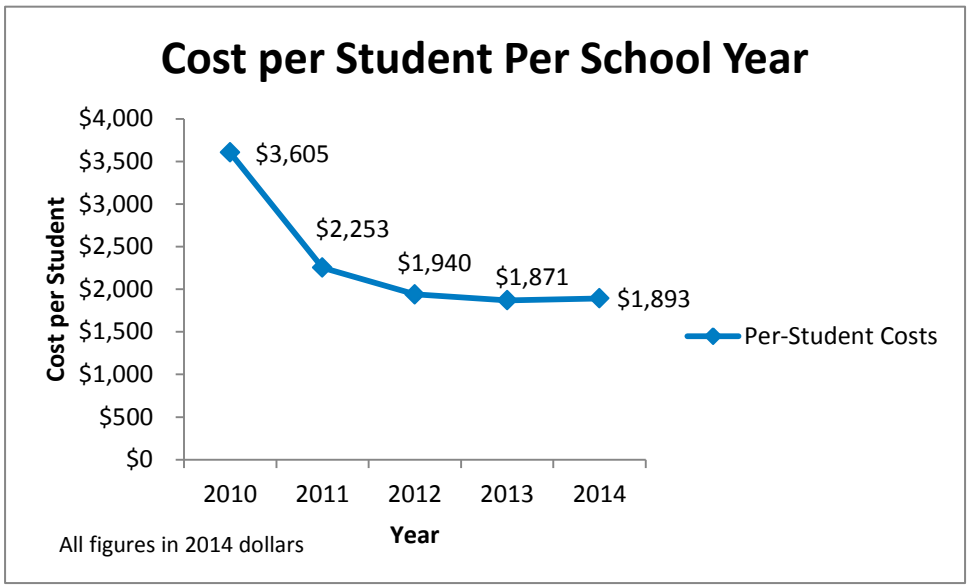
Average Annual Investment	
J.C. Nalle (including 2012 renovation)	$6,837,819
J.C. Nalle (excluding 2012 renovation)	$4,912,494
CAS Elementary School	$8,183,800
CAS Middle School	$4,747,096

Source: DCPS historical financial records and Martinez & Hayes, 2013

By considering the number of students attending J.C. Nalle each year—and, thus, potentially benefitting from the deployment of the resources noted above—Child Trends' research team was able to develop a crude measure of per-student cost related to NCCF's constellation of programs and services. It is a crude measure because it cannot account for individual programs or services or for the fact that every student will not participate in each program. Also, the measure is limited by the fact that some NCCF-supported programs are provided throughout the school year while others are offered during the summer. Nonetheless, it is useful to estimate the value potentially added to each J.C. Nalle student above and beyond what is provided through public education dollars. Figure V.1 depicts a decrease and leveling off in per-student costs related to NCCF programs and services from 2010 to 2014. This makes sense given the declines in NCCF's budget and expenditures over the same period. As a point of comparison, though not perfect, other research examining the costs of high quality out-of-school time programs has estimated the average per-enrollee cost for elementary and middle school programs at $3,218[24] (Grossman et al., 2009). A 2002 evaluation of the Children Aid Society's Carrera Program cited costs of about $3,900 per year for teenagers enrolled in the year-round program (Philliber, Kaye, Herrling, & West, 2002).[25] While direct comparisons should be avoided due to differing methodologies and available data, the estimates seem to suggest that NCCF is able to provide programs and services to J.C. Nalle's students and families at about the same or lower costs than similar out-of-school time providers. Indeed, this coincides with the research previously cited which found that programs run by community-based organizations but based in schools and those serving only elementary school children typically cost less than programs with other characteristics.

[23] Figures were converted to "2014 Washington, D.C. Dollars" by adjusting for inflation and then applying a conversion factor from the 2010 (i.e., most recent) ACCRA Cost-of-Living Index.
[24] The original figure, $2,640, was presented in 2005 "average urban dollars" based on the ACCRA cost-of-living index. It is presented here in 2014 dollars.
[25] This figure was converted to "2014 Washington, D.C. Dollars" by adjusting for inflation and then applying a conversion factor from the 2010 (i.e., most recent) ACCRA Cost-of-Living Index.

Figure V.1. NCCF's estimated per-student expenditures at J.C. Nalle – 2010 through 2014 (2014 dollars)



Source: Final audited budget comparison reports from NCCF, Child Trends' calculations

DC SCORES is also a major community partner, which has offered soccer, poetry and service learning afterschool activities for third- through fifth-grade students at J.C. Nalle since the 2011-12 school year. Based on financial data from DC SCORES[ix], Child Trends was able to estimate annual expenditures that supported J.C. Nalle students. Further, J.C. Nalle staff was able to provide approximate annual enrollment in DC SCORES, allowing Child Trends to estimate per-student expenditures for the program (see Table V.6). Given the lack of detailed financial information available for DC SCORES, it was not possible to ascertain how resources were deployed to achieve its goals of teambuilding and academic development. Without itemized financial statements it is unclear what percentage of funding was allocated for staff salaries, equipment, travel costs, etc. However, the total expenditures and per-participant expenditures allowed Child Trends to make some comparisons between the provision of DC SCORES at J.C. Nalle and the costs of other similar out-of-school time (OST) programs nationally. The cost per-student of providing DC SCORES is much lower on average than the figure from the national research presented earlier ($3,218). This could be a function of DC SCORES' program model (lots of outdoor activity with minimal need for materials) and/or relatively lower cost of coaches/instructors. In any case, it represents another valuable resource that enriches the experiences of J.C. Nalle's students.

Table V.6. DC SCORES' estimated per-participant expenditures at J.C. Nalle (2012-2013)

School Year	J.C. Nalle Enrollment	Spending on J.C. Nalle	Per Participant Expenditure
2011-2012	35	$44,228	$1,264
2012-2013	35	$31,536	$901

Source: DC SCORES annual reports, Child Trends calculations

Leveraging its partnerships with the Freddie Mac Foundation, NCCF, and DC SCORES has allowed J.C. Nalle to allocate, on average, an additional $1,923 per-student a year over the past five years, beyond what was provided by DCPS. This is similar to the annual per-student costs of other OST programs for elementary-age children. When funding from J.C. Nalle's community partnership with NCCF and DC SCORES is added to the DCPS per-pupil expenditure, the school is effectively providing $14,030 in academic, social, and material support to each of its students each year. As noted in previous sections of the report, this additional support has the potential to promote meaningful change in student achievement. J.C. Nalle and its partners should continue to pursue opportunities to bolster these complementary supports.

Conclusions and next steps

After being identified as a school that should either be closed or targeted for a significant turnaround effort, J.C. Nalle (with support from their NCCF partners and strategic investments by DCPS and the Freddie Mac Foundation) made a concerted effort to improve student academic performance. In 2012-2013, J.C. Nalle demonstrated impressive improvements in the percentage of students scoring at or above proficient on the DC CAS reading and math tests. In fact, J.C. Nalle was reported to have the highest increase in proficiency in math among all DC public schools that year.

In January 2014, the Freddie Mac Foundation provided Child Trends with a grant to study the turnaround effort at J.C. Nalle. The purpose of the research was to provide an independent assessment of the school's effects on student achievement and to investigate the likely reasons for recent test score improvements. In the section below, we summarize key findings, study limitations, and implications for practice and research.

Summary of findings

A package of interventions was introduced in 2012-2013, targeting academic achievement.

Interventions introduced in 2012-2013 focused on expanded learning opportunities and increasing students' access to technology as a tool to enhance teaching and learning.

The use of technology as tools to enhance teaching and learning was emphasized.

The school increased students' access to technology by purchasing tablet computers for use in the intermediate grades and additional laptop computers for use in primary classrooms as well as acquiring licenses for online educational programs. As a part of the building renovation, each classroom was equipped with an interactive whiteboard.

The school day was extended.

Learning time was extended by approximately 75 minutes for students in grades three through five. Students received uninterrupted core academic instruction from 8 a.m. to 1 p.m. After recess and lunch, students attended "special" classes in art, science, music, physical education and other subjects from 2 to 4:30 p.m. Students also received specialized instruction in reading and math during this time, which was provided by subject matter specialists, allowing students extra time to learn and reinforce skills.

An academic program was offered on Saturdays.

In addition, the Freddie Mac Foundation provided funds to the National Center for Children and Families to provide Saturday School programming for students in grades one through five, with a focus on assisting underperforming students by encouraging students and their parents to work together on strengthening academic skills.

The new interventions built upon investments J.C. Nalle had previously made as a community school.

For approximately 15 years, with investments from Freddie Mac Foundation and early guidance from Children's Aid Society, J.C. Nalle has operated as a community school. They have worked collaboratively with the National Center for Children and Families, which is funded primarily

through the Freddie Mac Foundation, to serve as their primary community school partner. Through NCCF and the Freddie Mac Foundation, J.C. Nalle offers its students and their parents a wide range of academic, socio-emotional, physical, and personal supports. These supports and services are well-received by members of the J.C. Nalle community and considered to be a critical contributor to student success by many informants. Based on our own observations and analysis of documents provided to us, a sizable proportion of students and families access services provided through the community school, particularly the mental or behavioral health services and the afterschool program.

Outcomes evaluation

Mathematic performance—descriptive results

J.C. Nalle student **performance in mathematics improved after the intervention with respect to all measures we examined** in our descriptive analyses, including increases in the percentage of students scoring proficient or advanced, decreases in the percentage of students scoring basic or below basic, increases in average test scores, and increases in student test score gains over time.

After the intervention, J.C. Nalle students' mathematics scale scores and gain scores were on par or slightly better than the District average.

Students have sustained gains in math. In 2014, 52 percent of J.C. Nalle students performed at proficient or higher in math; 13 percent performed below basic.

Reading performance—descriptive results

Although there was an increase in the percentage of students scoring at or above proficient in reading after the intervention, this was offset by an increase in the percentage of students scoring below basic in reading. Over the five year analysis period, there were declines in reading gain scores. These declines were evident among most student cohorts.

After the intervention, J.C. Nalle students' reading scale scores and gain scores remained below the District average.

Students continue to lag in reading. In 2014, 30 percent of J.C Nalle students performed at proficient or higher in reading; 26 percent performed below basic.

Math and reading growth for J.C. Nalle students vs. matched comparison students

J.C. Nalle students demonstrated growth in mathematics that was 3.62 points (0.21 s.d.) greater than matched students attending other public schools in DC – roughly equivalent to 4.7 months of learning.

J.C. Nalle students' reading growth was 1.74 points lower (-0.12 s.d.) than matched comparison students'. The magnitude of this effect is roughly half the size of Nalle's positive effect on student mathematics performance.

Implementation evaluation

Primary drivers of improved academic performance

An emphasis on technology as a tool for learning and teaching.

Findings from our analysis suggest that the use of interactive online education programs, particularly Spatial-Temporal Math (ST Math) and First in Math, seemed to be a key factor in

driving the improved math test scores. Both programs are aligned with Common Core standards and cover a set of concepts in each grade level. Teachers use ST Math to produce reports on student needs, allowing them to provide more individualized instruction. Because it is based online, students can access ST Math from classroom computers as well as mobile devices and tablets. One key reason why the online education programs seem to be effective is that children enjoyed them and used them in different settings, including in the classroom, during afterschool and Saturday School, and at home. In addition, the online programs gave teachers real-time feedback on how students were doing so that they could develop individualized lessons plans. During the 2012-13 school year, when J.C. Nalle had the highest test score gains in math in the District, they also had the highest ST Math completion rates. In addition, some informants cited the general influx of technology into the school including more computers, laptops and tablets and interactive, electronic Promethean white boards as key contributors as well. Teachers received professional development and parents were offered training to help make use of technology to support student learning.

Extended learning time that supported individualized instruction.

We found that extending the school day allowed teachers of students in grades one to five to provide uninterrupted instruction in core academic subjects during the morning math and reading blocks. During that time, classroom teachers were able to spend time delivering instruction while reading and math specialists were also able to work one-on-one and in small groups with struggling students. In addition, we found that teachers had more time in the afternoon when students were participating in classes like art, music, and Spanish, to review student work and plan their lessons accordingly. Teachers also would meet one-on-one or in small groups with students in the afternoon to reinforce academic content. Learning time was extended even further with the introduction of Saturday School, and academically focused program that allowed students and their families to work together on academic skills and content outside of the traditional school day in a fun and engaging format.

The new interventions built on a strong foundation of support.

A supportive learning environment for all students.

Our analyses found that J.C. Nalle Community School takes a "whole child" approach to promoting student success—addressing both academic and non-academic barriers to learning. Many J.C. Nalle students, most of whom are from economically disadvantaged families, face challenging family circumstances that can lead to behavioral and emotional problems. As a community school, J.C. Nalle has partnered with NCCF and other community-based organizations to ensure that the school can meet the needs of the whole child. A common theme heard among informants of different types is that the school has helped to support student achievement by helping to remove nonacademic barriers to learning – especially by providing convenient access to mental and physical health services and supports. As a community school, J.C. Nalle works to meet the needs of students' families as well. Multiple informants highlighted the ways in which school staff and NCCF staff partner with students' families to foster a supportive learning environment at school and at home.

An academic climate that promotes high expectations for all.

We found that J.C. Nalle has been able to establish a school-wide climate of high academic expectations. Multiple informants commented on the skill and dedication of the teachers; and both teachers and NCCF staff remarked on the dedication and support provided by school administrators to set high standards for staff and students. Several parents noted that they value the way that many teachers at the school are able to assess a student's ability and challenge them to improve. Several parents also noted that school staff and NCCF staff work

particularly hard with struggling students so that they will also be able to achieve at high levels. These high expectations were evident in students' remarks as well. Some students expressed an enthusiasm for attaining high levels in the on-line educational programs, others stated that they valued the extended learning opportunities such as a longer school day and Saturday School as ways to learn more and "get smarter."

Cost analysis

J.C. Nalle has leveraged funds from DCPS and the Freddie Mac Foundation.

Since 1994, the Freddie Mac Foundation has provided approximately $11.1 million in funding to support J.C. Nalle and the National Center for Children and Families to provide a wide range of services and supports to students and their families. These services complement the academic learning that takes place through traditional instruction in ways that can bolster cognitive and social development.

For the 2012-13 school year, in addition to its standard budget allocation, J.C. Nalle received a "*Proving What's Possible*" grant from DCPS for $275,000. The grant funded the extension of the school day and technological innovations to support learning.[x] This additional financial support allowed J.C. Nalle flexibility to tailor innovative solutions for its student population. The school received an extension of that grant in 2013-2014 in order to fund the extended school day. The school also underwent a $6.8 million building renovation during the summer of 2012.

J.C. Nalle costs in comparison to similar schools.

J.C. Nalle has a per-pupil expenditure allocation of $10,858, which is approximately $1,400 lower than the average annual allocation for other elementary schools in the district serving primarily low-income students. However, when funding from J.C. Nalle's community partnerships is added to the DCPS per-pupil expenditure, the school is effectively providing $14,030 in academic, social, and material support to each of its students each year. The cost per student beyond the per-pupil expenditure of $10,858 is similar to the estimated average per-enrollee cost for elementary and middle school out-of-school time programs nationwide, although the services at J.C. Nalle are provided during and after the traditional school day.

Next steps

In this section, we offer several recommendations for J.C. Nalle's consideration. We preface these recommendations with two observations drawn from the evaluation and from relevant research literature.

The first observation is that there is no silver bullet—a wide range of supports is needed to support student learning.

Not surprisingly, no single factor explains why J.C. Nalle has been effective in improving students' math performance. According to many informants, and consistent with research on factors that promote school success, it is unlikely that a single factor alone would work to improve student outcomes (Moore & Emig, 2014). Given the myriad issues facing some students at J.C. Nalle, there are non-academic barriers to learning. By providing a range of academic and non-academic services, and by tailoring supports to the needs of individual students and families, J.C. Nalle helped students overcome at least some of the barriers they faced.

Turning around a low-performing school serving disadvantaged children doesn't happen overnight. It takes committed and distributed leadership, trust among staff, and ability to leverage outside resources. It is not feasible for external research at a single school to be

ongoing, so there is a need for school staff, with support from DCPS and external partners, to continually re-examine data to build off success and to identify areas needed for growth.

Our second observation is that improving reading in upper elementary grades can be particularly challenging.

The results of the matched comparison analyses presented in this report suggest that math and reading scores among J.C. Nalle students were not significantly different from their peers in years prior to the 2012-2013 school year, when a set of "interventions" was introduced, including technology, educational online programs, extended learning time, school-wide renovations, and more; however, J.C. Nalle students outperformed their peers in math, but not reading, in the two years since the intervention. Several factors may have contributed to the absence of positive effects in reading:

Later introduction of Lexia, online educational literacy program. In addition, the fact that both math programs were implemented in 2012-13 while the literacy program was not implemented until the following year means that students have had less exposure to the program and may also mean that teachers had fewer hours of professional development related to its use in the classroom. In addition, a number of reading teachers were out of the building for some portion of the school year on long-term leave, which likely influenced implementation of the reading software. Finally, it is possible that these interventions had a more significant impact on reading skills for students in the lower grades who were not included in our analytic sample.

Timing of the intervention. Lauer and colleagues (2003) noted that early elementary students were more likely to benefit from reading interventions than older students. This may have implications for the findings presented in this evaluation because our analyses were restricted to late elementary students (grades 3-5). It is possible that early elementary students exposed to the set of interventions that were initiated in 2012-13 may demonstrate greater reading gains than their peers.

Finding larger effects in math than reading is not uncommon in related literature. There is evidence from studies of academic-oriented out-of-school time and related education interventions that such programs tend to have a larger effect on math performance than reading performance (Herrera, Grossman, & Linden, 2013; Dobbie & Fryer, 2011; Decker, Mayer, & Glazerman, 2004; Lauer, 2003). While the literature referenced above suggests that math scores might be more malleable than reading scores, particularly for the older elementary students that are the focus of these analyses, few are directly comparable to the current study because they tend to focus on a specific intervention or program. The changes at J.C. Nalle weremuch broader in nature.

With these thoughts in mind, we offer the following recommendations for next steps for J.C. Nalle and for the education community more broadly:

1. **Work to maintain gains in math performance.**

   The math test scores seem to be influenced, at least in part, by the use of interactive online educational programs, ST Math and First in Math. Implementation and outcomes studies focusing on these interventions note that effects may be less likely if the program is not implemented fully and as intended. Based on information from these studies and teacher informant interviews, it is important for new teachers to receive professional development to ensure their most effective use. In addition, to continue to bolster use of the programs at home, continued trainings for parents may prove useful as well. Professional development may also be needed to inform teachers how to best use iPads, laptops, and Promethean boards to support student learning.

Research on individual and small-group tutoring as well as out-of-school time learning highlight the importance of using individualized and small-group instruction to improve academic achievement outcomes (Bodilly & Beckett, 2004; Redd et al., 2012). In addition, parents interviewed noted how helpful it was to have NCCF staff teach them techniques for helping their children to "calm down" and become more ready to learn. In a number of cases, the non-academic supports for learning were referenced as critical for helping to overcome barriers to learning.

2. To improve students' reading performance, a more intense, targeted, coordinated effort may be needed.

Given the lack of progress in reading test scores, the school, along with community partners, should consider redoubling their efforts with a cohesive set of evidence-based and targeted interventions. When selecting interventions, the school leaders should consider those that are feasible for them to implement and that have been proven to be effective with similar populations. Summaries of effective interventions and best practices for helping students who are struggling with reading can be found in What Works Clearinghouse practice guides.[xi]

One potential gap in the community school model is in the supports for children during the summer months when the camp is not held at J.C. Nalle. During the 2014 summer, when the camp was not held at the school, many parents stated that they might be less likely to send their child to the camp since it was located a bit farther from where they live. Research finds that low-income children experience greater "learning loss" during summer months as compared to higher income children who may do more reading or participate in activities or do reading or continue to be stimulated in other ways (Cooper et al., 1996; Terzian & Moore, 2009). Evidence-based summer learning programs such as Building Educated Leaders for Life (BELL) have been found to be effective in preventing summer learning loss or even in boosting reading test scores (Chaplin & Capizzano, 2006; McCombs, Augustine, & Schwartz, 2011). To help prevent or minimize this loss of learning during the summer months, parents might be encouraged to enroll their children in the summer program regardless of its location. Another option for increasing participation in summer camp if it is not held at J.C. Nalle or a nearby school might be to provide transportation to the camp from J.C. Nalle, funding permitting, or adult-supervised walking groups, if deemed safe and realistic.

Given the fact that parents, school staff, and NCCF staff all commented on the prevalence of challenging student behavior, an approach to improve reading performance that also emphasizes social-emotional outcomes may be effective. There is some evidence that deficits in social skills and literacy skills are associated across the elementary school years. For example, one study found that behavior problems in early elementary grades were associated with low literacy skills and that poor reading performance in early grades was similarly associated with behavior problems later in elementary school (Miles, 2006). Another study found that kindergarten students with poor literacy skills but strong social skills tended to have better reading scores in fifth grade than their peers with poorer social skills (Cooper, 2014).

A number of school-wide interventions that target social-emotional outcomes have been shown to impact math and reading performance among elementary school students (Jones, Brown, & Aber, 2011; Rimm-Kaufmann & Sawyer, 2014; Snyder et al., 2009). Of particular interest, experimental evaluations of Responsive Classroom (Rimm-Kaufmann & Sawyer, 2014) and Positive Action (Snyder et al., 2009) found slightly larger impacts on reading than math. Additionally, an experimental evaluation of the 4Rs program found greater impacts on literacy for students with behavior problems at baseline (Jones, Brown, & Aber, 2011). Some common features of these successful programs include an emphasis on training school

administrators and teachers (including ongoing coaching), an interactive approach to instruction, and an integration of social-emotional content within the classroom and across the school.

A large body of research demonstrates the central influence that parents have on their children from pre-birth into adulthood across a wide range of outcomes. Parents have influence children through their own attitudes and behaviors (Morris et al., 2007; Voisin & Hong, 2012). Home visiting and parenting programs have been effective in changing parenting outcomes. Through this research, J.C. Nalle was found to have high levels of parent engagement based on interview and observation data. The school can take advantage of their parent engagement levels by identifying interventions found to increase reading at home, particularly during the summer months.

Although Lexia is an evidence-based program noted in the U.S. Department of Education's What Works Clearinghouse, the evaluations cited were conducted in schools using it for Kindergarten and first graders. While less rigorous research suggests that it is also effective for children in older elementary school and middle school grades, more research may be needed to confirm its effectiveness for students in higher grades. In addition, the program is newly implemented and there is evidence to suggest that staffing challenges may have compromised the fidelity with which the program was implemented. School leadership may want to assess whether the program is being implemented well and, if not, provide additional training and seek out opportunities for coaching or observations to understand how to best use the program.

3. There is a need to better understand why and how technology influences student outcomes.

More research is needed to better understand whether and how technology is linked to improved test scores. The use of tablet computers and interactive whiteboards were remarked upon by all categories of informants interviewed for this study. While this is a new area of education research, there is preliminary evidence that such technologies can have a positive influence on student performance, *although the introduction of technology of itself does not necessary produce results*. In fact, a recent meta-analysis noted that technology interventions rarely seem to produce significant improvements in reading skills in the absence of extensive professional development to help teachers integrate technology into literacy interventions (Cheung & Slavin, 2012). Additionally, an evaluation of the effect of interactive whiteboards in elementary school classrooms found small improvements in math and science performance – and no significant improvement in reading– during the initial year, although these benefits seemed to disappear in the second year (Higgins, 2010). Research also suggests that comprehensive professional development training for teachers is particularly critical in utilizing technology to increase student outcomes.

Through the District's *Proving What's Possible* grant, 40 low-performing schools were given grants that enabled them to invest in extended learning time, technology, or staffing and training-related investments in "talent." Options for more rigorous analyses might include comparisons of student outcomes in schools that implement certain interventions in comparison to those for similar students in schools that do not. This might help to better isolate the effects of particular interventions, such as implementing online educational games or of lengthening the school day. If the grant is expanded, as it was for the 2014-2015 school year, it may be possible to test interventions by randomly assigning which schools receive certain types of interventions. Any school-specific or multi-site evaluation of the effects of a specific intervention should also include a complementary implementation evaluation to provide information on the quality and intensity of program implementation.

4. **It is important to examine a wider range of outcomes targeted by community schools.**

   J.C. Nalle, as do most community schools, targets outcomes across all domains of children's development. Therefore, future evaluation efforts should seek to examine effects on social, emotional, behavioral, physical, and other outcomes of interest. Beyond student test scores, there are a large number of academic outcomes that might be affected by the school, including school engagement, academic self-efficacy, and achievement motivation. Not only are these outcomes important for assessing effects on student well-being, but examining such outcomes can also shed some light on how pre-existing interventions that target non-academic barriers to learning might influence the efficacy of more academically-focused interventions. Parents receive a number of services from the community school, so future research efforts should collect data from parents to explore the benefits that they or their families have experienced, such as gaining access to affordable, stable housing or increases in parent engagement levels. Funding permitting, outcomes should be examined for students and parents at J.C. Nalle in comparison to those from similar schools that do not operate as community schools.

Appendix A: Figures and Tables

Table A.1 Descriptive statistics for J.C. Nalle students by grade and year: 2009-2014 school years

	Total						Grade 3						Grade 4						Grade 5					
		Year[1]						Year[1]						Year[1]						Year[1]				
	Total	10	11	12	13	14	Total	10	11	12	13	14	Total	10	11	12	13	14	Total	10	11	12	13	14
Demographics																								
Age (avg.)	9.6	9.6	9.6	9.7	9.4	9.7	8.6	8.7	8.6	8.7	8.4	8.5	9.5	9.5	9.6	9.6	9.6	9.5	10.6	10.7	10.5	10.7	10.5	10.7
Econ. Disadvantage[2] (%)	80	94	89	71	73	75	81	95	82	63	74	87	81	91	94	78	71	73	79	95	89	74	73	67
ELL[3] (%)	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0
Homeless (%)	7	—	—	7	8	6	8	—	—	6	11	8	6	—	—	4	7	5	8	—	—	11	7	6
Male (%)	42	37	42	44	46	43	43	39	46	40	58	33	46	38	44	39	40	63	39	33	36	50	40	37
Race/Ethnicity																								
Black (%)	96	96	94	96	95	97	96	100	96	94	92	97	95	91	97	96	95	97	96	95	89	97	100	96
Hispanic (%)	4	4	6	4	5	3	4	0	4	6	8	3	5	9	3	4	5	3	4	5	11	3	0	4
School mobility[4] (%)	21	—	13	20	25	23	—	—	—	—	—	—	19	—	16	17	21	22	20	—	11	20	23	24
Special education[3] (%)	7	4	1	5	8	12	5	9	4	3	3	5	9	3	0	9	12	18	6	0	0	5	10	13
Attendance Zone[5]																								
In-boundary	61	64	59	61	58	61	60	64	56	54	59	64	60	61	58	62	61	59	62	65	63	66	53	60
Neighborhood J-1	2	1	0	4	4	2	2	0	0	6	3	3	1	0	0	0	5	0	3	2	0	5	3	2
Neighborhood J-2	32	35	36	31	29	32	32	38	33	29	28	31	33	35	33	33	29	32	33	30	41	32	30	33
Neighborhood J-3	5	7	4	4	5	5	4	4	4	0	5	8	4	3	6	8	2	3	7	14	4	5	7	4
Neighborhood J-4	12	13	13	12	10	12	13	13	15	17	10	13	14	19	11	8	15	14	9	9	15	11	3	10
Neighborhood J-5	9	7	6	9	11	11	8	9	4	3	13	10	9	3	8	12	10	11	10	9	4	13	10	12

—Not available.

[1]Year labels refer to the spring of the school year (e.g., "10" refers to the 2009-10 school year).

[2]Students were characterized as economically disadvantaged if they qualified for free- or reduced-price lunch or their parents received SNAP or TANF. Students initially coded as attending a "Community Eligibility Option" were not counted as economically disadvantaged. Eighty-seven percent of JC Nalle students who were coded as attending a Community Eligibility Option in 2014 were categorized as paying for lunch in 2013.

[3]Students were coded as ELL or Special Education based on whether they received accomodations on the assessment for these reasons in a given year.

[4]School mobility involves being listed as attending a different school in the prior school year than in the current school year. A small number of students who were held back in grade 3 are included in the total estimate for school mobility, but not reported separately.

[5]Data on in-boundary students may differ than that reported by the District of Columbia Public Schools because of student address cleaning Child Trends performed for this project. Neighborhoods J-1 through J-5 refer to Census tracts 99.03 through 99.07, which are those tracts that overlap with Nalle's school attendance zone.

SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Office of the Chief Technology Officer, DC Office of the Deputy Mayor for Education, and U.S. Census TIGER/Line Shapefiles.

Table A.2. Characteristics of matched comparison neighborhoods: 2008-12

Neighborhoods (Census tracts)	Median income (to nearest $1,000)[1]	Percent		
		BA degree or higher[2]	Black	White collar[3]
Washington, DC (Total)	**64,000**	**29**	**35**	**21**
Matched comparison neighborhoods[4]				
M-1 (Tract 77.03)	43,000	10	99	17
M-2 (Tract 77.08)	36,000	13	98	41
M-3 (Tract 78.03)	38,000	18	97	33
M-4 (Tract 78.07)	22,000	5	99	16
M-5 (Tract 78.09)	35,000	15	97	39
M-6 (Tract 96.02)	18,000	4	100	16
M-7 (Tract 96.04)	64,000	19	94	29

[1]Median family income in 2012 inflation-adjusted dollars.

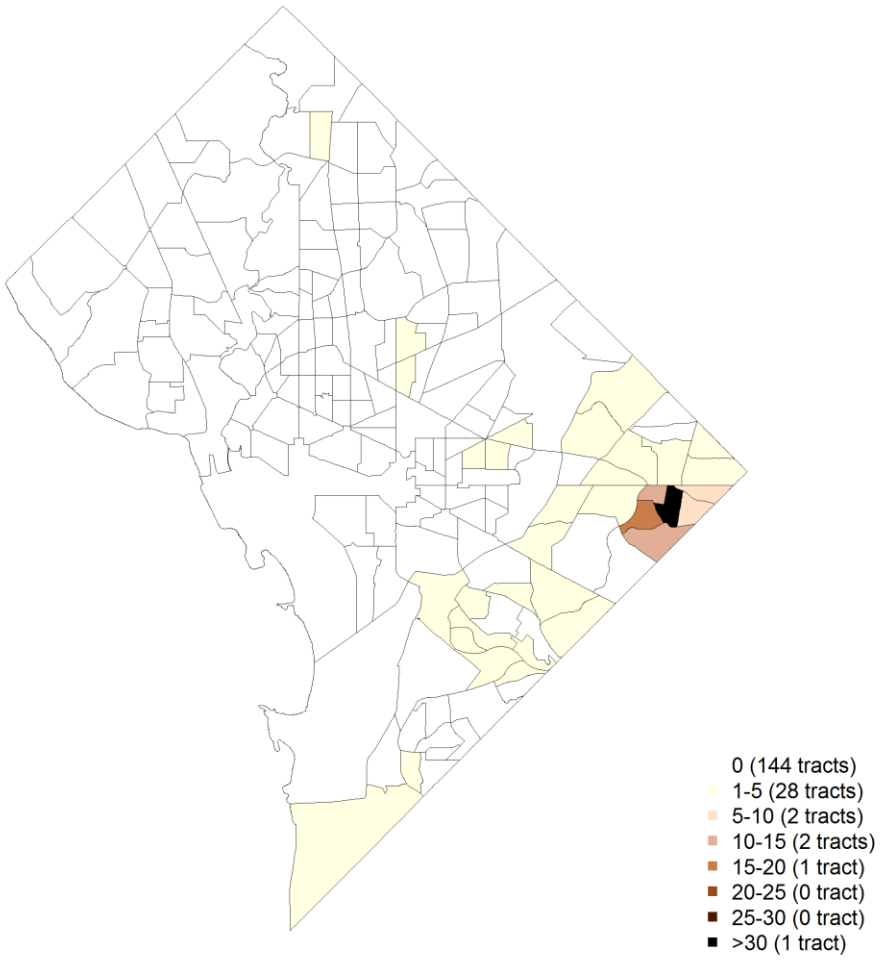
[2]Educational attainment for population 25 years and over.

[3]Percent of employed civilian population ages 16 and over who are in management, professional, and related occupations.

[4]Matched comparison neighborhoods matched one or more Nalle neighborhoods. For information on which neighborhoods matched which, see table A.2.

SOURCE: Child Trends tabulations using American Community Survey, 5-year estimates, 2008-12; Census TIGER/Line shapefiles; and attendance zone information based on data from the DC Office of the Chief Technology Officer and the DC Office of the Deputy Mayor for Education.

Figure A.1. Average number of J.C. Nalle students by neighborhood: 2009-2014



SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Chief Technology Officer, and U.S. Census TIGER/Line Shapefiles.

Table A.3 Descriptive statistics for all J.C. Nalle fourth and fifth grade students versus the J.C. Nalle analytic sample: 2011-14

	Total					Analytic sample				
Characteristics	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Grade										
Fourth	299	0.48	0.501	0	1	245	0.49	0.501	0	1
Fifth	299	0.52	0.501	0	1	245	0.51	0.501	0	1
Year[1]	299	2012.64	1.145	2011	2014	245	2012.66	1.137	2011	2014
Attendance Zone[2]										
In-boundary	285	0.60	0.49	0	1	245	0.58	0.495	0	1
Neighborhood J-1	285	0.02	0.144	0	1	245	0.02	0.127	0	1
Neighborhood J-2	285	0.33	0.47	0	1	245	0.29	0.456	0	1
Neighborhood J-3	285	0.05	0.209	0	1	245	0.03	0.178	0	1
Neighborhood J-4	285	0.11	0.312	0	1	245	0.13	0.333	0	1
Neighborhood J-5	285	0.10	0.303	0	1	245	0.11	0.314	0	1
Demographics										
Age	299	10.11	0.721	8.2136	12.25	245	10.09	0.716	8.214	12.25
Econ. Disadvantage[3]	296	0.77	0.421	0	1	245	0.78	0.415	0	1
ELL[4]	291	0.00	0.059	0	1	245	0.00	0.064	0	1
Homeless	231	0.07	0.254	0	1	192	0.06	0.243	0	1
Male	299	0.43	0.497	0	1	245	0.45	0.498	0	1
Race/Ethnicity										
Black	299	0.96	0.189	0	1	245	0.96	0.198	0	1
Hispanic	299	0.04	0.189	0	1	245	0.04	0.198	0	1
School mobility[5]	279	0.21	0.409	0	1	245	0.18	0.385	0	1
Special Education[4]	291	0.10	0.295	0	1	245	0.09	0.286	0	1
Achievement										
Math score	290	-2.92	16	-58.73	29.11	245	-3.28	16.17	-58.7	29.11
Math score lagged	277	-2.81	15.93	-58.73	28.85	245	-2.89	16.02	-58.7	28.85
Math gain score	261	-0.09	10.53	-36.16	42.66	245	-0.39	10.52	-36.2	42.66
Reading score	290	-4.68	13.81	-63.84	22.16	245	-4.67	13.83	-63.8	22.16
Reading score lagged	277	-3.73	12.8	-49.41	25.73	245	-3.44	12.92	-49.4	25.73
Reading gain score	261	-1.12	8.909	-48.33	24.59	245	-1.22	8.544	-48.3	24.59

* p<.05. There were no statistically significant differences between total and analytic sample means.

[1]Year labels refer to the spring of the school year (e.g., "10" refers to the 2009-10 school year).

[2]Data on in-boundary students may differ than that reported by the District of Columbia Public Schools because of student address cleaning Child Trends performed for this project. Neighborhoods J-1 through J-5 refer to Census tracts 99.03 through 99.07, which are those tracts that overlap with Nalle's school attendance zone.

[3]Students were characterized as economically disadvantaged if they qualified for free- or reduced-price lunch or their parents received SNAP or TANF. Students initially coded as attending a "Community Eligibility Option" were not counted as economically disadvantaged.

[4]ELL or Special Education indicates receipt of assessment accomodations for these reasons in a given year.

[5]School mobility involves being listed as attending a different school in the prior school year than in the current school year.

SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education, DC Office of the Chief Technology Officer, DC Office of the Deputy Mayor for Education, and U.S. Census TIGER/Line Shapefiles.

Table A.4 Outcomes evaluation data and sources

Source	Data	Year[1]
District of Columbia (DC) Office of the State Superintendent of Education (OSSE)	Enrollment and demographic information	2010-2014
	DC CAS results	2010-2014
	Student addresses	2013-2014
	Homelessness information	2012-2014
DC Public Schools (DCPS)[2]	Student addresses	2010-2012
DC Public Charter School Board (DCPCSB)[2]	Student addresses	2010-2012
American Community Survey (ACS)[3]	Neighborhood (Census tract) demographics	2008-12
U.S. Census TIGER/Line Shapefiles	Neighborhood (Census tract) shapefile	2012
DC Geographic Information System, Office of the Chief Technology Officer	Elementary school attendance zone shapefile	2012
	DC address points (longitude and latitude)	2012
	Closed public schools	1971-2013
DC Office of the Deputy Mayor for Education	Elementary school attendance zone map	2014

[1]Year refers to spring of the academic year for (OSSE) data.

[2]DCPS and DCPCSB provided student address data for 2010-2012 to OSSE, which provided the data to Child Trends.

[3]ACS data were downloaded via Social Explorer.

Table A.5. Standardized mean differences between J.C. Nalle (J) neighborhoods and matched comparison (M) neighborhoods on matching characteristics: 2008-12

Neighborhood comparisons	Matching characteristics			
		Percent		
	Median income[1]	BA degree or higher[2]	Black	White collar[3]
J-1 vs. M-7	-0.0931	0.1017	0.0644	1.4422
J-2 vs. M-3	-0.0621	-0.1245	-0.1381	-0.2120
J-2 vs. M-5	-0.0155	-0.0042	-0.1192	-0.4747
J-3 vs. M-1	-0.0621	0.1308	-0.0229	0.3853
J-3 vs. M-2	0.0466	0.0217	-0.0034	-0.7592
J-3 vs. M-3	0.0155	-0.1441	0.0282	-0.3848
J-3 vs. M-5	0.0621	-0.0238	0.0472	-0.6475
J-4 vs. M-1	-0.0155	0.0049	-0.0593	0.3753
J-4 vs. M-2	0.0931	-0.1041	-0.0398	-0.7691
J-4 vs. M-5	0.1086	-0.1497	0.0107	-0.6574
J-5 vs. M-4	0.0776	-0.0056	-0.1104	0.4733
J-5 vs. M-6	0.1397	0.0365	-0.1254	0.5083

[1]Median family income in 2012 inflation-adjusted dollars.

[2]Educational attainment for population 25 years and over.

[3]Percent of employed civilian population ages 16 and over who are in management, professional, and related occupations.

NOTE: Census tracts aligning with neighborhood abbreviations are listed in table A.1.

SOURCE: Child Trends tabulations using American Community Survey, 5-year estimates, 2008-12; Census TIGER/Line shapefiles; and attendance zone information based on data from the DC Office of the Chief Technology Officer and the DC Office of the Deputy Mayor for Education.

Table A.6. Standardized mean differences between Nalle and non-Nalle students before and after Propensity Score Matching and amount of bias reduced

	Before		After		
Characteristic	smd[1]	p	smd[1]	p	Bias Reduced
Age	0.123	0.068	0.031	0.685	0.744
Economic disadvantage[2]	-0.428	0.000	0.129	0.096	0.698
Homeless	0.133	0.076	0.037	0.633	0.723
Homeless missing[3]	-0.097	0.129	0.000	1.000	1.000
Male	-0.115	0.079	0.061	0.434	0.474
Black	0.797	0.000	0.000	1.000	1.000
School mobility[4]	0.242	0.001	0.020	0.796	0.917
Special education[5]	-0.135	0.025	-0.125	0.107	0.076
Prior year reading scaled score	-0.262	0.000	0.024	0.756	0.908
Prior year math scaled score	-0.202	0.001	0.007	0.928	0.965

[1]smd = standard mean difference.

[2]Students were characterized as economically disadvantaged if they qualified for free- or reduced-price lunch or their parents received SNAP or TANF. Students initially coded as attending a "Community Eligibility Option" were not counted as economically disadvantaged. Eighty-seven percent of JC Nalle students who were coded as attending a Community Eligibility Option in 2014 were categorized as paying for lunch in 2013.

[3]A dummy variable for missing information on homelessness was included in the analysis because homeless data was not available for the 2010-11 school year.

[4]School mobility involves being listed as attending a different school in the prior school year than in the current school year.

[5]Students were coded as special education based on whether they received accomodations on the assessment for that reason in a given year.

SOURCE: Child Trends tabulations based on data from the District of Columbia (DC) Office of the State Superintendent of Education.

Appendix B: NCCF Services

Saturday School program

Population served	Number served	Time period	Years offered
1st – 5th grade students and their families	78 students 30 adults	October-April	2012-2013
1st – 5th grade students and their families	75 students 39 adults	October-April	2013-2014

Mental health support services

Population served	Number served	Time period	Year
Students in Montessori-5th grade	132	Throughout the school year	2010-2011
Students in Montessori-5th grade	128	Throughout the school year	2011-2012
Students in Montessori-5th grade	X	Throughout the school year	2012-2013
Students in Montessori-5th grade	189	Throughout the school year	2013-2014

Parent and family support services

Population served	Number served	Time period	Year
Family referral services			
Family members of students in Montessori-5th grade	265	Throughout the school year	2009-2010

Family members of students in Montessori-5th grade	371	Throughout the school year	2010-2011
Family members of students in Montessori-5th grade	373	Throughout the school year	2011-2012
Family members of students in Montessori-5th grade	267	Throughout the school year	2012-2013
Family members of students in Montessori-5th grade	265	Throughout the school year	2013-2014
Parent University at Nalle			
Family members of students in Montessori-5th grade	121	Throughout the school year	2010-2011
Family members of students in Montessori-5th grade	261	Throughout the school year	2011-2012

Summer program services

Population served	Number served	Time period	Year
Students in Montessori-5th grade	125	Summer	2010
Students in Montessori-5th grade	150	Summer	2011
Students in Montessori-5th grade	150	Summer	2012

Students in Montessori-5th grade	200	Summer (at Nalle)	2013
Students in Montessori-5th grade	110	Summer	2014

Wrap-around services and referrals to social services

Population served	Number served	Time period	Year
Students, Montessori-5th grade	131	Throughout the school year	2010-2011
Students, Montessori-5th grade	187	Throughout the school year	2011-2012
Students, Montessori-5th grade	200	Throughout the school year	2012-2013
Students, Montessori-5th grade	187	Throughout the school year	2012-2013

International Trips

Population served	Number served	Time period	Years offered
Students in 4th and 5th grades	15-22	Early summer	2006-2013

Appendix C: Technical Report

Data Cleaning

All student-level data were provided to Child Trends in Microsoft Excel format and imported into Stata SE, version 13.1, using Stata's import Excel function. Data cleaning programs were written to convert "NULL" values to system missing values, encode string variables as numeric categorical variables, and recode variable values as needed for analysis.

Missing USIs

There were six cases that were missing Universal Student Identifiers (USIs). We dropped four of these cases, and back-mapped the USI in two cases by matching them with cases in future years using birth date, grade, school code, gender, special education status, and English Language Learner status.

Duplicate records

We identified completely duplicate records (where all variables matched) and dropped them from the analysis files. Because individual records should have been uniquely identified by universal student identifier (USI) and year, we also addressed cases where there were duplicate records according to USI and year. In these cases, we dropped any duplicate records based on communications with an OSSE representative regarding OSSE's authoritative audit database or based on what other data was available on the record.

Time-invariant variables

We identified discrepancies in the OSSE data file with respect to time-invariant variables (i.e., gender, race/ethnicity, and date of birth) that inappropriately varied across years within a single student. For example, a student may have been coded as male in one year and female in the next. We corrected these discrepancies by replacing all values for a given time-invariant variable for a given student with the modal (most frequently reported) value. In cases where there were multiple modal variables, the most recently reported value was used.

Student addresses

Student address data were cleaned through an iterative process to ensure that (1) street types (e.g., road, avenue, street, terrace) were not abbreviated, (2) DC quadrants were listed consistently (e.g., NE versus northeast), (3) zip codes were listed consistently (i.e., 5-digit zip codes versus 9-digit zip codes), (4) street misspellings were corrected, (5) street names were not abbreviated (e.g., N Capitol versus North Capitol), (6) all extraneous information (e.g., apartment number) was removed from the address, and (7) all addresses were listed in the same format (i.e., street number street name street type and quadrant). Once the address cleaning code was finalized in Stata, the cleaning code was run on the raw address data to ensure that all addresses were cleaned consistently.

School attendance zone shapefiles

In matching the school names on the student enrollment file with the school names on the school attendance zone shapefile from the DC Office of the Chief Technology Officer, we recognized that there were inconsistencies based on school closures. By examining a geocoded list of school

closures, along with a PDF map of school attendance zones as of the 2013-14 school year, we were able to modify the school attendance zone shapefile to take into account changes over time in Nalle and matched comparison neighborhoods. We identified one case where students in one school attendance zone could attend one of two assigned schools between 2010 and 2014 because the initial school for that attendance zone had been closed. In another case, a school closed in 2013 and so students in that zone were assigned a new school in 2014. In a third case, a school closed in 2012, and the students in that school's zone were assigned to attend either of two schools in 2013 and 2014.

Data merging

From OSSE, we received separate enrollment, assessment, and homelessness files for DCPS students and charter school students. We appended the charter school student enrollment file onto the DCPS student enrollment file. We then did the same for the assessment and homelessness files. After doing initial cleaning and coding of the files, we merged them by USI and year.

Although student addresses were available on the OSSE-provided enrollment files for 2012-13 and 2013-14, prior years' address information was not. Because these data were needed for our neighborhood-based propensity score matching analysis, OSSE requested address data for the 2009-10, 2010-11, and 2011-12 school years from DCPS and DCPCSB, and then relayed these data files to Child Trends. We aggregated data files across years and across the DCPS and DCPCSB files. We then merged these data into the dataset with enrollment, assessment, and homelessness information by USI and year, and cleaned the addresses. Hereafter, we will refer to this as the student data file.

Then we added longitude and latitude information for student addresses in the student data file. To do so, we merged the student file with the DC address point file by students' home street address and zip. We were able to match 91 percent of the addresses on the student data file. The 9 percent of students who we were not able to obtain latitude and longitude information on were excluded from the analysis.

The next step was to add neighborhood information to the student file by identifying which neighborhood (i.e., census tract) each student lived in. Utilizing a shape file that mapped out all Census tracts in the district, we identified which neighborhood each student lived in based on the latitude and longitude of their home address. We used Geographic Information System (GIS) mapping techniques (a spatial join of address points to neighborhood polygons) to accomplish this.

Now that we had information on which neighborhood each student resided in, we merged in neighborhood characteristics from the ACS for each student using the Geographic ID of each census tract.

Finally, we added school attendance zone information to the updated student file, again using GIS mapping techniques. That is, we overlaid each student's address point on the polygon of the school attendance zone so as to obtain information regarding whether the student lived in or out of the school attendance zone boundary of the school he or she attended.

Variables

Student Demographic Variables

Age

Using the student's date of birth, we derived an age variable that represented students' age on the date that OSSE conducts enrollment verification (October 5th of each academic year).

Economic Disadvantage

We generated a dummy variable indicating economic disadvantage based on students' free- and reduced- price meals ("FARMS") status. In OSSE's data file, in 2010, students were characterized as eligible for free lunch, eligible for reduced-price lunch, or ineligible for either (paid lunch). In 2011 and beyond, the data file distinguished between whether students were eligible for free-lunch through a traditional application or via direct certification on account of their parents being enrolled in SNAP or TANF programs. In 2013, a new category was added that indicated whether a student was eligible for free lunch as a result of attending a Community Eligibility Option school. To be identified as a Community Eligibility Option school, at least 40 percent of the school's student population must be direct certified, homeless, or foster care. From our analysis of the OSSE data file, it appears that typically, students were only categorized as Community Eligible if they were not, themselves, deemed eligible for free- or reduced-price lunch through application or direct certification. Eighty-two percent of students categorized as attending a Community Eligibility Option school were listed as paying for lunch in the previous year. Thus, we characterized students as economically disadvantaged if they qualified for free- or reduced-price lunch or if they were directly certified for free-lunch. Students initially coded as paying for lunch or receiving free lunch as a result of attending a Community Eligibility Option school were not counted as economically disadvantaged.

English Language Learner

We classified students as English Language Learners if they received accommodations for being an English Language Learner on the current year's DC-CAS assessment. We also had information on English Language Learner program participation from the enrollment file, but decided to utilize the data from the assessment file. We made this decision because preliminary analyses suggested incorporating both measures into our propensity score matching analysis was problematic and receiving accommodations on the assessment is more directly tied to assessment outcomes.

Homelessness

By year, students were categorized as homeless if they were listed as homeless on the homelessness data file. This data was only available for the 2011-12, 2012-13, and 2013-14 school years.

Gender

We generated a dummy variable for whether or not each student was male.

Race/Ethnicity

OSSE included data on whether or not a student was American Indian or Alaskan Native, Asian, Black or African American, Hispanic or Latino, Mixed Race, Pacific Islander, or White. Because all students in Nalle were categorized as Black or African American or Hispanic or Latino, we generated a dummy variable for each of these categories to use in our analyses.

Special education

We classified students according to whether or not they received accommodations on the current year's DC-CAS assessment because they were a special education student. As was the case for English Language Learner status, we also had information on special education status from the enrollment file, but decided to utilize the data from the assessment file. We made this decision because preliminary analyses suggested incorporating both measures into our propensity score matching analysis was problematic and receiving accommodations on the assessment is more directly tied to assessment outcomes.

School-related variables

Grade Level

Given that the outcome variable of interest is students' DC CAS scores and that students do not take the DC CAS until third grade, our sample only includes students enrolled in grades 3-5 across each academic year of interest.

In boundary

We overlaid each student's point, defined by the longitude and latitude of the home address, on each census tract's polygon boundary to obtain whether this student lived in this census tract or not. If the student's point was on the polygon boundary of the census tract or the point corresponded to the polygon's vertex, this student was also considered to be inside the polygon.

School mobility

We created a school mobility variable based on whether or not the student was listed as attending the same school in the previous year as in the current year.

Neighborhood variables

Median income

The American Community Survey (ACS) data provided the median family income in 2012 inflation adjusted dollars.

Percentage college graduates

ACS provided data on the educational attainment for the population aged 25 years and older at seven levels: less than high school, high school graduate, some college, bachelor's degree, master's degree, professional school degree, and doctorate degree. For our analysis we wanted to identify the percentage of parents who were college graduates. We therefore created a bachelor's or higher variable that included the population with a bachelor's degree or higher (bachelor's, master's, professional school, and doctorate degree.)

Percentage white collar

ACS provided data on the occupations for employed civilians 16 years and over in six categories: (1) management, professional, and related occupations, (2) service occupations, sales and office occupations, (3) farming, fishing, and forestry occupations, (4) construction, extraction, and maintenance occupations, and (5) production, transportation, and material moving occupations. For the purposes of our analyses we created a percentage of heads of house hold holding a white collar job variable using the ACS variable for management, professional, and related occupations.

Percentage Black

ACS included data on the percentages of the total population who were American Indian or Alaska Native, Black or African American, Asian, Hispanic or Latino, two or more races, Native Hawaiian or other Pacific Islander, or White. Because the student population in Nalle was, predominantly black or African American, we generated a dummy variable for percentage black residents to use in our analyses and data reporting.

Identifier and time variables

USI

All students were assigned a unique student identifier (USI) number in the OSSE dataset.

Year

The year variable was defined as the year in the spring of the corresponding academic year.

Geographic ID

ACS provided a unique geographic indicator number that corresponds to each of the 178 census tracts.

Exclusion variables

Status exclude

OSSE included data on students whose test scores were excluded for accountability purposes for various reasons, such as medical exemptions and test security violations.

Gain exclude

In generating the gain score variable, we also had to generate a variable for students whose test scores were excluded from this measure. Student's test scores were excluded from the gain score calculations if they were (1) included in the OSSE data as exclusions or (2) off track students, meaning they were either held back or skipped a grade.

Standardization techniques for calculating scale scores

On the OSSE data file, students have three-digit reading and math scores. The first digit represents the grade in which a student was tested, and the second two digits represent the student's performance. For each year, grade, and subject, student scores can range from 0 to 99. For the purposes of this analysis, we standardized the score (generated a z-score) for each year, grade, and subject. In other words, we took each score's difference from the mean score for a given subject in a given grade in a given year, and we divided the result by the standard deviation of the scores for that subject-grade-year combination. This centered scores at zero, and put them all on a standard deviation scale, where a score of +1 was one standard deviation above the average, and a score of -1 was one standard deviation below the average.

To make the scores more understandable to education stakeholders who are used to interpreting DC-CAS scores, we then rescaled these z scores, putting them back on an average (across grades and years) DC-CAS scale. For each subject, we generated an average standard deviation across grades and years using the standard deviations we calculated prior to standardization. We then multiplied our z scores by this average standard deviation. As a result, we can interpret a one-point increase in our scale as equal to (on average across years) a one-point increase on the DC CAS scale. In our analyses, we refer to these as scale scores. This approach to scale scores is

the same that DCPS uses prior to calculating gain scores for its teacher evaluation system (Isenberg & Walsh, 2014).

Propensity score matching

To mitigate selection bias via propensity score matching, it is necessary to think through how students are "selected" into J.C. Nalle or other schools and how this selection process could be related to our outcomes of interest. In Washington, DC, students may attend any traditional public school in the district or any charter school, if there is space. Students living in the attendance zone (also sometimes referred to as catchment area) of a given traditional public school have the right to attend that school. In some neighborhoods, students may have multiple schools to which they have the right to attend. As discussed above, roughly 6 in 10 J.C. Nalle students are in boundary. That is, they are attending their assigned school.

Our propensity score matching process involved two steps (figure III.2). The first step was to match at the neighborhood (census tract) level. That is, for each of the five census tracts that the J.C. Nalle catchment area covered, we matched to one or several census tracts within 2 miles of the J.C. Nalle catchment area. We matched census tracts regarding socio-economic status of census tracts, which is reflected in four factors including median family income, percent of population that is black, percent of heads of household with a white collar job, and percent of residents with at least Bachelor's degree. We conducted the matching so that the matched tracts are comparable to tracts in the J.C. Nalle catchment area, that is, the differences between matched tracts and tracts in J.C. Nalle catchment area in the four aforementioned factors are all within .15 standard deviation of the overall distribution in the DC area.

The second step was to match at the student level. We employed logistic regressions to predict a propensity score for each student, defined as the conditional probability of being enrolled as a student at J.C. Nalle given the student's value on a full set of the aforementioned covariates. Then, each student who did not attend J.C. Nalle (henceforward non-J.C. Nalle students) was selected to match each student who attended J.C. Nalle (henceforward J.C. Nalle student) that had the same or very similar propensity scores.

The match was conducted within each of the paired census tracts from the first step and based on an exact match of in or out of school boundary. That is, if a J.C. Nalle student lived within the J.C. Nalle catchment area (i.e., this student was in-boundary), this student was matched with a non-J.C. Nalle student in the paired census tract from the first step who was also in-boundary, that is, who lived in the catchment area of the school he or she attended. If a J.C. Nalle student lived outside the J.C. Nalle catchment area (i.e., this student was out-of-boundary), this student was matched with a non-J.C. Nalle student who lived in the same census tract and was also out-of-boundary, that is, lived outside the catchment area of the school he or she attended. We considered all students attending charter schools to be out of boundary. The match was conducted within each year of attendance, and within each grade. That is, a J.C. Nalle student was matched with a non-J.C. Nalle student who was enrolled in the same grade during the same academic year as the J.C. Nalle student in an effort to reduce or eliminate unobserved differences in the selection process (Cook, Shadish, & Wong, 2008). A caliper width of 0.1 standard deviations was used to ensure a sufficiently close match in propensity scores between JC and non-JC students (Caliendo & Kopeinig, 2008). The propensity score matching procedure matched participants with replacement to mitigate possible bias in the variance of the estimates (Smith & Todd, 2005). Since most of our covariates in matching are categorical, it was highly possible that two or more students could have exactly the same propensity score. These students are thus "tied" in the matching. That is, one JC student could be matched to more than one non-JC student who had exactly the same propensity score, and vice versa. The final matched sample was weighted to reflect such multiple matches; the sum of the weighted

observations was still equal to the original number of observations. This was done to avoid possible underestimation of variance in final estimates (Abadie & Imbens, 2006). Balance checking was conducted to ensure that the matching procedure was able to balance the distribution of the relevant covariates in both JC and non-JC groups.

Difference-in-difference analysis description

After propensity score matching, we conducted regressions on matched pairs. This technique was used because even after matching, small differences in distributions of covariates between the J.C. Nalle and non-J.C. Nalle groups may remain. Linear regression was applied to propensity score matched subsamples for the same reason it is used in the case of randomized experimental treatment and control group—to reduce variability and to increase the power of the comparison (Rubin & Thomas, 2000). We included key variables (paired census tracts, year, grade, and in/out of boundary) into the regression as covariates to control for unobserved factors within these variables that could be correlated with student outcomes and introduce bias into our estimates. For example, neighborhood could be correlated with exposure to crime and violence, non-school peer influences, and access to and quality of community services and institutions.

Equation for difference-in-differences analysis

$$MATH_{it} = \beta_0 + \beta_1 MATH_{i,t-1} + \beta_2 READ_{i,t-1} + \beta_3 NALLE_{it} + \beta_4 POST_t + \beta_5 NALLE_{it} * POST_t + \beta_6 INBOUNDS_{it} + \beta_7' TRACT_{it} + \beta_8' YEAR_t + \beta_9 GRADE_{it} + \beta_{10}' DEMC_i + \beta_{11}' DEMV_{it} + \varepsilon_{it} \quad (1)$$

In equation 1, for individual *i* in school year *t*, math scale score ($MATH$) is modeled as a function of: the individual's math and reading scores in the prior year ($MATH_{i,t-1}$ and , $READ_{i,t-1}$ respectively); a dummy variable (i.e., a variable that can take on the values of one or zero) indicating whether or not the student attended J.C. Nalle in school year *t* ($NALLE_{it}$); a dummy variable for whether the year is before or after the introduction of the package of interventions ($POST_t$); an interaction term indicating whether or not a J.C. Nalle student is attending school after the package of interventions went into place ($NALLE_{it} * POST_t$); a variable indicating whether or not a student was attending their assigned public school in a given year ($INBOUNDS_{it}$); a series of neighborhood fixed-effects variables ($TRACT_{it}$); a series of year dummies ($YEAR_t$) indicating the school year; a variable indicating whether or not the student was in grade 5 ($GRADE_{it}$); a series of time-constant demographic control variables ($DEMC_i$), comprised of age, gender, and race/ethnicity; and a series of time-varying demographic and other control variables ($DEMV_{it}$), indicating whether or not the student was economically disadvantaged, changed schools in the last year, received test accommodations for having a disability, received test accommodations for being an ELL student, or was homeless. The βs are the corresponding parameters to be estimated. The error term is represented by ε_{it}. The equation for modeling student growth in reading is equivalent to that for math, but reading scale score is the dependent variable.

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[i] More information on *Proving What's Possible* grants is available at http://dcps.dc.gov/DCPS/About+DCPS/Strategic+Documents/Proving+What's+Possible.

[ii] Data retrieved from http://nces.ed.gov/nationsreportcard/districts/.

[iii] Robinson, E. (1993). Children's Aid Society. An Interim Evaluative Report Concerning a Collaboration between the Children's Aid Society, New York City Board of Education, Community School District 6, and the I.S. 218 Salome Urena de Henriquez School [and] The Community Schools P.S. 5 and I.S. 218 Spring 194 Update; p. 21

[iv] Ibid, 2.

[v] Per pupil expenditures were calculated based on the DCPS total budget allocation and J.C. Nalle's actual enrollment as reported on the school profile: http://profiles.dcps.dc.gov/Nalle+Elementary+School.

[vi] Information gathered from interviews with J.C. Nalle leadership and online at http://dcps.dc.gov/DCPS/About+DCPS/Strategic+Documents/Proving+What's+Possible.

[vii] Per-pupil allocations were calculated based on the DCPS total budget allocation and each school's projected enrollment for the upcoming school year: http://dcps.dc.gov/DCPS/About+DCPS/Budget+and+Finance/FY14+Fiscal+Report+Card/Initial+School+Budget+Allocations

[viii] National Education Association (2012). Rankings and Estimates: Rankings of the States 2012 and

Estimates of School Statistics 2013, retrieved October 29, 2014 from http://www.nea.org/assets/img/content/NEA_Rankings_And_Estimates-2013_(2).pdf

[ix] Information was gathered from DC SCORES' Annual Reports.

[x] Information gathered from interviews with J.C. Nalle leadership and online at http://dcps.dc.gov/DCPS/About+DCPS/Strategic+Documents/Proving+What's+Possible.

[xi] Gersten, R., Compton, D., Connor, C.M., Dimino, J., Santoro, L., Linan-Thompson, S., and Tilly, W.D. (2008). *Assisting students struggling with reading: Response to Intervention and multi-tier intervention for reading in the primary grades. A practice guide.* (NCEE 2009-4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/; Slavin, R.E., Lake, C., Cheung, A., & Davis, S. (2009, June). Beyond the basics: Effective reading programs for the upper elementary grades. Baltimore, MD: Johns Hopkins University, Center for Data-Driven Reform in Education.