



# SDP FELLOWSHIP CAPSTONE REPORT 2016

## Data Governance, Visualization, and Utilization: Case Studies from Four School Districts in Various Stages of Implementation

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## **Executive Summary**

How can school districts improve their data governance and data dashboards to support better decision-making? Four school districts—Paterson Public Schools, Howard County Public Schools, Cleveland Metropolitan School District, and Baltimore County Public Schools—undertook ambitious data governance and visualization projects in order to support stakeholders in accessing and understanding important data used to improve schools. The SDP Fellow in Paterson assessed the level of access, training, and staff comfort with each existing data system in order to build a comprehensive data governance policy. The SDP Fellows in Howard County defined the roles, goals, and process for data governance, breaking down data siloes, and creating a unified vision for data access and management. The SDP Fellow in Cleveland designed a dashboard to provide actionable information about high and low performing schools using multiple dimensions of school quality, and to clarify supports schools can expect. The SDP Fellow in Baltimore County designed dashboards and visualizations that would make data a more accessible tool for administrators.

## **Strategic Data Project Fellowship Capstone Reports**

Strategic Data Project (SDP) Fellows compose capstone reports to reflect the work that they led in their education agencies during the two-year program. The reports demonstrate both the impact fellows make and the role of SDP in supporting their growth as data strategists. Additionally, they provide recommendations to their host agency and will serve as guides to other agencies, future fellows and researchers seeking to do similar work. *The views or opinions expressed in this report are those of the authors and do not necessarily reflect the views or position of the Center for Education Policy Research at Harvard University.*

## **Introduction**

The appropriate use of data in education is essential to accelerating student learning, program and financial effectiveness and efficiency, and policy development. However, decision making in systems of education is only as good as the evidence upon which those decisions are based. School districts have an abundance of data, yet the extent to which those data are accessible, comprehensible, and useful to education stakeholders varies. There is a prevailing belief that districts and schools are data rich but information poor. Many of these problems can be traced to a lack of effective data governance.

Common in many school districts is a “siloes” approach towards data governance, whereby data collection, storage, and reporting are managed in multiple departments. These departments follow the policies set by their directors, often without cross-departmental communication or an understanding of operational dependencies between departments. While forward-thinking district leaders attempt to harness and leverage the power of data in their districts, there remains a pressing dearth of uniform policies, rules, and procedures regarding data governance, visualization, and utilization to support high quality, data-informed decisions at all levels in an education ecosystem—from the individual teacher’s classroom to the superintendent’s office.

Four school districts are attempting to meet this growing need for high quality, system-wide data governance. In this report, authors from these districts share current practices in various stages of data governance, from collection to visualization and utilization. These case studies focus on the development of a data governance policy and the creation of systems for data use and visualization in Paterson Public Schools, Cleveland Metropolitan School District, Howard County Public Schools, and Baltimore County Public Schools.

## **Case Study 1:**

### **Paterson Public Schools**

Paterson Public Schools has multiple new systems that house the district's data. No single department runs and maintains all systems, and no single department has full governance over all systems. Different system administrators control the flow of data as well as the levels of verification. District-level staff have different credentials for each system and limited access based on their specific roles. Each system's structure is designed uniquely for Paterson Public Schools and has different login credentials.

The district's goal for this project was to gauge the level of access, training, use, and comfort with each system in order to build a governance policy. More specifically, Paterson Public Schools aims to create one research-based comprehensive policy defining data governance that responds to district need and accelerates student learning.

#### **Infinite Campus**

For the past two years, Paterson has been utilizing Infinite Campus as its main student information database system. Infinite Campus houses all student and teacher data, from schedules and attendance to grades and report cards. Infinite Campus is a web-based system designed to improve access to student data and facilitate communication between faculty, parents, and students. The goal for the past two years has been to consolidate multiple antiquated systems into this single web-based system in order to improve the flow and transfer of information.

Before Infinite Campus, district-level student information was handled by a number of different departments as well as multiple school staff due to turnover. Therefore, a new, modern, more updated system was needed to keep track of the issues that the team encountered. As the

new system was being adopted, the team found multiple students with the same ID number or the same student with multiple ID numbers. In other words, the data were “dirty.” Upon implementation, the district was able to resolve some of the underlying issues for which there had never been clear evidence. Students were identified properly and placed in the proper locations.

At the school level, an improved governance policy was viewed as an absolute necessity. Paterson administrators have the autonomy to run their schools as they see fit. This autonomy has potentially negative implications for data integrity and the communication between systems, however. For example, schools create and monitor their own schedules. Some have 40-minute periods, while others have 90-minute blocks. Some assign full classes of students to all teachers and some assign individual students to individual teaching staff. A centralized system has brought some order, but there is much more to do to eliminate chaos across autonomous school units. Within the last two years, different stakeholders have had different levels of training to use Infinite Campus. As of June 17, 2016, survey data show that 84% of staff felt a level of comfort with the system, and administrators overwhelmingly said they want more training for their staff, with 77% stating its relevance.

### **Performance Matters**

Performance Matters is a data management system that uses Paterson’s state assessment results and benchmark assessments to create easy to interpret color-coded reports. These reports will enable the staff to see the exact strengths and weaknesses of the district, teachers, classes, subgroups, and individual students. Although Performance Matters provides statistical data in a timely fashion, the manpower needed to input the information and ensure the accuracy of teacher input is monumental. Paterson administration needs to ensure that the local assistant

superintendents hold principals accountable for using Performance Matters to manage data for instructional improvements and that principals hold teachers accountable for using it in the classrooms. A monitoring process has been implemented to ensure implementation with fidelity and follow through.

Again, because schools and their administrators have the autonomy to run their buildings as they see fit, there are some data accuracy issues. Schools create processes based on their particular needs and the staffing resources required to input and monitor data entry into Performance Matters. According to survey data, 77% of staff use the system monthly, less, or not at all. Moreover, the system is seen as “not user friendly” by 42% of users. This perception decreases accountability for data usage.

### **Data Mentorship**

Each of the schools within Paterson Public Schools is placed into one of three separate categories based on assessment results: priority, focus, and non-categorized (i.e., higher performing schools that do not fit the criteria of the other two categories). This categorization allows for additional Title I funding to target the needs of data usage assistance through data mentors. A priority school is among the lowest-performing 5% of Title I schools in the state. These five schools in Paterson have an overall three-year proficiency rate of 31.6% or lower. Focus schools have room for improvement in areas that are specific to the school. As part of the process, focus schools receive targeted and tailored solutions to meet their unique needs. There are three types of focus schools:

- **Low graduation rate schools** are high schools with a graduation rate lower than 75%.

- **Largest within-school gap schools** have the largest gap (43.5% or higher) between the proficiency of the highest-performing subgroup in the school and the combined proficiency of the two lowest-performing subgroups.
- **Lowest subgroup performance schools** have an overall proficiency rate for the lowest-performing subgroups of 29.2% or lower—among the lowest combined proficiency rates in the state.

Paterson budgets 30% of its Title I funding for priority and focus schools. With this funding, these schools receive a staff member hired as the data mentor teacher. This teacher's primary role is to provide and analyze data for the school's administration based on the goals set in their school improvement plan, as well as work with teachers to analyze student achievement data that drives daily instruction. The data mentor's job description includes the following:

- Focus on implementing a system for leadership and staff to develop and utilize common assessment data as well as formative assessment data for improving and differentiating instruction.
- Collaborate with staff to collect and analyze data for professional development needs in the school.
- Build the capacity of the leadership and staff to collect and analyze data for improving instruction and the skills necessary to develop a system for increasing teacher ownership of data analysis for improving instruction.
- Assist the building administration with data necessary to conduct needs assessments based on the school improvement plan.
- Collaborate with the administration on the collection and analysis of performance data and the identification of instructional priorities.

- Complete in a timely fashion all reports and data requested by the principal.
- Attend required staff meetings and serve, as appropriate, on staff committees.
- Protect confidentiality of records and information gained as part of professional duties and use discretion in sharing such information within legal confines.

Currently, there are two full-time two data mentors in the two School Improvement Grant schools in Paterson. The other six mentors are split between 18 schools, serving three schools each with a six-day rotating schedule. The data mentors show teachers how to use data systems, such as Performance Matters and Infinite Campus, run and maintained by the Assessment and Information Management Departments, respectively.

### **Data Use in Paterson**

Data mentors do not report to any one department. Rather, they are given directives from their principals based on the individual needs and requirements of the school. This process directly connects to the teacher's evaluation rubric. The Paterson rubric adopted the Focal Point rubric, which sets a specific standard for the use of data to drive instruction. Sections 2a–2c of the rubric are included below in Figures 1–3.



Name: _____		Date: _____		<b>Evidence:</b>  Use this portion of the rubric to record critical elements of each strand to ensure quality understanding of your professional practice.	
<b>PERFORMANCE STANDARD #2: USE OF DATA TO INFORM INSTRUCTION</b> <i>Professional educators use data to inform instruction.</i>					
Educators should know and be able to: <b>2a. Focus on improving instruction using data.</b>					
<b>INDICATORS OF EFFECTIVENESS</b>	Use of Electronic Data Management Tools	<b>UNSATISFACTORY</b> <input type="checkbox"/> Relies on someone else to provide student achievement data.	<b>PROGRESSING</b> <input type="checkbox"/> Accesses electronic data management tools to view class achievement results.	<b>PROFICIENT</b> <input type="checkbox"/> Uses electronic data management tools to access and exhibit achievement results for individuals and groups of students.	<b>EXEMPLARY</b> <input type="checkbox"/> Regularly accesses and systematically uses electronic data management tools to retrieve data, organize data tables and create profiles on multiple measures of individual and group student achievement results.
	Uses Data to Inform Instruction	<input type="checkbox"/> Even when data is provided, there is no evidence that the information is used to make instructional decisions.	<input type="checkbox"/> Attempts to make instructional decisions linked to analysis of data, although inferences about the data may not be complete.	<input type="checkbox"/> Makes accurate use of student achievement data when making instructional decisions.	<input type="checkbox"/> Accurately draws inferences from multiple data sources with which to make decisions about instruction for both whole group and individual student instruction.
	Uses Disaggregated Data to Refine Instruction	<input type="checkbox"/> No data is considered with which to make changes in instruction.	<input type="checkbox"/> Examines data at the group level and uses these data when planning instruction.	<input type="checkbox"/> Examines data at the item level to find strengths and challenges for disaggregated groups of students which is appropriately used when planning instruction for whole and small groups.	<input type="checkbox"/> Systematically examines data at the item level to find strengths and challenges both for disaggregated groups and for individual students. Uses these data to accurately refine and modify instruction for whole groups, small groups and for specific individuals.

Figure 1. Paterson Public Schools performance standard 2a: Focus on improving instruction using data.

<b>2b. Use a variety of assessment methods when designing classroom assessments.</b>					<b>Evidence:</b>  Use this portion of the rubric to record critical elements of each strand to ensure quality understanding of your professional practice.	
<b>INDICATORS OF EFFECTIVENESS</b>	Assessment Methods	<b>UNSATISFACTORY</b> <input type="checkbox"/> A single type of classroom assessment method is used that is not aligned with the evidence outcomes in the curriculum.	<b>PROGRESSING</b> <input type="checkbox"/> Uses a limited number of classroom assessment methods (e.g., end of chapter or selected response tests) to assess all types of learning, which may be loosely aligned to the evidence outcomes in the curriculum.	<b>PROFICIENT</b> <input type="checkbox"/> Appropriately matches classroom assessment methods (e.g., personal communication, selected response, constructed response, portfolios and performance tasks) with evidence outcomes in the curriculum.		<b>EXEMPLARY</b> <input type="checkbox"/> Evidence of a well-balanced classroom assessment system is in place which uses a variety of assessment methods (e.g. personal communication, selected response, constructed response, portfolios and performance tasks) that matches intended purpose and is closely aligned with evidence outcomes in the curriculum.
	Classroom Assessments	<input type="checkbox"/> Classroom assessments are of poor quality.	<input type="checkbox"/> Uses prepared assessments with multiple choice responses as the main criteria for determining what students know.	<input type="checkbox"/> Creates a variety of classroom assessments that are a good measure student learning of the lesson or unit objectives. Assessment tasks provide varied options for students to demonstrate what they know and are able to do.		<input type="checkbox"/> Designs high-quality classroom assessments that accurately measure student learning of the lesson or unit objectives. Classroom assessments are a function of learning and not time. Assessment tasks may be embedded within the lesson and/or require a performance component for students to demonstrate what they know and are able to do.
	Common Assessments	<input type="checkbox"/> Does not implement or contribute to the development of common assessments.	<input type="checkbox"/> Cooperates with colleagues to implement common assessments. Compares results.	<input type="checkbox"/> Collaborates with colleagues to develop and implement common assessments. Engages in data-dialogues with colleagues to better understand how to use common assessment results to improve future instruction.	<input type="checkbox"/> Collaborates with colleagues to design and implement common assessments. Actively participates in data-dialogues with colleagues to evaluate the results from common assessment tasks and uses that information to re-teach or improve future lessons.	

Figure 2. Paterson Public Schools performance standard 2b: Use a variety of assessment methods when designing classroom assessments.

<i>2c. Involve students in assessing their own learning.</i>					<b>Evidence:</b>	
<b>INDICATORS OF EFFECTIVENESS</b>		<b>UNSATISFACTORY</b>	<b>PROGRESSING</b>	<b>PROFICIENT</b>	<b>EXEMPLARY</b>	Use this portion of the rubric to record critical elements of each strand to ensure quality understanding of your professional practice.
	Scoring Criteria	<input type="checkbox"/> Students are not made aware of the assessment scoring criteria in advance of the lesson or unit.	<input type="checkbox"/> Students are provided with the scoring criteria for success too late in the process to allow adequate time for practice prior to taking assessments. Students may not be able to identify what they need to do to improve performance.	<input type="checkbox"/> Students have the scoring criteria in advance of the lesson or unit. Based on the scoring criteria, students can identify what they need to do to improve performance.	<input type="checkbox"/> Students are very familiar with the scoring criteria provided in advance of the lesson or unit. Based on the scoring criteria, students are able to take responsibility for improvements to their work by focusing on what needs to be done to move to the next performance level.	
	Student Self-Monitoring	<input type="checkbox"/> The teacher does not have a system in place for tracking student achievement results and/or does not have a system set up for students to know how they are doing.	<input type="checkbox"/> The teacher takes responsibility for monitoring achievement results for students. Without active involvement in monitoring their own learning, students wait for the teacher to let them know their level of proficiency.	<input type="checkbox"/> The teacher has a system in place that requires active teacher prompting in order for students to monitor their achievement results over time. Students have opportunities to practice self-monitoring. By using the system, students know their level of proficiency against the achievement criteria.	<input type="checkbox"/> The teacher has established a system that empowers students to become active partners in monitoring their own achievement results over time. Feedback is provided to students on the quality of their self-monitoring. The system includes an organized way for students to keep artifacts that document their level of proficiency against established achievement criteria.	
	Student Goal Setting	<input type="checkbox"/> Periodically provides anecdotal information to students about how they are doing.	<input type="checkbox"/> Provides students with information about how to understand achievement data. The teacher sets goals and monitors progress for students.	<input type="checkbox"/> Coaches students to understand how to interpret their own achievement data and to set focused, yet realistic goals for improving their performance. Students are supported in monitoring their progress.	<input type="checkbox"/> The teacher facilitates opportunities for students to analyze their own achievement data and supports students in setting specific, yet challenging goals to improve performance. Students create a plan to keep track of their progress over time.	

Figure 3. Paterson Public Schools performance standard 2c: Involve students in assessing their own learning.

Teachers are expected to access and analyze their data in multiple measures using the tools that have been adopted by the district. For example, Performance Matters is maintained by the Assessment Department and houses formative and summative data including, but not limited to, NJASK, PARCC, and unit assessment data. Paterson students take the Renaissance STAR assessments. Teachers primarily use this data for their state mandated student growth objectives (SGOs), and the district uses this to show growth; it is the main criteria for summer school and retention decisions. The teachers are expected to use Infinite Campus for attendance, grades, and even office referrals.

With all of these individual silos, data governance and ownership get blurred. The results of a governance survey show that teachers identify the need for and relevance of further training in the district’s main two systems. Eight-two percent believe it to be extremely important for Infinite Campus and 65% for Performance Matters.

## **Case Study 2:**

### **Cleveland Metropolitan School District**

The Cleveland Metropolitan School District is an urban school district serving approximately 38,000 students in 104 schools. It is a “majority minority district” (67% African American, 15% White, 14% Hispanic) with a large proportion of special education students (23%), and a non-trivial number of multilingual students (7.8%). All students are eligible for free or reduced-price lunch. The district is currently in the process of implementing an ambitious plan to reinvent public education in the city, commonly known as the Cleveland Plan. This plan is the culmination of collaboration between the district and community, the passage of the first operating levy for the district in recent memory, the passage of a state law giving the district special flexibilities around some state rules, and the approval of an innovative collective bargaining agreement between the district and the Cleveland Teachers Union (CTU). The district’s goal for this plan is to triple the number of students in high performing schools while eliminating all failing schools in the district.

In order to achieve this goal, the district is implementing a portfolio strategy. Portfolio districts have a number of common characteristics, including school choice and autonomy, pupil-based funding, diverse support providers, an innovative talent-seeking strategy, extensive public engagement, and performance-based accountability for all schools. This strategy reframes the district central office as a support structure while giving significant autonomy to schools. As a result, the district has a need for a portfolio decision-making process that will help central leadership make choices on managing the portfolio of schools. These choices include a wide gamut of options, such as differentiated supports, new school openings, model replications, school closings, or corrective action.

The need for this type of strategic decision-making process is further underlined by the demographic and financial context of the district. As charter schools expanded in the city of Cleveland, the district saw an initial rapid decrease and a more recent leveling off of its enrollment. While there are opportunities to grow enrollment as low-performing charter schools are closed by the state, the district is operating too many schools for its overall student population. Additionally, the passage of a new levy for the schools provided a much-needed infusion of resources into the district, but financial constraints continue to be a reality. In order to be good stewards of public funds, the district must efficiently and effectively allocate its limited resources to ensure maximum benefit for all students in the city.

Each year, the district takes a series of steps in pursuit of this goal (see Figure 4). Crucial to the smooth flow of this process is the ability of the district to coherently and consistently assess the current state of its school portfolio (see the second column, “assess progress and define priorities”). After available resources are identified, information on school performance and other trends is used to generate a list of decisions available for each school (see the third and fourth columns in Figure 4). Given the large number of possible contingencies and scenarios that could be explored annually, in addition to the many pieces of quantitative and qualitative data that inform these decisions, this process was at risk of becoming unwieldy. As a result, the district sought to answer the following questions:

1. How can the district use multiple data points to provide summative ratings of schools that substantially differentiate between them?
2. How can the district use these summative ratings to drive decision making about schools?

## Steady state portfolio decision making process

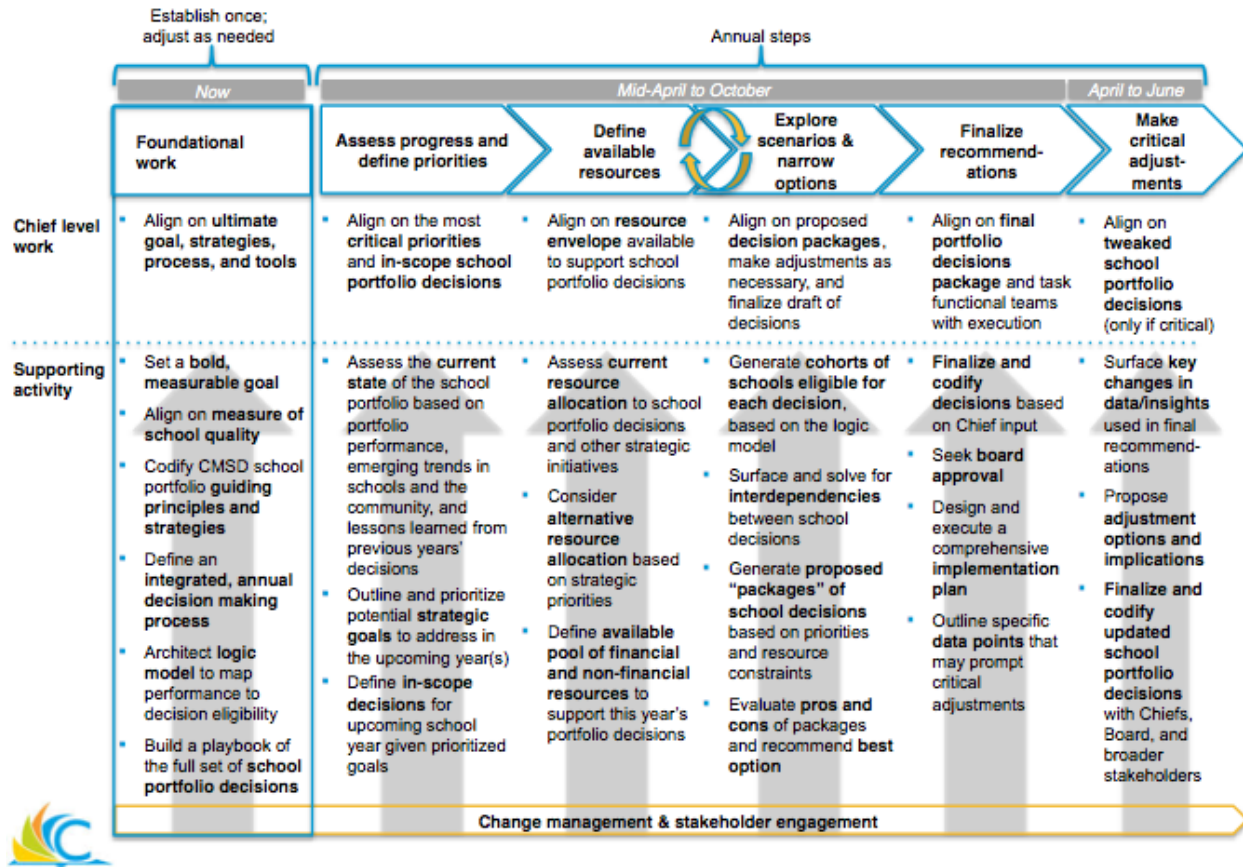


Figure 4. CMSD Steady state portfolio decision-making process.

### CMSD Logic Model

To answer these questions, CMSD created a logic model to provide actionable information about schools. This required not just reporting individual data points, but combining multiple dimensions of school quality to give leaders an overall sense of schools' performance on academics as well as other areas. Via this logic model, the district would gain a common understanding of what strong performing schools look like and what supports underperforming schools should expect. This is where the analytic skills of SDP Fellows were needed.

The logic model was created in accordance with five design principles. It was important to articulate these principles to match the overall goals of the portfolio decision-making process

and to cultivate investment from all relevant stakeholders. First, decisions are transparent. The metrics used to reach decisions are similar to those already familiar to principals and school staff; schools are not surprised by actions or supports provided. Second, decisions are consistent, and similar levels of school performance lead to eligibility for similar decisions. Third, while decisions are consistent, they are not rigid; they take into account all relevant and accessible data, qualitative understanding, and strategic initiatives of the district. Fourth, the “guiding star” priorities of the district inform the weight placed on different metrics. This ensures fidelity to the accountability measures in the Cleveland Plan and is consistent with how the public and broader community understand school performance. And fifth, the demands on chiefs’ time and capacity are minimized by targeted engagement where it matters most.

**Step II will sort schools into four cohorts, each with a set of potential school portfolio decisions for SY 17-18**

PRELIMINARY  
PREDECISIONAL DRAFT

	CMSD school portfolio decisions	Potential Logic Model Outputs
<b>Expand access to high-performing schools</b>	<ul style="list-style-type: none"> <li>Expand seats at high performing District school or fill to capacity</li> <li>Recognize as a School of Distinction</li> <li>Merge separate academic programs/schools<sup>1</sup></li> <li>Provide “targeted design support” to strengthen a school’s design</li> <li>Take no portfolio action this year</li> </ul>	
<b>Bolster performance of mid-performing schools</b>	<ul style="list-style-type: none"> <li>Designate as a “School of Promise”</li> <li>Provide “targeted design support” to strengthen a school’s design</li> <li>Merge separate academic programs/schools<sup>1</sup></li> <li>Take no portfolio action this year</li> </ul>	
<b>Dramatically improve performance of low-performing schools</b>	<ul style="list-style-type: none"> <li>Provide “prescriptive support and monitoring” to improve a school’s performance</li> <li>Replace existing school with redesigned school (imported, replicated, or new model; phase out/in or immediate)</li> <li>Merge separate academic programs/schools<sup>1</sup></li> <li>Take no portfolio action this year</li> </ul>	
<b>Take corrective action for failing schools</b>	<ul style="list-style-type: none"> <li>Designate as an Investment School</li> <li>Replace existing school with redesigned school (imported, replicated, or new school model; phase out/in or immediate)</li> <li>Convert existing school to community school</li> <li>Enlist a turnaround partner</li> <li>Close existing program (phased, immediate, or through merger<sup>1</sup> with another program)</li> <li>Take no portfolio action this year</li> </ul>	
<b>Create new schools</b>	<ul style="list-style-type: none"> <li>Open a new District school to create options that do not currently exist</li> </ul>	
<b>Support high quality charter schools</b>	<ul style="list-style-type: none"> <li>Incentivize high performing CMSD-sponsored charter school to expand seats</li> <li>Renew CMSD-authorized charter school contract with adjusted terms</li> <li>Non-renew contract with CMSD-authorized charter school</li> <li>Craft criteria and begin RFP process to partner with/authorize a new/replicated/existing charter school</li> </ul>	



1: All CMSD schools are eligible for merger; decision to merge driven by demand, facilities condition, etc.

Figure 5. Step II in CMSD portfolio decisions.

Stakeholders were engaged in the logic model building process through design teams and a cross-functional core team. The design teams engaged stakeholders from multiple departments in outlining the different decision options for schools and what those options entailed. This playbook allowed fellows to understand the different decision options as they were mapped to summative school ratings. In addition, a cross-functional core team met weekly to discuss the portfolio decision process and the different elements of it. This ensured the fellows working on the logic model piece were in constant communication with others and received steady feedback. The possible decisions can be found in the Figure 5 above.

## **Results**

The logic model was built as a four-step process for mapping schools to portfolio decisions (see Figure 6). Step I is a filter that is applied to all schools in CMSD to determine which are eligible for consideration. Schools that have had portfolio decisions applied in the previous three years—and therefore are still in the implementation process—are removed from consideration. This ensures adequate time for schools to demonstrate improved performance following a portfolio decision and focuses organizational efforts on the more targeted list of schools that are candidates for future decision making. Although a school may be deemed ineligible for a new school portfolio decision during the three-year window after that decision, evaluation of the impact of all school portfolio decisions will occur on an annual basis to allow for course correction when needed.

**The logic model uses four steps to combine automated sorting with more qualitative consideration of data**

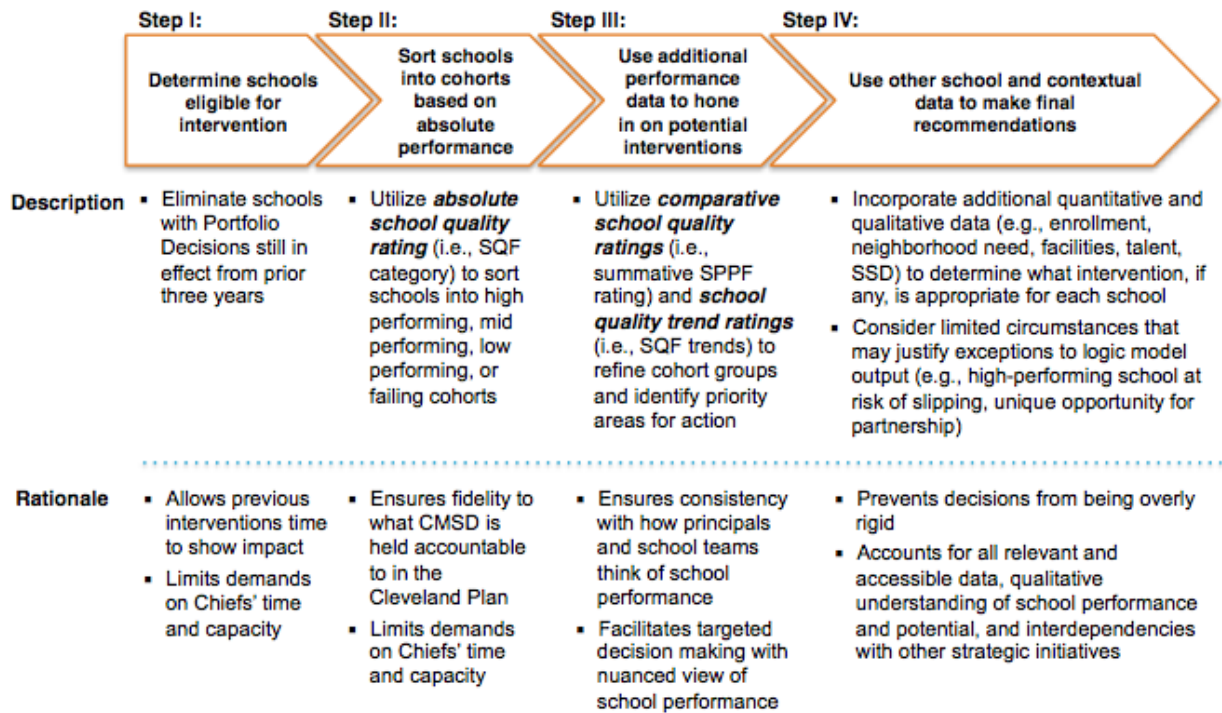


Figure 6. CMSD logic model.

Step II and Step III are focused on school performance data because the primary objective of any school portfolio decision is to move the district closer to its goal of tripling the number of students enrolled in high performing schools and eliminating failing schools. Step II sorts schools into cohorts based on absolute school quality ratings, which provide a criterion-referenced indication of school quality on critical student performance measures. They are based on the school quality framework (SQF) rating developed for the Cleveland Transformation Alliance (CTA), a public watchdog that monitors the quality of schools in the city that was established as part of the Cleveland Plan. CTA ratings were developed via dialogue between the district, city charter schools, and the CTA itself. SQF ratings are based on



Ohio Department of Education (ODE) Report Card grades in order to ensure schools are held to a high, absolute standard that is aligned with ODE metrics. Schools are categorized as high-performing, mid-performing, low-performing, or failing. Schools in each of these four absolute performance cohorts are eligible for a specific set of school portfolio decisions, as shown in Figure 7 below.

Step III provides two additional pieces of performance data about schools: comparative school performance and school performance trends. Comparative school quality ratings provide a norm-referenced indication of school quality on critical student performance measures. These ratings are based on the school performance and planning framework (SPPF) and compare schools to other demographically similar schools in the district. The SPPF is a local report card designed by the district with the specific objective of providing greater levels of differentiation than the state report card. While the SPPF uses many of the same measures as the state report card, in an effort to keep things consistent for principals, it contextualizes results on those measures via a peer matching methodology that shows how well a school is doing compared to peer schools over the past three years. The SPPF examines six dimensions of school quality, and weights a final rating as 50% quantitative measures (school culture, gap closure, growth, performance, and prepared for success) and 50% qualitative measures (results from a qualitative school visit). In this measure, each school is categorized as above average, average, or below average compared to its peer schools.

School quality trend ratings provide an indication of whether a school is making significant progress in moving its absolute school quality rating year-to-year. The rating is based on yearly changes in the measures that make of the SQF rating (PI and value-add/graduation rates). The measure combines changes across both of the dimensions to ensure movement is not

random noise, and instead indicates a systematic trend. In this measure, schools are categorized as improving, holding steady, or declining.

At Step III in the logic model, each cohort of schools from Step II can be mapped to a subgroup that shows their performance against the additional contextual pieces of performance data. The figures below show how these subgroups can help facilitate conversations about which schools might be the best candidates for specific school portfolio decisions. For example, Valley View Boys' Leadership Academy is the only high performing CMSD school that is on par with its peers (i.e., average SPPF rating) and is on an upward performance trajectory (i.e., improving SQF trend). This contextual information suggests that this school may be a good candidate for expanding seats. An example of the final output from the logic model for the group of low performing schools can be found below in Figure 7.

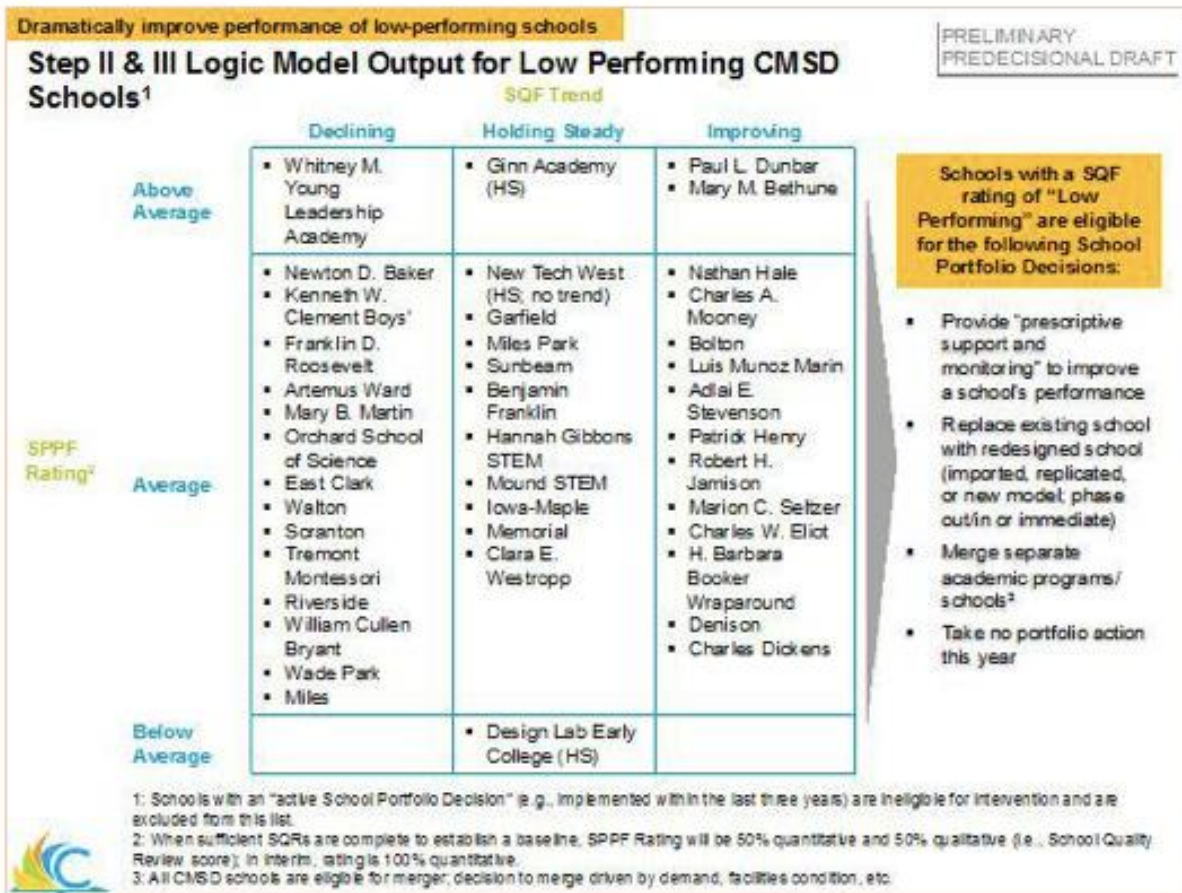


Figure 7. Step II and III logic model output for low-performing CMSD schools.

While performance is the primary factor in determining school portfolio decisions, it does not provide the full context about a school or its needs. There are many additional quantitative and qualitative pieces of information that could be included in school portfolio decision making. As such, Step IV provides additional school data beyond performance. To ensure the annual collection and review of data is effective and efficient, we prioritized data that would best help differentiate interventions among eligible schools and that could be accessed relatively easily. The standard inputs to be collected annually for eligible schools for consideration in Step IV are:

- Additional performance trend data (i.e., number of years with current SQF trend);

- Enrollment data (e.g., enrollment trends, flags for schools with unsustainably small school populations);
- IFF data (e.g., how many and which IFF high needs neighborhoods a school serves);
- Facilities data (e.g., plans for a school in the master facilities plan, building condition);
- Talent data (e.g., principal performance and tenure, average teacher performance and tenure); and
- Strategic school design (SSD) data (e.g., proportion of SSD goals met in previous year).

In addition to gathering and including the quantitative and qualitative data above in a recommendation of the “best fit” decision for each school, Step IV is intended to offer an opportunity to consider a limited set of exceptions to the logic model. For example, exceptions might be considered if:

- The school is also slated for massive facilities redesign or new construction;
- The school has a unique opportunity to leverage a partnership or significant grant funding opportunity; or
- The school is at risk of losing its “high performing” status.

In these circumstances, schools under consideration may be eligible for school portfolio decisions beyond those suggested by the logic model in Step I.

### **Lessons Learned and Next Steps**

The CMSD cabinet agreed to the use of this logic model. The model has had greater success in better differentiating our schools than the state report card grades, which typically assigned the vast majority of schools grades of D or F. These school performance metrics are now being regularly calculated for schools and shared with those involved in the portfolio decision-making process. The framework has been in full implementation for only one year, and

all potential challenges have not yet surfaced. Nevertheless, an abbreviated version of this process was conducted and a major problem that arose was timing and communication. Deadlines were regularly missed and decisions were not always articulated to all relevant groups. This speaks to an important next step in the work: training the entire district and portfolio of schools in the process. While schools have become familiar with the SPPF and its metrics over the past few years, it was used more formatively. Schools will now need to adjust to its increased meaning and decision consequences. This will be crucial to the wider success and adoption of the logic model at all levels of the organization.

### **Case Study 3:**

#### **Howard County Public School System**

The Howard County Public School System (HCPSS) is located in Maryland between Baltimore and Washington, DC. Howard County is one of the wealthiest counties in Maryland, and the school system serves over 53,000 pre-K–12 students in 76 schools with 8,200 staff members. HCPSS students are 42.7% White, 21.8% Black, 19.3% Asian, 9.4% Hispanic, and 6.2% of two or more races. About 19% of HCPSS students qualify for free or reduced-price meals, fewer than 5% have limited English proficiency, and 8.5% receive special education services. HCPSS was interested in building a data governance program to promote the overall management and utilization of actionable data for school leaders and central support personnel within the district.

In July 2013, HCPSS implemented a five-year strategic plan called Vision 2018: Fulfilling the Promise of Preparation. This plan reflects the goals and priorities for the school system of more than 2,400 stakeholders—parents, staff, students, and community members—who provided input through focus groups, listen-and-learn sessions, surveys, and other venues.

It projects a vision for the kind of educational program that every child deserves, where students are inspired to learn, challenged to grow, and empowered to reach for their goals. The document is organized into four goals for students, staff, families, the community, and the organization as a whole. Each goal area includes specific strategies as well as performance measures to track success. The goals are as follows:

- **Goal 1: Students.** Every student achieves academic excellence in an inspiring, engaging, and supportive environment.
- **Goal 2: Staff.** Every staff member is engaged, supported, and successful.
- **Goal 3: Families and the Community.** Families and the community are engaged and supported as partners in education.
- **Goal 4: Organization.** Schools are supported by world-class organizational practices.

### **Data Governance Program**

The Department of Data Management is leading the data governance program. The following departments/staff are involved: Division of Accountability, Department of Information Technology, Division of Budget and Finance, Department of Human Resources, and Division of Curriculum and Instruction. The work aligns with Vision 2018. It has a three-part mission: create rules, resolve conflicts, and provide ongoing services. This involves an evolution of the collected data elements, as well as the proper methods of collection, storage, usage, and even data output. The program includes 10 components (Figure 8), described in the remainder of this section.



*Figure 8.* HCPSS data governance framework.

**Data quality.** Maintaining a high level of data quality is key to data governance management. Effective data governance would establish data quality dimensions, targets, metrics, and processes. Before any release of systems, application, or software, a quality check must be performed at several levels—unit, end-to-end, system, sanity, smoke, regression, and user acceptance testing.

**Data integrity.** The key to maintaining high quality data is a proactive approach to data governance. This requires establishing and regularly updating strategies for preventing, detecting, and correcting errors and misuses of data. This includes:

- Performing validation checks automatically each time data are entered into the system;

- Defining organizational rules that will consistently identify entries as out of range, omitted, incorrectly formatted, or invalid in the data dictionary; and
- Creating mechanisms that identify the person who entered the data.

The data warehouse will possess dashboards that aid in the process of auditing.

**Data security.** Defining and assigning differentiated levels of data access to individuals based on their roles and responsibilities in the district is critical to preventing unauthorized access and minimizing the risk of data breaches. Data stewards should be assigned to oversee the auditing process and report their findings to the data governance committee.

**Data privacy.** The main aim of data privacy is to protect the organization's data against internal and external threats to privacy and confidentiality. To this end, it is imperative to establish guidelines and ensure that the organization complies with applicable laws, regulations, and standards. Likewise, proof of compliance must be generated and documented within the process.

**Data retention.** It is essential to develop a policy for the length of time each data item is to be retained.

**Data operation management.** Data governance must include defining and establishing business continuity and disaster recovery programs. Likewise, a change control process must be developed and practiced.

**Master data management.** A master data management (MDM) system must be defined, developed, and established. This should include metadata management, as well as the documentation and maintenance of a system of records. All departments and offices should leverage the existence of MDM.



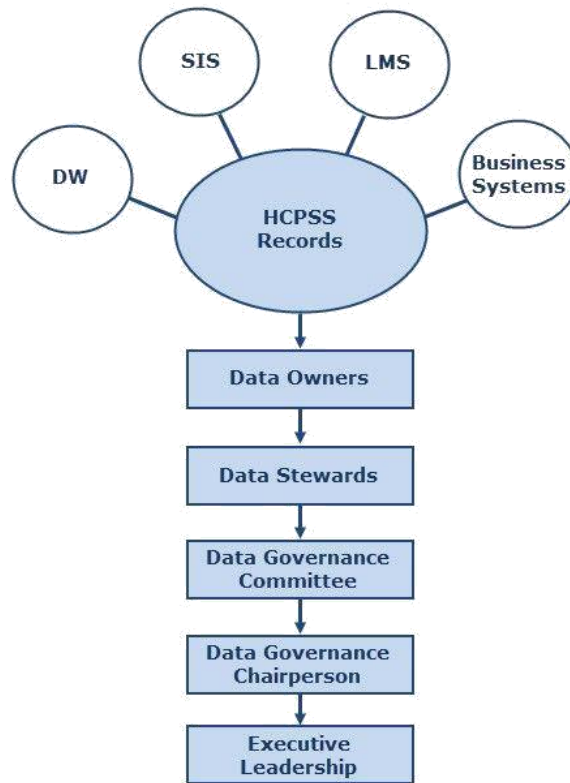
**Risk management.** Data governance will create processes to ensure the security of data. This includes the implementation of risk management strategies to evaluate risks and vulnerabilities related to both intentional misuse of data by malicious individuals (e.g., hackers) and inadvertent disclosure by authorized users. This also includes identification of sensitive and personally identifiable data, and limitation of access to such data to individuals with a valid need to know.

**Standardization.** Data governance will create and monitor the standardization of district data.

**Transparency.** Principles and timelines will be communicated to key personnel.

### **Data Governance Roles and Responsibilities**

A variety of individuals and groups work with the data, as depicted in Figure 9 below. In the current section, we describe the role of each in ensuring an efficient data governance process.



*Figure 9. Defining Data Roles*

**Data owners.** Data owners include staff who enter data into the data systems such as data clerks, registrars, principal secretaries, and teacher secretaries. Their primary responsibilities include ensuring that all student, staff, and school data are entered and accurate.

**Data manager.** The data manager is accountable for the quality, usage, and reliability of the data and may be the principal or a delegate of the principal. His or her responsibilities include ensuring all data are accurate, used well, and reliable. This person works closely with school staff and administration to escalate and resolve any data issues. He or she also chooses appropriate data owners and makes sure they attend relevant trainings offered.

**Data stewards.** Data stewards are accountable for the quality and usage of data within their subject areas. A data steward might be, for example, the coordinator of student information systems. Table 1 describes the various responsibility areas and corresponding individuals who might oversee them. A data steward's primary responsibilities include:

- Determining how data are defined, collected, and reported, as well as how quality is assured;
- Defining data quality metrics for the subject area;
- Establishing access rights and security levels for all data elements;
- Arranging training for the data owners and constantly and efficiently communicating with the oversight data owners;
- Ensuring compliance to governance policies and processes within the subject area;
- Identifying the required organizational MDM and metadata to be collected and stored for the subject area;
- Overseeing appropriate business use of data in the subject area; and
- Creating data audit guidelines for existing and new data sources.

Table 1

*HCPSS Data Stewards and Responsibility Areas*

<b>Data Steward</b>	<b>Responsibility Area</b>
Coordinator of Student Information Systems	Overall student data
Coordinator of Assessment	Assessment
Coordinator of Early Childhood	Early childhood
Coordinator of Special Education	Special education
Coordinator of Gifted Education	Gifted education
Coordinator of Title 1	Title I
Office of Health	Child nutrition
Coordinator of Digital Learning	Digital learning
Executive Director of Finance	Overall financial data
Director of Transportation	Transportation
Executive Director of School Facilities	Facilities

**Data governance committee.** The data governance committee provides support and guidance to executive leadership, data stewards, and data owners. The committee is responsible for developing and maintaining the data governance program and resolving issues that cannot be resolved by data stewards. Additional duties include:

- Identifying data stewards for each program area;
- Working with data stewards to ensure data are collected, stored, shared, and reported in a consistent manner throughout the organization;
- Implementing processes, procedures, and systems to improve data quality and eliminate data redundancy;
- Ensuring data stewards and data owners are following procedures, such as auditing;

- Ensuring there is no redundant data collection within the organization;
- Consulting on data related issues;
- Consulting on changes requested and serving as the change control committee;
- Defining and advising on role and user access management; and
- Overseeing the data quality framework dashboard.

**Data governance chairperson.** The data governance committee chairperson oversees the agendas, meetings, and action items from the data governance committee. The chairperson is also responsible for:

- Acting as a liaison between data management and the rest of the organization;
- Communicating with data owners, data stewards, the data governance committee, and executive leadership on procedures and data governance activities;
- Ensuring transparency of processes;
- Ensuring that current and future projects align with data governance goals;
- Proactively aligning policies with emerging data needs;
- Maintaining a critical data issue log that identifies problems impeding data quality, collection, and reporting;
- Maintaining a data collection reporting calendar;
- Responding to ad hoc data requests; and
- Convening working groups of data stewards to address critical data issues.

Executive leadership. Finally, the role of executive leadership is to support the program, assist with implementing the program, and communicate executive leadership's data needs and requirements.

## **How the Program Works**

Through the data governance committee and their assigning of duties, the data governance program will follow seven steps to build the program. These steps are described in this section.

**Step 1: Prioritize areas for organizational improvement.** It may seem ideal to tackle all data issues at once. To start, however, it is far more effective to target specific subject areas. Implementing data governance in a targeted way sets a firm foundation for expansion across the district. By targeting an area of the organization, such as student data, one can work with the underlying organizational structure to take action and ensure accountability. Information objectives are clearly aligned with the district's strategy.

The first step is to objectively assess the key areas where improvement is necessary. The data governance committee analyzes the district's silos, develops a methodology for assessing data governance across the district, and asks key questions to assess where to begin. The committee should also understand the best data governance models, data quality processes, and ongoing organizational processes.

**Step 2: Maximize availability of informational assets.** To govern data assets, the data first have to be available and accessible. Data need to be considered holistically throughout the organization. If data are not available, the district's ability to make the most of all the data will be hampered. Informational assets come in all shapes and sizes including student information systems, learning management, data warehouse, business systems, and third-party applications.

**Step 3: Create roles, responsibilities, and rules.** Once the information is accessible, the organization must determine who does what with it by creating roles, responsibilities, and rules for the processes staff. This is the responsibility of the data governance program.

**Step 4: Improve and ensure informational asset integrity.** After the roles, responsibilities, and rules are established, data governance processes allow the information to become a quality resource that aids decision making and the validation of decisions by continuously improving and ensuring the integrity of informational assets. This is done in the following ways:

- ***Data profiling.*** Check for quality by profiling the data utilizing various tools and technology in data management.
- ***Data reports (MSDE) outcomes.*** It is important to look for errors and inconsistencies reported.
- ***Advanced data quality framework dashboards in data warehouse.***
- ***Monitoring the data over time.*** Although data integrity will improve with these processes, the district will need to easily assess improvement and monitor the quality of informational assets. Profiling data over time makes it possible to perform trend analyses and identify areas for constant improvement. It also shows where information quality suffers, so corrective processes can be implemented sooner rather than later.

**Step 5: Establish accountability infrastructure.** Even with all of the processes in place to ensure information integrity, lingering questions will remain: What happens if the information is still inaccurate? What happens to data elements that fall through the cracks of the automated processes? What if I want to make sure the changes are right before they are applied? Processes alone do not ensure the integrity of information, people do. Data governance will establish an accountability infrastructure that holds staff accountable for information assets, and provide them with the technology they need to ensure the integrity of the assets remains high.

**Step 6: Convert to a data-based culture.** With the staff, processes, and technology in place to ensure data integrity, the next step toward data governance is to change the culture of the organization to be data-based rather than transaction-based. Through various measures, data define an organization; they exist everywhere—in applications, systems, transactions, data warehouses, and messages. No matter which application generates a report, the information should be consistent.

**Step 7: Develop a feedback mechanism for process improvement.** Data governance will create a built-in feedback mechanism that allows for continuous process improvement. This will include improved data quality, reliability, and accuracy, as well as enhanced protection of student, staff, parent, and teacher data. Adherence to all legal and regulatory compliance will reduce operational risk, and the elimination of redundant data collection will reduce costs. In the end, data will be transformed into information for sound decision making.

### **Next Steps**

As HCPSS moves forward, it will be important to implement committees like data governance and change management, as well as to communicate roles and responsibilities to appropriate stakeholders. The ultimate goal is to design and develop the data governance dashboard. While this is in process, the district should implement stop-gap solutions to address data governance issues and concerns. HCPSS should constantly monitor and improve the data governance program. When data governance is effectively established, the quality of data collection and reporting is enhanced, staff burden is reduced, and communication, collaboration, and relationships with various agencies, information technology (IT) staff, and program areas are improved.



## **Case Study 4:**

### **Baltimore County Public Schools**

Baltimore County, Maryland, surrounds Baltimore City on three sides and stretches north to the southern border of Pennsylvania. With a \$1.76 billion operating budget, Baltimore County Public Schools (BCPS) is the 25th largest school district in the United States and the third largest in Maryland. BCPS comprises 175 schools, centers, and programs and has a total enrollment of 111,127 students. Thirty-eight percent of BCPS students are African American, 41% are White, 8.2% are Hispanic, 7% are Asian, and 4% are two or more races; 47% of students qualify for free or reduced-price meals, 11.5% receive special education services, and 3.9% are English language learners representing 106 countries and speaking 80 languages. BCPS employs 21,225 individuals, including 8,904 teachers.

#### **Blueprint 2.0 Strategic Plan**

In 2013, the BCPS Board of Education adopted Blueprint 2.0: Our Way Forward, a bold strategic plan driven to provide all students with equitable learning opportunities by leveraging technology to transform teaching and learning and by graduating students who are proficient in a second language. Blueprint 2.0 is organized around four goal areas: academics, safety, communication, and organizational effectiveness.

Goal 1 asserts that every student will experience high academic achievement and continuous growth by participating in a rigorous instructional program designed to raise the academic bar and close achievement gaps. The idea is that every student will become a globally competitive citizen in a culturally diverse world. Goal 2 seeks to ensure that every school and office is safe and secure, promotes individual wellbeing, and provides a positive, respectful, and caring environment for teaching, learning, and working. Goal 3 focuses on communication, such

that every stakeholder experiences clear, timely, honest, transparent, and widely available communication about system initiatives and activities that engages them in building a culture of trust through action, establishing BCPS as a world class school system. And finally, Goal 4's emphasis is organizational effectiveness. It emphasizes strategic efforts that employ rigorous, relevant, and reasonable performance standards that provide for all employees' professional growth and shared accountability for student, school, and organizational performance.

Organizational effectiveness includes key strategies and initiatives including the creation of an Office of Performance Management (OPM) to streamline efficiencies across all areas of the organization and to support the academic achievement goals outlined in Goal 1 through the school progress planning process. Key actions in Goal 4 include two key subgoals:

- Goal 4b: To build, sustain, and invest in technology infrastructure and efforts to streamline data management and create efficiencies throughout the organization.
- Goal 4c: To establish a comprehensive performance management approach that ensures data-informed and evidence-based decision making.

### **BCPS One and Policy 0100: Equity**

To achieve these goals, BCPS developed BCPS One to replace several legacy systems and produce a single point of entry for employees' workflow (including a single sign-on). BCPS One calls for a reporting suite powered by a system upgrade to Cognos 10.2 that would include dashboards that need to be designed, developed, and deployed. To fully leverage the power of the new dashboards, a systemic decision was made to focus the reporting suite on data to drive continuous improvement in schools by supporting the school progress planning process.

In September of 2014, the Board of Education of Baltimore County adopted Policy 0100: Equity. As a part of this policy, the board made a strong commitment to equity by stating

that the school system *must* address and overcome institutional inequities, and that disparities based on race, ethnicity, socioeconomic status, and sexual orientation are unacceptable and at odds with the board’s belief that all students can achieve. In part, the policy reads: “Disparities on the basis of race, special education status, gender, ethnicity, sexual orientation, English language learner (ELL) status, or socioeconomic status are unacceptable and are directly at odds with the belief that all students can achieve. While complex societal and historical factors contribute to the inequities our students face, rather than perpetuating disparities, the school system must address and overcome institutional inequity by providing all students with the opportunity to succeed” (Baltimore County Board of Education, 2014).

In order to drive equity work in BCPS schools based on data and dashboards, OPM staff realized that the initial push needed to begin with school improvement activities. In the past, and under previous accountability systems, school progress planning was viewed as a compliance activity. Targets were imposed on schools and, because the school progress plan was viewed as a compliance-based activity, plans were shelved after approval and did not drive action by administrations and teachers. Consequently, OPM staff realized the need to shift school progress planning from an annual compliance activity to a performance management cycle of continuous improvement; staff further realized that the greatest lever for this change was the use of data dashboards and visualizations.

Three key questions informed and drove practices and work around data use and visualization:

1. How can the district centralize data displays to facilitate strong decision making district-wide?

2. How should the district organize and display data via a dashboard in order to create actionable data for principals and those who support them?
3. How can the district leverage the use of dashboards to build the capacity for data-driven decision making?

### **Project Scope**

Developing the data dashboard has been a two-year process involving continual refinement. Focus groups with principals at elementary and secondary schools yielded feedback on beta designs. A dashboard was developed for each school. On each dashboard, the Office of Performance Management displayed the data determined to be most relevant to the school improvement process. While these were not the only data to be analyzed, and they had to be triangulated with data gathered locally by teachers and administrators in buildings, the creation of the administrator dashboard allowed BCPS to provide a consistent view of the present state across schools.

The administrator dashboard has multiple tabs: main, assessment, leading for equity, graduation rate, and stakeholder satisfaction survey data. Access to the administrator dashboard is provided to principals, assistant principals, school counselors, professional development teachers called STAT teachers, and department chairs at the secondary level. On at least a quarterly basis, OPM provides professional development on the use of the dashboard tied to the timing of quarterly monitoring reports that schools must provide regarding their school progress plans.

All data on the administrator dashboard can be disaggregated. As BCPS entered Year 2 of dashboard professional development, however, feedback during focus groups and meetings with principals alerted OPM staff that simply providing the ability to disaggregate data by

race/ethnicity and special needs was insufficient. So, OPM collaborated with the Office of Equity and Cultural Proficiency to create the “leading for equity” tab. This tab displays data in chart format, already disaggregated, so that comparisons between and among student groups can be more readily observed (see Figure 10).



Figure 10. The leading for equity tab on the BCPS administrator dashboard.

## Results

During the 2015–2016 school year, OPM conducted seven workshops at the end of the first and second quarters. All 175 school teams were invited to participate. In total, 156 school administrators, one assistant superintendent, and four members of the Office of Mathematics attended the sessions. Additionally, OPM staff provided training as part of the STAT and new assistant principal monthly professional development. The purpose of the workshops was to deepen understanding of school progress monitoring with a focus on analyzing data through an equity lens.

Using Excel as a tool, school teams examined system data, such as 2015 PARCC and Measure of Academic Progress (MAP) growth and other data available on the administrator dashboard. School teams engaged in an inquiry protocol to examine their achievement gaps by isolating race; questioning policies, practices, norms, and existing structures; and seeking perspectives from the students represented in the gaps. Using a data analysis video centered on unpacking PARCC data, schools were invited to use the recommended English/language arts and mathematics effective practices to guide possible adjustments to their school progress plans. More than 80% of schools reported through the second quarter that they were on track to realize their goals for 2015–2016.

In addition to self-report, BCPS uses the MAP assessment to monitor student achievement and growth over the course of each year. The 2015–2016 results of MAP growth by school show that school progress planning efforts and training support are positively associated with student performance. More than 90% of schools met 50% growth (fall to winter) on MAP in both reading and math. Of all the schools that attended SPP monitoring workshops in both the first and second quarters, only three did not meet the 50% growth target for reading; all schools attending both sessions met the growth target for mathematics.

### **Lessons Learned and Next Steps**

Many valuable lessons have been learned regarding this work, and several areas of success have been revealed. In particular:

- **Having a consistent view of the world can streamline and lessen data demands.**

The creation of the administrator dashboard led to a significant reduction in the volume of ad hoc data requests received from schools and central office staff. Having a

dedicated place where data are refreshed and displayed has increased data use and lessened data demand.

- **The ability to disaggregate data alone is insufficient.** School teams may not choose to disaggregate data or name performance gaps in terms of student groups based on race/ethnicity or special services (FARMS, Special Education).
- **Equity-based conversations require consistent modeling and support, as well as recurring practice opportunities.** Equity-based conversations are difficult, so regular support and modeling are necessary. Building agency takes time and multiple cycles.

Next steps for BCPS include collaboration with the Division of Curriculum and Instruction on a district-wide data protocol. This work has the goal of increased data literacy throughout BCPS, from within schools to the central office staff charged with supporting schools. BCPS will also seek to collaborate with the assistant superintendents of schools to strengthen expectations around school progress planning, specifically in terms of the language and specificity in the plans and overall plan alignments—from data analysis and root cause to key actions and professional learning opportunities for staff.