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SCHOOL OF PUBLIC AFFAIRS

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# Systemwide and Intervention-Specific Effects of Denver Public Schools' Portfolio District Strategy on Individual Student Achievement

## Study Summary

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# 01

## DENVER PUBLIC SCHOOLS: DISTRICT REDESIGN DRIVES STUDENT SUCCESS

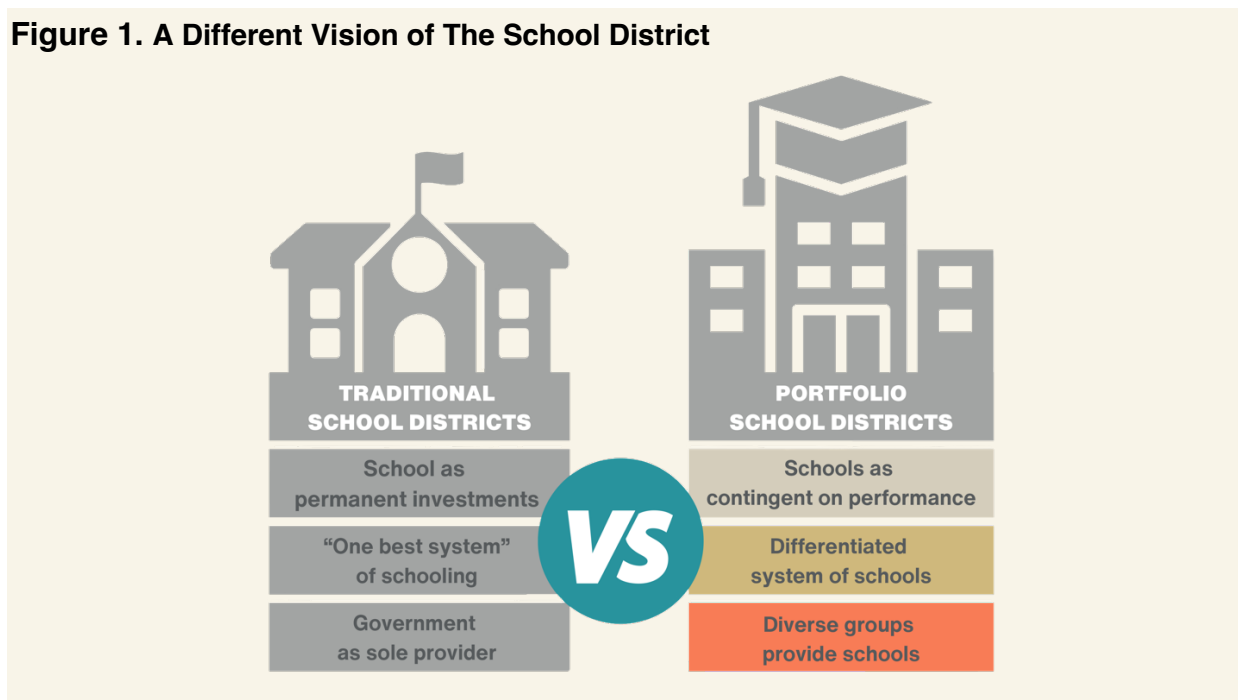
Between 2008 and 2019, Denver Public Schools (DPS) implemented a comprehensive strategy to reinvent the traditional school district. In an effort to reverse decades of low-performance, Denver's leadership abandoned the century-old, centralized approach to district management in favor of a more flexible and responsive system premised on adaptation, differentiation, and continuous improvement.

Denver's portfolio district strategy included:

- A shift from direct management and operation of a single set of schools to the governance and oversight of a variety of school options
- A systemwide focus on ensuring equitable access to quality education for all students while allowing for flexibility and innovation in how education is delivered.
- A framework for public reporting and accountability with a common set of performance metrics for all schools
- A unified enrollment and expulsion system for all schools
- A strategic focus on recruiting, developing, empowering, evaluating and supporting teachers and school leaders
- A flexible funding model which allocates dollars based on student need
- An annual process for creating new schools and intervening in persistently low-performing schools with internal and external partners
- Support for a citywide education ecosystem through public transparency, cross sector collaboration, and decentralized authority with shared responsibility for the success of all students.

Denver Public Schools' implementation of the portfolio district strategy was one of the most comprehensive efforts to redesign the delivery of public education in U.S. history. The reforms fundamentally altered the educational landscape in Denver and the allocation of power and opportunity in the city.

**Figure 1. A Different Vision of The School District**



This study provides clear, empirical evidence that Denver's strategy improved student learning systemwide, including for students the district has historically failed to serve. It also provides the first available evidence of the relative effectiveness of three of the district's primary tactics for improvement.

Denver's experience implementing the portfolio district strategy, what district leaders called their "family of schools model, is more relevant than ever. The challenges that led Denver Public Schools to reinvent itself—chronic low-performance, financial instability, and declining enrollment—are the same challenges districts across the country face today. Rather than shrink from these challenges, Denver's leaders chose to redesign the city's system of public education to adapt to them. By embracing choice for families, empowerment for educators, and accountability for student outcomes and equitable access, they transformed one of the lowest performing districts in Colorado into a dynamic education ecosystem of continuous improvement. Districts facing these same challenges can learn from Denver's efforts and take needed courage from the evidence of its success.

# 02

## DPS REFORMS CAUSED SIGNIFICANT AND SUSTAINED SYSTEMWIDE IMPROVEMENT

Prior research demonstrates the effectiveness of the DPS reforms at the system level, but there has not yet been a comprehensive evaluation using student-level data. Without this analysis, it is possible that the improvements in district performance were due to changes in the student population rather than the reforms themselves.

This study uses student-level data from 40,000+ individual students enrolled in DPS and from 11 surrounding school districts to evaluate the effects of Denver's reforms on the academic achievement of individual students. To ensure that we are only measuring the effects of the reforms on individual students and not improvements due to changes in the population in the district or city, we limit our analysis to only those students who were enrolled in DPS for at least two years prior to the reforms and for at least two years during them.

The study finds that the district's reforms improved academic achievement in both subject areas for the average DPS student systemwide as measured by state-mandated standardized assessments. In literacy (ELA), the results were positive in all years of the study, with DPS students gaining on average between 0.175 and 0.978 standard deviations improvement in academic performance over the 7 years of reform. In math, the results were null in the first year of the study, positive but not significant in the second year, and positive and significant in each of the following years, with students who experienced the reforms in grades 4 through 8 gaining on average between 0.452 and 0.640 standard deviations improvement. Although most of the students in the study were in elementary and middle school when they experienced the reforms, students who experienced them in high school had a higher probability of graduating compared to matched students in surrounding districts.

Put more plainly, each year of reform produced larger systemwide effects than the year before, the average DPS student who experienced the reforms received the equivalent of at least an additional six (6) months and as much as an additional 27 months (3 years) of schooling compared to their matched peers in surrounding districts. The annual effects of the reforms grew as they were implemented over time and more widely. The longer a student was enrolled in DPS during the reforms, the more they benefited from them.

The study finds that compared to their matched peers in surrounding districts:

- **DPS students who experienced two years of reform received the equivalent of at least six (6) months and as much as 18 months (2 years) of additional schooling.**
- **DPS students who experienced five years of reform received the equivalent of at least 18 months (2 years) and as much as 27 months (3 years) of additional schooling.**

These are the effects of the overall DPS reform strategy for the average DPS student in the sample irrespective of whether they experienced any of the individual reforms directly. The results also hold for nearly every subgroup.

These findings confirm that the DPS reforms resulted in significant, sustained, systemwide improvement in literacy and math achievement and were among the most effective in U.S. history.

# 03

## EVALUATING REFORM STRATEGIES: NEW SCHOOLS, REPLACEMENT, AND TURNAROUND

In addition to the systemwide analysis, this study also examines the effectiveness of three of the district's primary improvement strategies:

- new school creation
- closure of persistently low-performing schools, and
- district-led school turnaround.

For more than a decade, DPS used each of these tactics as part of an annual cycle of performance management and continuous improvement.

The study finds that DPS students benefited from new school creation and the closure of low-performing schools, but not from district-led turnaround. DPS students who left a closed school and then attended a new school opened during DPS reform saw the largest positive effects in math overall and for almost every subgroup.

**Attending a New School:** The overall effect of attending a new school opened during the DPS reform years was positive and statistically significant in both math and ELA performance. Attending a new school during DPS reform had positive effects in math and ELA as early as the first year it was in operation and the effects grew larger as the new schools were in operation longer.

**Leaving a Closed DPS School:** Students who left a closed school in DPS performed higher in math and similar in ELA, according to the study. Tellingly, students who left a closed school and attended a new school opened during the DPS reform years experienced a larger positive effect in math scores.

There were no subgroups where the effect of leaving a closed school resulted in negative and statistically significant results. Key subgroups including special education students, Hispanic students, English Learners, and students who attended schools where the Free and Reduced Lunch range (a widely used proxy for economic hardship) was between 50% and 100% all saw positive effects.

**Attending a School Identified for Turnaround:** DPS utilized the four federally-defined turnaround options: turnaround, restart, closure, and transformation. In examining the separate effects of all four turnaround options, the study finds negative effects on student math and ELA performance compared to their performance prior to the school being identified for turnaround.

However, students in schools identified for turnaround closure performed similar in math and ELA compared to the years before the school was identified for closure.



# 04

## STUDY METHODS

The study uses three statistical techniques to estimate the impact of DPS reforms on DPS students: Propensity Score Matching, Systemwide Difference-in-Differences Estimation, and Intervention Student Fixed-Effects.

- **Propensity Score Matching:** A control group of students were selected from the 11 surrounding districts who share the same demographic characteristics and academic backgrounds as the DPS students in the study dataset. This matching process is designed to balance the student characteristics between the treated and control groups, thus mimicking a randomized experimental design.

- **Systemwide Difference-in-Differences Estimation:** The study uses a difference-in-differences model with student-level panel data to estimate the systemwide, average effect of DPS reform on students who were enrolled in DPS before and after the onset of the reforms in the 2008-09 school year. While the DPS reform efforts began in the 2008-09 school year, the portfolio reform interventions were implemented and built up over time.

- **Intervention Student Fixed-Effects:** The study separately examined three DPS intervention strategies—new schools, school closures, and district-managed turnaround, transformation, and restart. Using student fixed effects models, the study examines the effects of these three interventions on the students who experienced one or more of them.

# 05

## DENVER'S PORTFOLIO DISTRICT STRATEGY PROPELLED UNPRECEDENTED IMPROVEMENT

This study shows, using student-level data, that Denver's reforms were among the most effective and comprehensive in U.S. history. Together with earlier system-level research, this study provides rigorous, empirical evidence that Denver's reforms dramatically improved student achievement in the city, including for students who directly experienced the district's most impactful reforms.

The portfolio district strategy is built on the idea that public education is a goal and not a particular governance model or set of operating arrangements. It was designed to stand in the gap between those who insist that traditional school systems are the only way to provide public education and those who insist no systems are needed at all.

Denver's implementation of the strategy creates an opportunity to evaluate whether it is possible to improve public education at-scale through an alternative paradigm with different operating assumptions, namely choice for families among multiple providers within a common market for publicly funded schooling that is governed and regulated for quality and equity.

The effects of Denver's strategy demonstrate that significant, sustained, systemwide improvements in student learning are possible, including in large school systems with high levels of student need. They demonstrate that there is an alternative, more effective way to provide public education than the traditional model of centralized control.

The transformation of Denver Public Schools from one of the lowest performing districts in the state into one of its most improved offers important lessons to others seeking systemic change. School systems face a perilous future. Millions of students are struggling due to lost schooling during the pandemic. Public confidence is at a historic low. Declining birth rates and the rapid expansion of school choice are causing widespread declines in enrollment and revenue. The need to improve and expand educational opportunity is more urgent than ever.

Denver's experience cannot be replicated exactly. The portfolio strategy must be customized to meet local needs and context. It requires careful planning, strong political will, an openness to innovation and a dedication to continuous improvement. Those seeking to follow the city's lead must begin with a commitment to put student learning above all else and a willingness to implement the core elements of the strategy in full. Transformative change does not come easily, but dramatic improvement is possible.