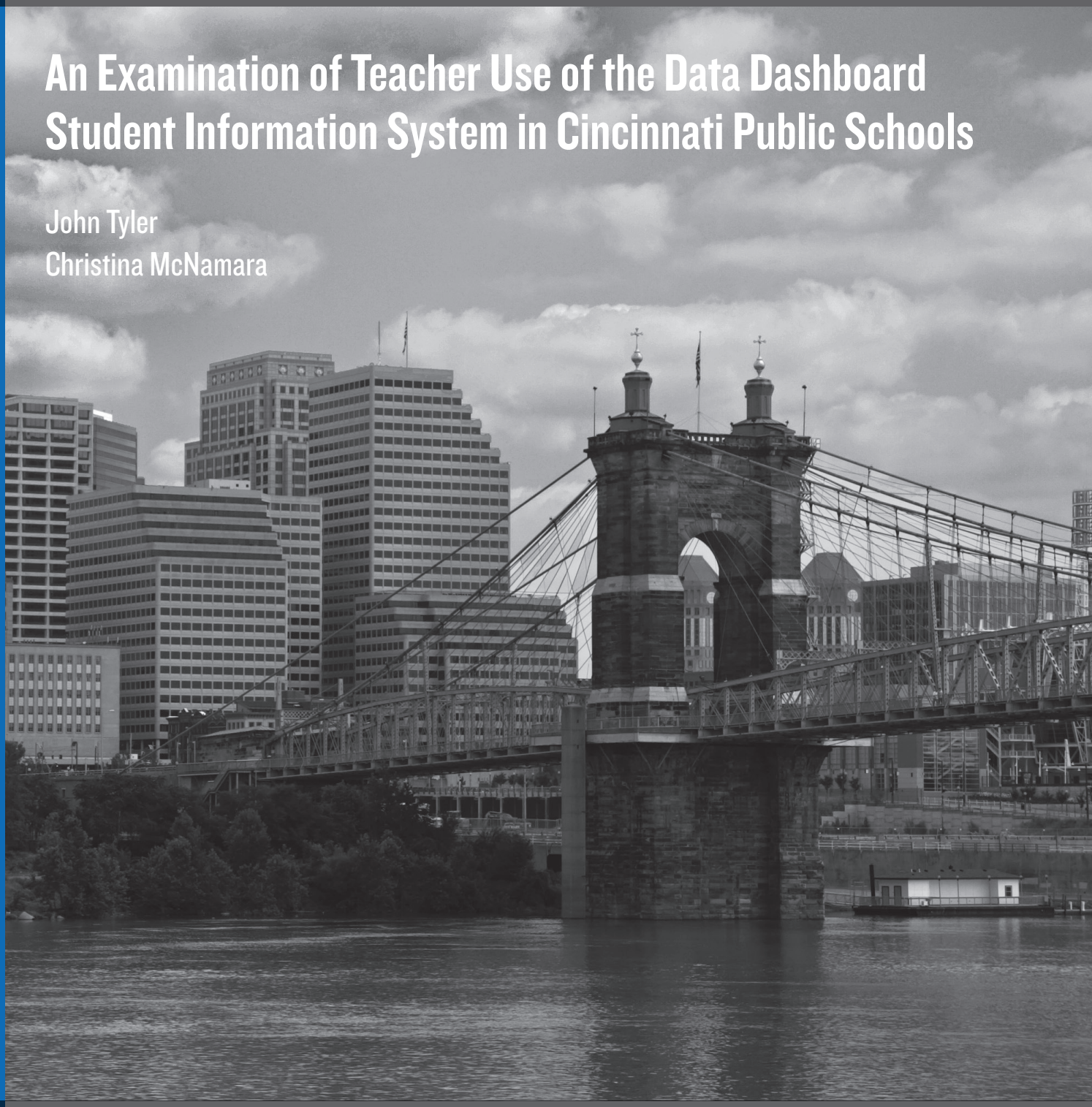
THE SENIOR URBAN EDUCATION RESEARCH FELLOWSHIP SERIES

An Examination of Teacher Use of the Data Dashboard Student Information System in Cincinnati Public Schools

John Tyler
Christina McNamara



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The findings and conclusions presented herein are those of the authors and do not necessarily represent the views of the Council of the Great City Schools or IES.

The Senior Urban Education Research Fellowship Series

Volume VI:

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The Council of the Great City Schools is the only national organization exclusively representing the needs of urban public schools. Founded in 1956 and incorporated in 1961, the Council is located in Washington, D.C., where it works to promote urban education through legislation, research, media relations, instruction, management, technology, and other special projects.

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OVERVIEW

THE SENIOR URBAN EDUCATION RESEARCH FELLOWSHIP PROGRAM

Large urban public school districts play a significant role in the American education system. The largest 65 urban school systems in the country – comprising less than one half of one percent of the nearly seventeen thousand school districts that exist across the United States – educate about 16 percent of the nation's K-12 public school students, approximately a quarter of the nation's economically disadvantaged students, and about a third of its African American students, Hispanic students, and English Language Learners.[1] Clearly, any attempt to improve achievement and to reduce racial and economic achievement gaps across the United States must involve these school districts as a major focus of action.

These school districts face a number of serious, systematic challenges. To better understand the problems in urban education and to develop more effective and sustainable solutions, urban districts need a program of rigorous scientific inquiry focusing on what works to improve academic outcomes in the urban context. Moreover, in order to produce such evidence and to move public education forward generally, the standards of evidence in education research must be raised in such a way as to bring questions regarding the effectiveness of educational interventions and strategies to the fore and to promote careful scrutiny and rigorous analysis of the causal inferences surrounding attempts to answer them.

It has been argued that, in order to move such an effort forward, a community of researchers, committed to a set of principles regarding evidentiary standards, must be developed and nurtured. We contend further that, in order to produce a base of scientific knowledge that is both rigorously derived and directly relevant to improving achievement in urban school districts, this community of inquiry must be expanded to include both scholars and practitioners in urban education.

Though a great deal of education research is produced every year, there is a genuine dearth of knowledge regarding how to address some of the fundamental challenges urban school districts face in educating children, working to close achievement gaps, and striving to meet the challenges of No Child Left Behind. Moreover, while there is a history of process-related research around issues affecting urban schools, relatively few studies carefully identify key program components, document implementation efforts, and carefully examine the effects of well-designed interventions in important programmatic areas on key student outcomes such as academic achievement. In sum, there is an absence of methodologically sound, policy-relevant research to help guide practice by identifying the conditions, resources, and necessary steps for effectively mounting initiatives to raise student achievement.

In order to address this need, the Council of the Great City Schools, through a grant from the Institute of Education Sciences, established the Senior Urban Education Research Fellowship (SUERF) program.

The Senior Urban Education Research Fellowship was designed to facilitate partnerships between scholars and practitioners focused on producing research that is both rigorous in nature and relevant to the specific challenges facing large urban school districts. We believe such partnerships have the potential to produce better, more practically useful research in at least three ways. First, by deepening researchers' understanding of the contexts within which they are working, the program may help them maximize the impact of their work in the places where it is needed the most. Second, by helping senior staff in urban districts become better consumers of research, we hope to increase the extent to which the available evidence is used to inform policy and practice, and the extent to which urban districts continue to invest in research. Third, by executing well-designed studies aimed at the key challenges identified by the districts themselves, we hope to produce reliable evidence and practical guidance that can help improve student achievement.

[1] Council of the Great City Schools (2011). *Beating the Odds: Analysis of Student Performance on State Assessments and NAEP.* Results from the 2009-2010 School Year. Washington, DC.

The primary goals for the Senior Urban Education Research Fellowship are to:

- promote high quality scientific inquiry into the questions and challenges facing urban school districts;
- facilitate and encourage collaboration, communication, and ongoing partnerships between senior researchers and leaders in urban school districts;
- demonstrate how collaboration between scholars and urban districts can generate reliable results and enrich both research and practice;
- produce a set of high quality studies that yield practical guidance for urban school districts;
- contribute to an ongoing discussion regarding research priorities in urban education; and
- promote the development of a "community of inquiry", including researchers and practitioners alike, committed to both a set of norms and principles regarding standards of evidence and a set of priorities for relevant, applied research in urban education.

The SUERF program benefitted greatly from the guidance and support of a Research Advisory Committee made up of experts and leaders from large urban school districts and the education research community. The committee included Dr. Katherine Blasik, Dr. Carol Johnson, Dr. Kent McGuire, Dr. Richard Murnane, Dr. Andrew Porter, and Dr. Melissa Roderick. This extraordinary group helped to identify and define the objectives and structure of the fellowship program, and we thank them for lending their considerable insight and expertise to this endeavor.

The following volume of the *Senior Urban Education Research Fellowship Series* documents the work of Dr. John Tyler and Ms. Christina McNamara working in collaboration with Cincinnati Public Schools. Both the research and reporting is the sole intellectual property of Dr. Tyler, and reflects his personal experience and perspective.

Dr. Tyler's examination of data use among teachers in Cincinnati is both important and timely. Cincinnati's Data Dashboard system is one of the most innovative online data management systems in the country, and yet low teacher usage speaks to the fact that supporting true "data-driven instruction" involves much more than an investment in technology. As the focus groups with teachers reveal, districts need to build the capacity of educators to use these data systems through professional development, incorporating time and opportunities for collaboration around data into the school day and year, monitoring data use in schools and classrooms, fine-tuning data systems in response to teachers' needs, and developing strong, data-savvy school leaders.

Dr. Tyler's collaboration with CPS not only advances the field of research on the use of student data in urban districts, but also yields actionable guidance to schools and districts in their efforts to make student performance data accessible and to build a culture of data use.

We hope you will find this report both interesting and relevant to your own work in education.

Thank you.

Michael Casserly
Executive Director
Council of the Great City Schools

ABOUT THE SENIOR URBAN EDUCATION RESEARCH FELLOW

John Tyler is Associate Professor of Education, Economics, and Public Policy at Brown University. He is an applied microeconomist who has been in the Education Department at Brown since 1998. His work focuses on questions within the economics of education field, especially as these questions can be viewed through a program evaluation lens. His past work includes evaluations of the economic impact of the GED credential, the effects of working while in high school on academic achievement, and the effects of prison-based education on post-release labor market outcomes. His recent and planned future work focuses on teacher quality issues in U.S. K-12 education. In this vein he has examined the extent to which classroom-based measures of teaching effectiveness are predictive of a teacher's ability to raise student test scores, teacher use of student test data as a means for improving instruction, and the extent to which teacher evaluation systems can help teachers become more effective.

Professor Tyler is a Research Associate at the National Bureau of Economic Research and is in his first year of a two-year stint as a W.T. Grant Foundation Distinguished Fellow. He received his doctorate from the Harvard Graduate School of Education in 1998.

ABOUT THE RESEARCH PARTNERSHIP

The idea for this project grew out of meetings with personnel in the Cincinnati Public Schools (CPS). These meetings were associated with research that I would be conducting in that district over the next two years looking at their nationally-recognized teacher evaluation system. In discussions with CPS representatives including Elizabeth Holtzapple, CPS Director of Research, Evaluation, and Test Administration, and Sarah Trimble-Oliver, Academic and Assessment System Administrator, it became clear that Cincinnati is a district that is trying to use student performance data in serious and sophisticated ways, and that they are welcoming of research that holds the potential of helping them use data more effectively. It was during these discussions that I learned that they had recently (in 2005) launched a new information management "dashboard" tool that gives teachers timely and easy-to-use access to student performance data on all district wide assessments, including the regularly-spaced "benchmark" assessments that are administered primarily in grades 3-8. Conversations with Holtzapple and Trimble-Oliver suggested interest on their part in evaluating the role of this tool in helping the district develop an entire faculty of "data informed" teachers.

My initial survey of the research literature following those meetings suggested that we currently know very little about what to expect when a district makes available to teachers, via technology, relatively large amounts of student performance data. Given that more districts will be following in the footsteps of Cincinnati and like-minded districts that have put in place systems for using student performance to inform policy and practice, it is obvious that expanding our knowledge base in this area could provide a substantial service to the field. I thus saw a unique opportunity that I thought could help the district address some of its needs and priorities and provide important information to the field.

It quickly became clear that the web logs generated whenever anyone logs into the Dashboard website would serve as an invaluable data source for the research. Since these web logs captured all relevant information while anyone was using Dashboard, an analysis based on the web logs could reveal much about teacher usage of the web-based tool. The district readily agreed to make the web logs available for the research after having first removed all personally identifiable information and subsequently provided the universe of web logs from the 2008-2009 and 2009-2010 school years.

Working together on the Dashboard web logs was, however, just the first of many steps in a fruitful and enjoyable partnership that has developed over the past years. Holtzapple and Trimble-Oliver have been exceedingly gracious with their time in answering critical questions about Dashboard, the software that generates the web logs, the benchmark tests, and other questions that have made this research possible. They have also helped with access to other administrative data sources that provided information on teachers and students ultimately used in the analyses. Elizabeth Holtzapple, in particular, helped set up focus group sessions with teachers and principals and both Holtzapple and Sarah Trimble-Oliver provided continual entrée to other district personnel who were accessed as a part of the project.

As the partnership coalesced I was asked to help the district with its i3 application to the U.S. Department of Education. The core of that application was a proposal to use federal i3 funds for enhancements to the Dashboard system. I readily agreed to help write the evaluation section of the district's i3 application and to serve as the evaluator of the project were it to be funded. The i3 process was, of course, extremely competitive and the CPS proposal was not ultimately successful. Nonetheless, the combined effort illustrates the strength and utility of the partnership that had been forged with the district.

ABOUT THE RESEARCH PARTNERSHIP

When the first usage results came in from the web log analysis the results were rather surprising and disconcerting. The teachers targeted as the primary beneficiaries of Dashboard data, the core subject teachers in grades 3-8 whose students have regular postings of benchmark test data to Dashboard, had very low levels of time spent viewing student data on Dashboard. In an attempt to understand these results a series of teacher focus groups were convened with the assistance of Holtzapple, as well as various building administrators and teachers across the district. I also was able to meet with instructional support teams who were the district's point people for assisting teachers in the use of Dashboard. I shadowed one of these teams for a day as they worked in one school. Some of the reasons for the lower than anticipated teacher usage of Dashboard emerged in these discussions and meetings, including uneven Dashboard training across the district, perceived lack of time to devote to Dashboard use, and dissatisfaction with the benchmark tests that constitute a substantial amount of the data on Dashboard. Through this project I have been able to share not only the usage statistics with the district, but also these and other possible explanations for the low levels of teacher usage, as well as some suggestions for advancing the use of Dashboard by district teachers.

The web log analyses that served as the analytical centerpiece of this project marked the first time this technique and these kinds of data were used to document and study usage of a student information system in education. Web log analysis is able to objectively answer questions at a level of detail that cannot be addressed by surveys, interviews, case studies, and the other methods that are prevalent in this work. Like much administrative data in education, web log data is relatively low cost to collect and store, can usually be linked to other administrative records of teachers and students, and can be de-identified so that researchers can use these data in conducting rich analyses that can provide information to the sponsoring district and the field. Based on the work in Cincinnati and in partnership with the Research Alliance for New York City Schools, I am now engaged in a similar Spencer Foundation- funded project in New York City.

EXECUTIVE SUMMARY

The past decade has seen increased testing of students and the concomitant proliferation of computer-based systems to store, manage, analyze, and report the data that comes from these tests. The research to date on teacher use of these data has mostly been qualitative and has focused on the conditions that are necessary (but not necessarily sufficient) for effective use of data by teachers. Absent from the research base in this area is objective information on how much and in what ways teachers actually use student test data, even when supposed precursors of teacher data use are in place.

This project addresses this knowledge gap by analyzing usage data generated when teachers in Cincinnati log onto the web-based, district-provided data delivery and analytic Dashboard tool. Based on information contained in the universe of web logs from the 2008-2009 and 2009-2010 school years, we find relatively low levels of teacher interaction with pages on the web tool that contain student test information that could potentially inform practice. For example, the teachers who should get most utility out of Dashboard, core subject teachers in grades 3-8 where students are tested quarterly, spend an average of just over 30 seconds per week looking at individual student-level data on Dashboard.

Even in peak usage weeks, immediately after benchmark test results are posted to Dashboard, average time spent looking at individual student data is only around a minute. Analysis of the web logs indicates that while some teachers do print off data from Dashboard instead of viewing it online, the majority do not and the use of Dashboard to print student data does not provide a substantive explanation for the low usage statistics.

Information from teacher focus groups does provide some explanation. While the teachers in these groups were generally supportive and enthusiastic about Dashboard and the promise of using student data, impediments to effective Dashboard usage did emerge. These include uneven and limited training on Dashboard use across the district, a perceived lack of time by teachers to interact with Dashboard in ways that would make the data useful to their practice, and a feeling that the benchmark tests that provide much of the student performance data on Dashboard are not well aligned to the district curricula and the district pacing guides.

INTRODUCTION

INTRODUCTION

Since the passage of the No Child Left Behind Act (NCLB) in 2001, school districts have primarily used student assessment data for accountability purposes, with only limited use of these data to inform instructional decisions (Wayman & Stringfield, 2006). Yet the recent proliferation of both student data and district-level data systems has led many to believe that this should change--that there should be increased use of data to inform work at all levels, from the district central office to the classroom. At the most fine-grained level the idea is that classroom teachers can use student performance data to guide classroom instruction and ultimately improve student achievement.

A simple theory of action for the way in which teacher usage of student performance data could affect student achievement would have the following sequential steps:

1. Test students to gather performance information.
2. Provide the test results to the teacher in a manner and in formats that foster meaningful analysis.
3. The teacher accesses the test data.
4. The teacher spends time analyzing the test data.
5. The teacher draws knowledge from that analysis that can inform her practice.
6. The teacher knows how and has the ability to alter practice based upon the new knowledge.
7. The teacher acts on the new knowledge and classroom practice is altered.
8. The altered practice has a positive impact on student achievement.

Overall, the hope is that performance data from the benchmark assessments will inform teachers' decisions around individual and/or group instruction, will assist in the prioritization of particular skills or standards, and will yield information regarding the effectiveness of chosen approaches or instructional strategies (Supovitz & Klein, 2003).

Given this theory of action, assessment systems and technology that can make relevant data readily accessible to teachers are the foundation for the effective use of data to inform classroom instruction. Yet until recently most districts stored student performance data that was not particularly suitable for informing day-to-day classroom instruction in systems that were inaccessible to teachers (Wayman, 2005). This is changing, however, as many districts are combining periodic formative assessment systems with data management and delivery systems that are designed to provide informative data to teachers and administrators in usable formats. Data on the growth of this industry is not readily available, but a 2003 report indicated that between 2000 and 2003 vendor revenues on data management and analysis software and services in the K-12 sector grew from $98.8 million to $145 million (Stein, 2003). These figures do not include the proliferation of systems built in-house, and thus they represent a lower bound estimate of district investment on student information systems.

In the 2005-2006 school year, the Cincinnati Public School district brought online for district-wide use their Data Dashboard system, a web-based tool developed in-house that allows teachers to access information on their students, including student performance data from regularly-administered benchmark assessments in core subject areas (math, English language arts, social studies, and science) in grades 3-8. These benchmark assessments are linked to state standards and are designed to provide information on student understanding and skill level that is both more regular and more detailed than the end-of-year state assessments (Means, 2005). Cincinnati's Dashboard tool is designed to be user friendly, though as we will see, there is some disagreement across teachers as to the extent to which this is actually the case.

As will also emerge later in this report, being locally developed and thus easily modified in response to suggestions from the field, is both a strength and a weakness of the Dashboard system.

While this project only examines the third and fourth steps in the model above—do teachers in Cincinnati access student performance data and how much time do they spend with the data when it is provided to them?—it is one of the first studies to date that addresses these questions at the individual teacher-student level.

METHODOLOGY

METHODOLOGY

This study utilized both quantitative and qualitative methods to understand teacher use of the Dashboard system. At the heart of the study is the analysis of web logs that are generated any time teachers and administrators log onto the Dashboard system. To better understand the patterns that emerged from the web log usage study, teacher focus groups were also convened and analysis of these focus group discussions form the basis of the qualitative research in the paper.

QUANTITATIVE ANALYSIS OF DASHBOARD WEB LOG FILES

Teachers begin a Dashboard session with a password-secured login. Each login starts an active background web logging process that records, among other things, a unique Dashboard session identifier, a unique user identifier, and information regarding every page that is accessed along with the time the page was accessed and whether or not there is a student identifier associated with the page (i.e., in the case that the teacher is looking at a student-specific page).

The teacher usage analysis of the Dashboard system is based on these web logs from the 2008-2009 school year, with some auxiliary analysis using data from the 2009-2010 school year.[2] For these years the district provided the universe of Dashboard log files after first removing any information that would allow for the identification of individuals.

Specifically, we analyze the extent to which core subject (math, English, social studies, and science) teachers in grades 3 through 8 accessed the performance data of their students via the Dashboard web tool. The study focuses on these teachers because these are the grades and subjects where students take the quarterly benchmark assessments--the regular tests designed to provide information to teachers regarding the performance of their students.

With these data, we were able to analyze teacher logins to the Dashboard system, the types of pages in Dashboard that teachers view when logged in, the amount of time teachers spend on the different kinds of pages, and whether this activity is related to student test score growth. This process began with the conversion of the raw web log files into data suitable for analysis. In particular, the task was to reduce the dimensionality of the analysis by grouping the many different pages that a teacher can access on Dashboard into common groups. To that end, individual pages were grouped into the following page-type categories:

- Class-level pages that have information on a given class of a given teacher
- Students-in-class level pages that have information on multiple students in a teacher's class
- Individual student level pages that have information on an individual student in a teacher's class
- Item pages that have information on particular test items
- Resource pages that have resource information for teachers such as model lesson plans.

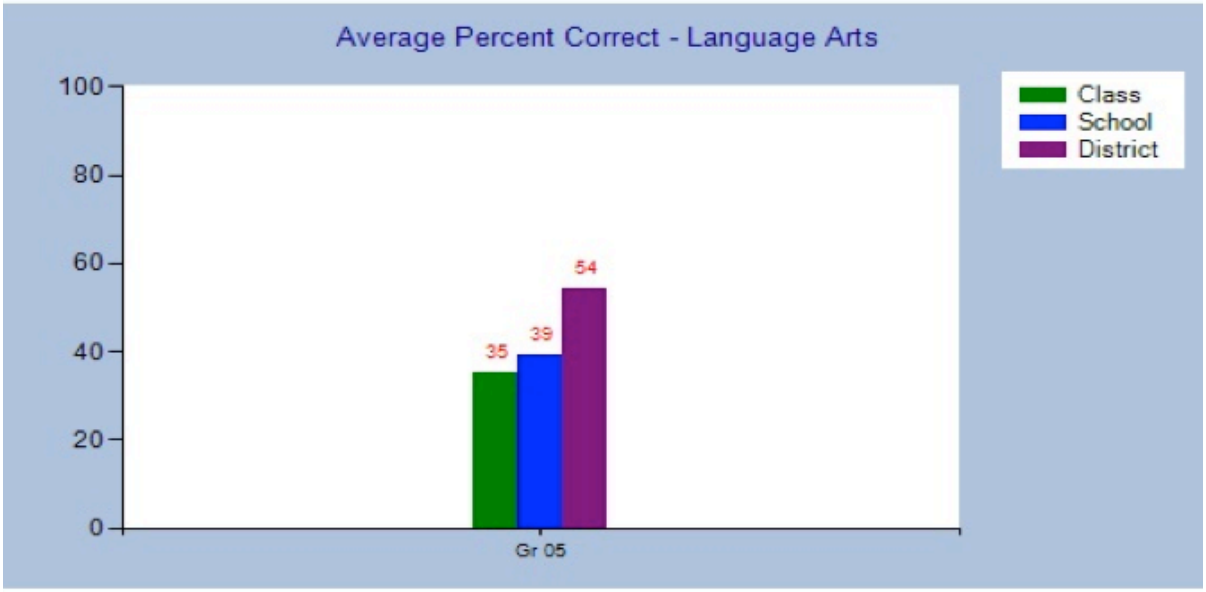
Figure 1 gives an example from the demonstration version of Dashboard of a "class" level page for a class taught by a hypothetical CPS teacher. On this page the teacher learns that on the November 12th, 2010 English language arts (ELA) benchmark assessment her students answered 35 percent of the questions correctly compared to 39 percent for all the students in her school and 54 percent in the district. Similar statistics for the benchmark math test are displayed below the ELA results.

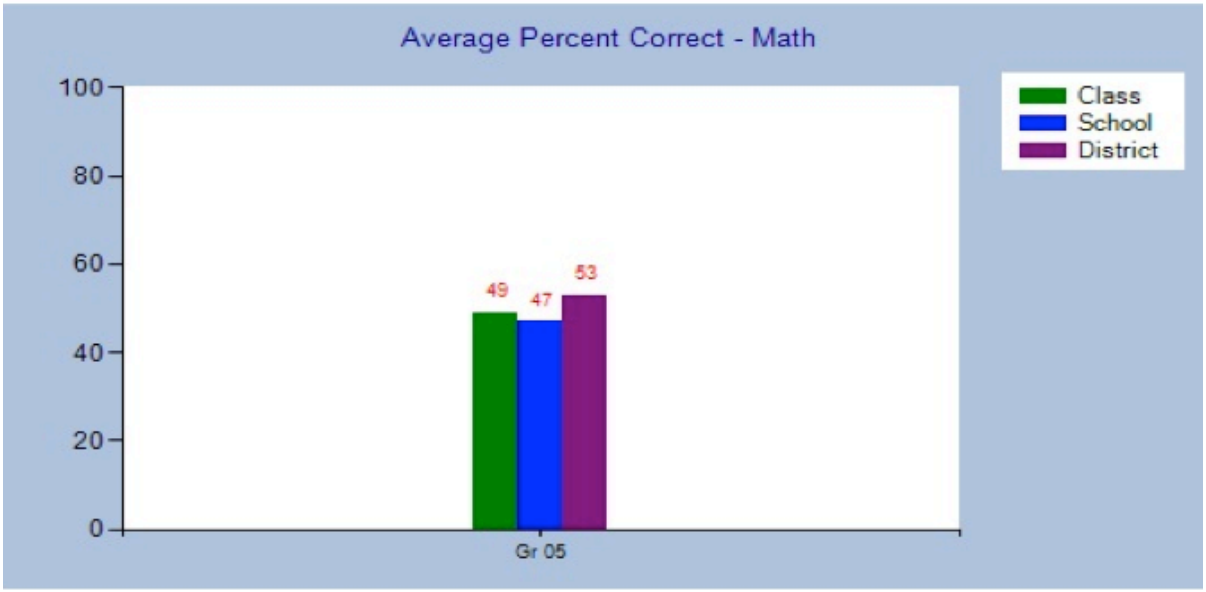
[2] For narrative simplicity in the remainder of the paper, I will refer to the 2008-2009 school year as the 2009 school year and the 2009-2010 school year as the 2010 school year.

FIGURE 1. EXAMPLE OF A "CLASS" LEVEL PAGE FROM DASHBOARD

Percentage Correct

Cincinnati Public Schools Dashboard
School: Demo School
Teacher: Demo Teacher
Section: 00000
Test Date: 11/12/10





METHODOLOGY (CONT'D)

FIGURE 2. EXAMPLE OF A "STUDENTS-IN-CLASS" LEVEL PAGE FROM DASHBOARD

Percentage Correct

Cincinnati Public Schools Dashboard
School: Demo School
Teacher: Demo Teacher
Section: 00000
Test: Short Cycle Assessment 5 Math Grade 5 (232)-11/12/10

Avg % Correct: 49%
District Avg % Correct: 53%

Graphs showing all district, school, class, class averages

Student and Score		Assessment Mastery
Student 1	(18%)	Reteach
Student 2	(27%)	Reteach
Student 3	(27%)	Reteach
Student 4	(36%)	Reteach
Student 5	(36%)	Reteach
Student 6	(36%)	Reteach
Student 7	(36%)	Reteach
Student 8	(36%)	Reteach
Student 9	(45%)	Reteach
Student 10	(45%)	Reteach
Student 11	(45%)	Reteach
Student 12	(45%)	Reteach
Student 13	(45%)	Reteach
Student 14	(45%)	Reteach
Student 15	(55%)	Reteach
Student 16	(55%)	Reteach
Student 17	(55%)	Reteach
Student 18	(64%)	Reteach
Student 19	(64%)	Reteach
Student 20	(64%)	Reteach
Student 21	(64%)	Reteach
Student 22	(64%)	Reteach
Student 23	(64%)	Reteach
Student 24	(64%)	Reteach
Student 25	(82%)	Enrichment

FIGURE 3. EXAMPLE OF "INDIVIDUAL STUDENT" PAGE FROM DASHBOARD

Student Results

Cincinnati Public Schools Dashboard
School: Demo School
Teacher: Demo Teacher
Section: 00000
Test: Short Cycle Assessment 5 Math Grade 5 (232)-11/12/10

Student: Student 22

Question	Correct Answer	Student Response	
1	D	D	Correct
2	C	C	Correct
3	C	C	Correct
4	C	D	Incorrect
5	B	B	Correct
6	*		Invalid test item
7	A	A	Correct
8	B	B	Correct
9	3	1	Incorrect

Figure 2 is a "students-in-class" level page for the same class. On this page the score of each student on the 11/12/2010 math assessment is displayed in ascending order down the column. A click on a student, for example Student 22, who got 64 percent correct, takes the teacher to a page with information on Student 22 (Note: Teachers see the actual names of their students. And, while student names are scrambled on the demo version of Dashboard from which these screen shots are taken, we have nonetheless provided aliases to assure confidentiality.).

Figure 3 gives an example of an "individual student" level page with Student 22's responses to all of the questions on the math benchmark. Clicking on "1" takes the teacher to a page that displays the first question on the benchmark test, a question which Student 22 answered correctly.

"Item" level pages give teachers the exact test question along with the grade-level "indicator" and the state "standard" being tested by that question.

There are many different types of "resource" pages in Dashboard. For example, some resource pages list the Ohio grade-level indicators for a given subject and grade. Each indictor is linked to a model lesson plan to teach that indicator, along with other links to related resources for the teachers.

The pages in Figures 1-3, along with "item" and "resource" pages, are examples of the page type groupings created for this analysis. In fact there are many different pages under each of the grouping (class, students-in-class, individual student, item, and resource) that can be accessed on Dashboard.

The raw web logs were also used to create other variables for use in the analysis. Information from district administrative personnel files, course files, and student test files were merged with the processed web log files to create the analysis files for this project, files with Dashboard usage information on 429 core subject grade 3-8 teachers in 2009 and 359 teachers in 2010. The 2009 data set is a teacher by Dashboard-page panel with 214,779 lines of data that were generated from 14,228 separate logins between August 2008 and May 2009.

QUALITATIVE ANALYSIS OF TEACHER FOCUS GROUP SESSIONS

In additional to the web log analysis, the project convened two focus groups of teachers in April of 2010 as a means of better understanding the patterns of teacher data usage that emerged from the Dashboard web log analysis. Teachers in the two groups were selected using a quasi-random process. We first identified sixteen randomly selected elementary and middle schools in the Cincinnati Public School system. The principal at each school was contacted and asked to select one teacher who was a "typical" data user to participate in the focus group. Two focus groups of eight teachers each from different schools were formed from these sixteen teachers.

A protocol to guide the focus group discussions was developed based on results from a pilot study that was conducted in the previous year. In that pilot study randomly selected teachers at four different schools engaged in four different site-based focus group discussions. The pilot focus groups helped to identify themes for further investigation that we pursued with the April 2010 focus groups. Specifically, the following three research questions were examined:

1. How does the District Support Data Use?

- To what extent have Cincinnati public schools developed a culture of data-use, and what has fostered or hindered that process?
- How do the district and school leaders support classroom teachers in their effort to use data to inform instruction?

2. How are teachers using data to inform and change practice?

- To what extend do Cincinnati classroom teachers report using the Data Dashboard, now that rich student, class, and school level data has been made available to them?
- How does the use of the Data Dashboard inform instructional planning and implementation?

3. What impediments to effective use of data have Cincinnati public school teachers encountered?

All of the focus group discussions were tape recorded and then transcribed. The transcribed data were then grouped into commonly occurring themes using NVivo--research analysis software that helps organize and analyze qualitative data.

RESULTS

PART I: TEACHER USAGE OF STUDENT PERFORMANCE DATA ON THE DASHBOARD SYSTEM

Basic summary statistics from the Dashboard web logs indicates that the average teacher in the targeted group of teachers--core subject teachers in grades 3-8--logged into the Dashboard system 33 times during the 2009 school year and spent a total of about 7 hours on Dashboard over the course of the school year. As described in the methodology, the many different pages that a teacher can access on Dashboard were grouped into class-level pages that have information on a given class of a given teacher, students-in-class-level pages that have information on multiple students in a teacher's class, individual student-level pages that have information on an individual student in a teacher's class, item pages that have information on particular test items, and resource pages that have resource information for teachers such as model lesson plans.

The average teacher apportioned her 7 hours during the year on Dashboard in the following ways:

- 3.2 percent (13 minutes) on class-level pages
- 26.8 percent (almost two hours) on students-in-class pages
- 9 percent (38 minutes) on individual student pages
- 6.6 percent (27 minutes) on item pages
- 31.6 percent (about two hours and ten minutes) on resource pages
- 5.2 percent (22 minutes) entering student test data information, and
- 17.4 percent of the time (slightly over an hour) on login, password, or navigational pages containing decision nodes (links) for users, but no information beyond the potential destination pages.

One way to give these annualized numbers context is to look at usage per week. When Dashboard usage is analyzed on a weekly basis, the web logs indicate that the average teacher in the target group logged in slightly less than once per week during the school year and that the mean time spent logged in is about 10 minutes per week. Conditional on having logged in at least once during the week, the mean time logged in is almost 30 minutes, where these 30 minutes could have been accumulated during a single Dashboard session or totaled across several sessions during the week.

We are particularly interested in how much teachers view students-in-class and individual student pages, since these are the pages that provide teachers with information on student test data and test items. The web log analysis indicates that on average teachers spend about 2.3 minutes per week on students-in-class pages and slightly over half a minute per week on individual student pages. Among teachers who spend any time on these pages during the week, the mean times are 7.6 minutes on students-in-class pages and 6.33 minutes on individual student pages. The average teacher accesses (hits) a students-in-class page about 2.5 times per week and an individual student page only about once every two weeks (0.58 times per week).

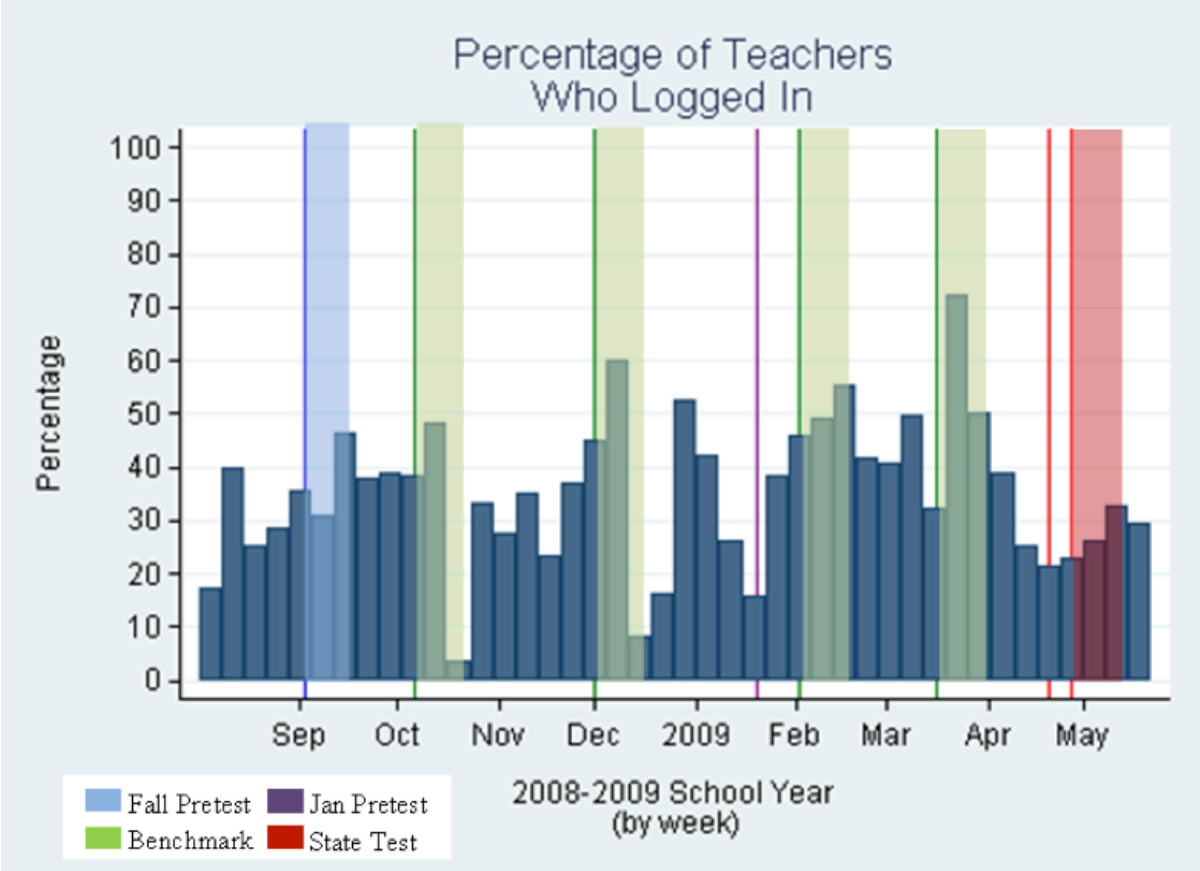
To the extent that teachers use Dashboard to access and then print out student data instead of viewing these data interactively and online, estimates of usage based solely on time-on-page will underestimate teacher data usage. Information is captured in the web logs anytime a Dashboard page is printed, allowing us to assess this mode of interacting with the web tool. On average teachers go to pages that print students-in-class information only about once every three weeks (0.35 times per week), and they go to pages that print individual student information only once every 6 weeks (0.16 times per week). Thus, it appears that teachers use Dashboard more as an interactive tool than as a tool for printing off student test data.

To provide a more complete look at how teachers use Dashboard throughout the year, figures 4-8 give week-by-week statistics on Dashboard usage. In each of these figures key test dates are marked with vertical lines: blue for the fall pre-test given to the 15 elementary initiative (EI) schools that received special services during this time period, green for each of the four benchmark tests given during the year, maroon for the January post-test given

the EI schools, and red for the end-of-year state tests. Following each test a two-week period is shaded in with the corresponding color. This two-week period represents the period during which test results from that test will be appearing on Dashboard, with the results for most classes available within two weeks of the test administration, an exception to this being the end-of-year state exams that are not returned within two weeks of administration.

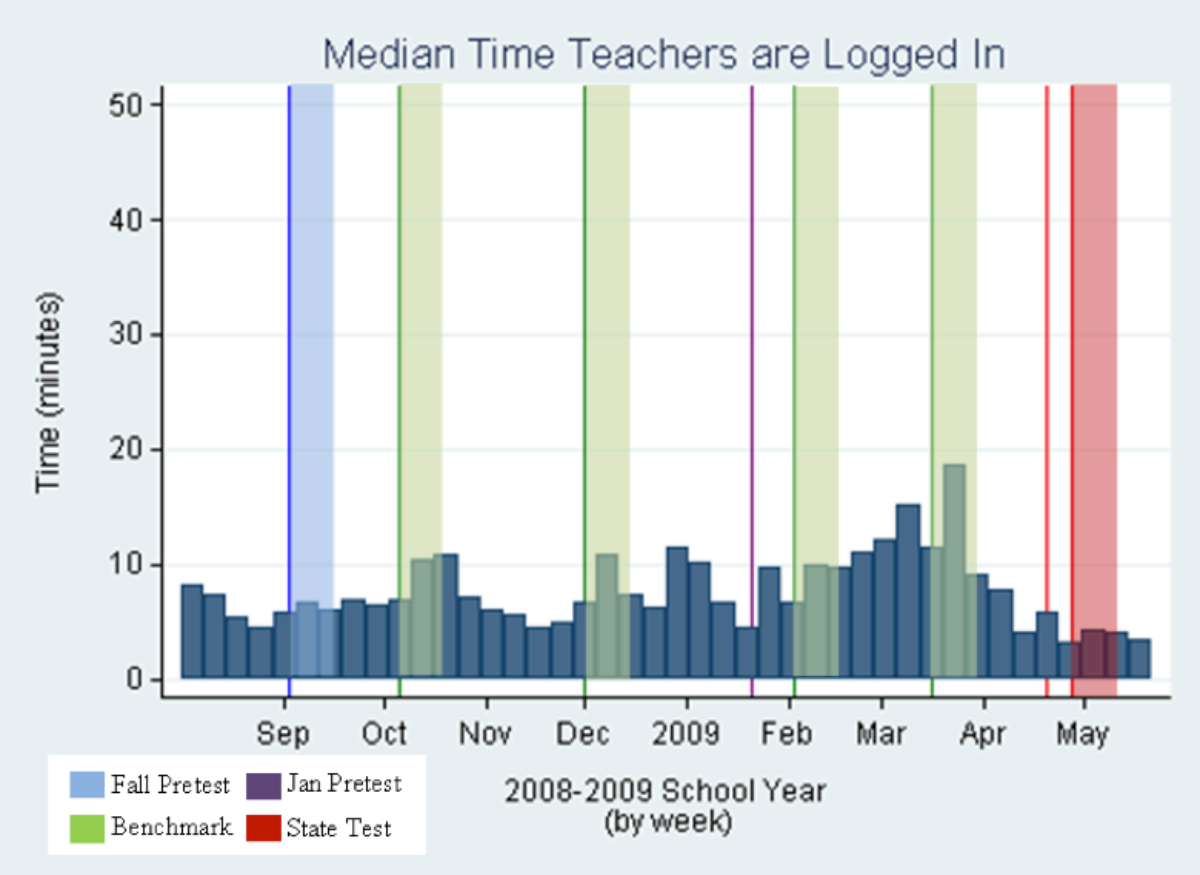
Figure 4 provides week-by-week information on the pattern of Dashboard logins by the target group of teachers during the 2009 school year, with the figure showing variation across the year in teacher logins to Dashboard. A higher percentage of teachers log into Dashboard in the weeks following a benchmark assessment than at other times during the year, ranging from about 45 percent on the fall pretest and the 1st benchmark to slightly over 70 percent of the teachers logging in immediately after the last benchmark in March. These patterns suggest that teachers use Dashboard more as a tool to review test results as they come in than as a tool for preparing for upcoming tests.

FIGURE 4. PERCENTAGE OF CPS TEACHERS WHO LOGGED INTO DASHBOARD BY WEEK



PART I: TEACHER USAGE OF STUDENT PERFORMANCE DATA ON THE DASHBOARD SYSTEM (CONT'D)

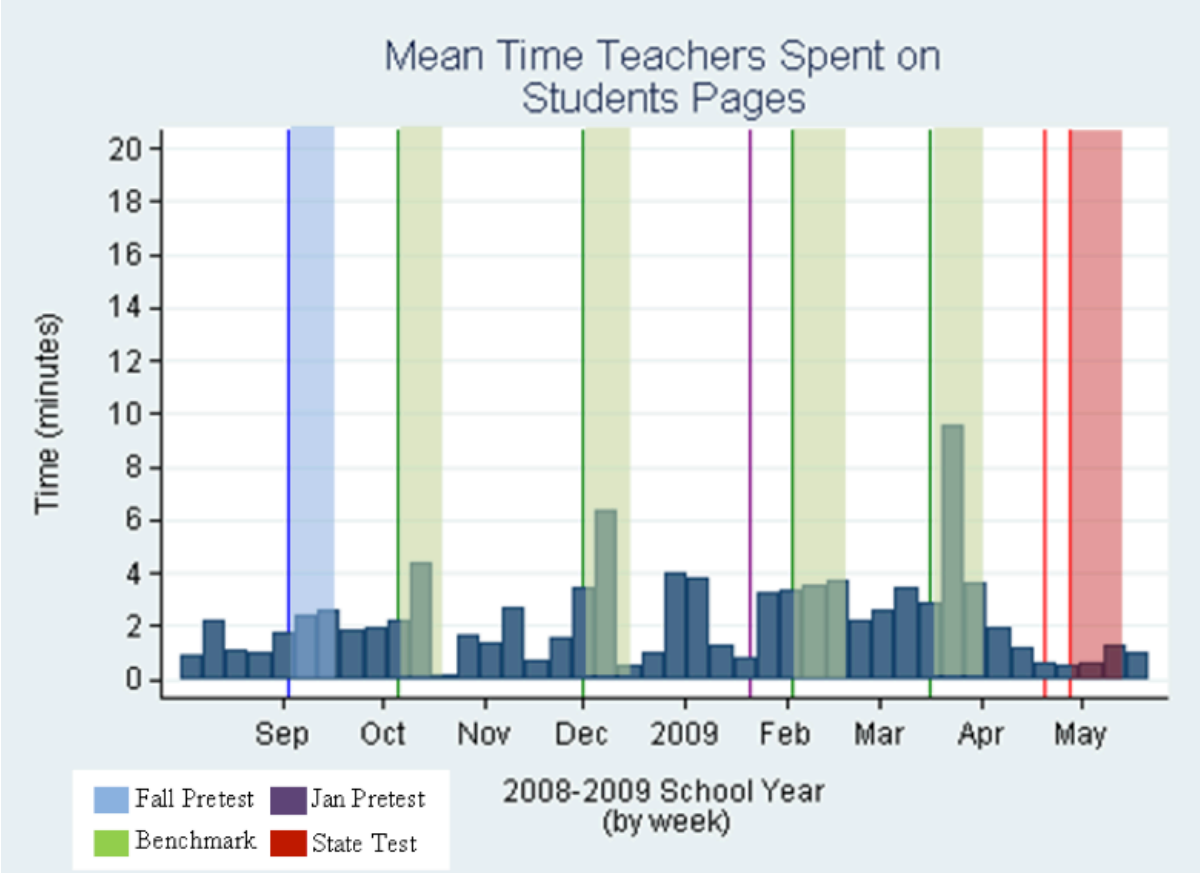
FIGURE 5. MEDIAN TIME LOGGED IN AMONG TEACHERS WHO EVER LOGGED INTO DASHBOARD DURING A WEEK, BY WEEK



The topic of Figure 5 is week-by-week information on the median time spent logged in, among those teachers who logged in during that week. Except for just before and just after the final benchmark in March, all of the median login times in Figure 5 are around or less than 10 minutes per week.

Figures 4 and 5 provide information on how much teachers use Dashboard, and a glance at these figures suggests that somewhere around 10 to 40 percent of the target teachers logged into the system in any given week and that the average teacher who logged in spent somewhere around 6 to 8 minutes online with Dashboard during the week. Given that there are no other studies against which to benchmark these figures, a natural question is whether or not this represents substantial usage of the Dashboard tool. One way of calibrating an answer to this question would be to consider two elementary school teachers who each have self-contained classrooms of, say, 21 students. Assume that one-third of each teacher's students are struggling and that benchmark tests have just been administered. Figure 4 suggests that only one of these two teachers would go to Dashboard to view information that might help her with her seven struggling students following the posting of benchmark test results. According to Figure 5, the teacher who did turn to Dashboard for information spent only about one minute per struggling student logged into the system (7 struggling students and a median login time of around 7 minutes per week for those who logged in that week). While only a rough barometer, this back-of-the-envelope estimation suggests that on average, CPS teachers-- even the core subject grade 3-8 teachers most expected to use Dashboard-- may not be making extensive use of Dashboard as a tool for helping their struggling students.

FIGURE 6. MEAN TIME SPENT ON "STUDENTS-IN-CLASS" PAGES BY WEEK

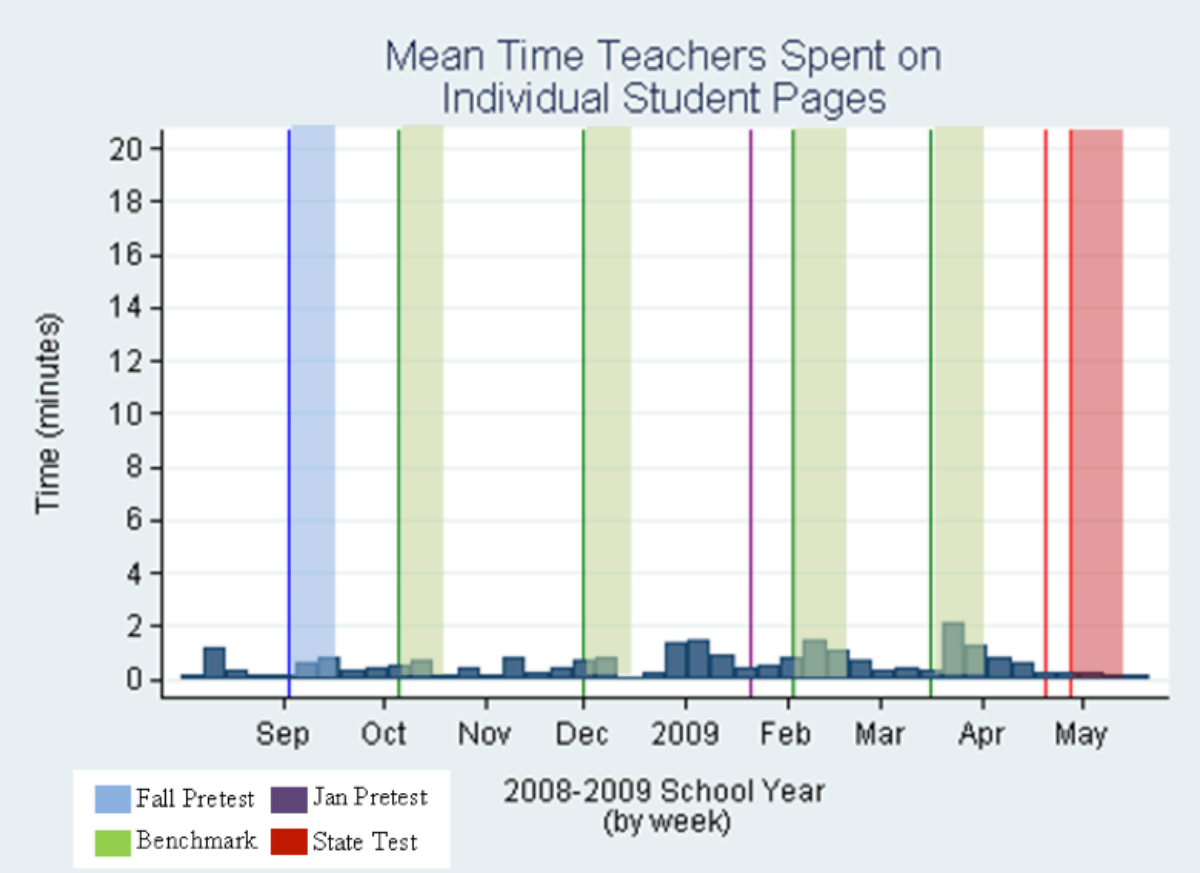


The second question examined in this project is how do teachers use Dashboard? In particular, since the bulk of student test data is presented on either students-in-class pages or individual student pages, the question becomes to what extent do teachers view student test data information on these pages? Week-by-week information on teacher time spent on students-in-class pages is presented in Figure 6. Averaged across all teachers, including those who never logged on during the week (i.e., have a time of zero spent on the page), Figure 6 indicates that teachers spent an average of from one to four minutes per week viewing students-in-class pages, with the exceptions of 6 and 9 minutes per week spikes after the 2nd and 4th benchmark tests.

PART I: TEACHER USAGE OF STUDENT PERFORMANCE DATA ON THE DASHBOARD SYSTEM (CONT'D)

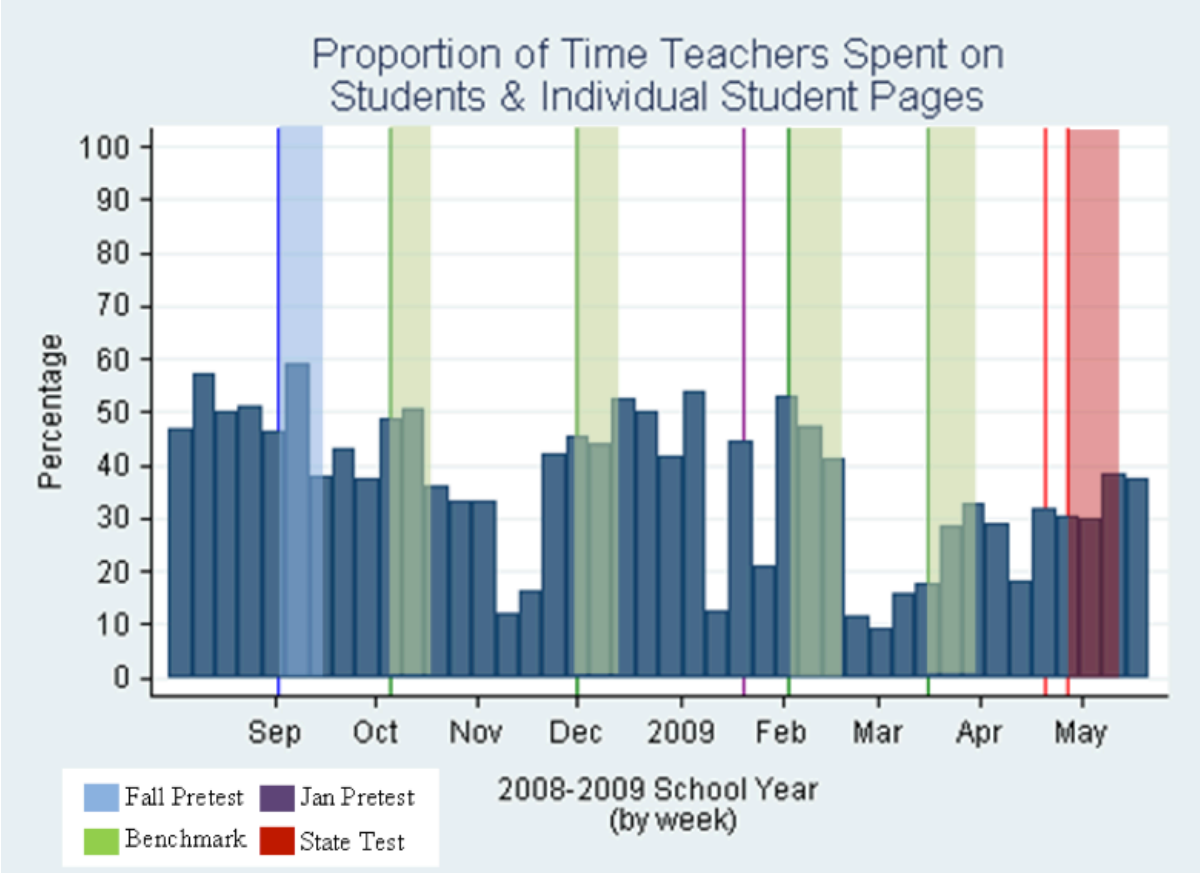
If we think that more intensive Dashboard usage of student-level data would be characterized by a teacher burrowing deeper into Dashboard to view test data on an individual student, then Figure 7 presents some more discouraging information. According to this figure the average teacher in the target sample spent less than 2 minutes per week total time viewing individual student pages, even during peak weeks.

FIGURE 7. MEAN TIME SPENT ON "INDIVIDUAL STUDENT" PAGES BY WEEK



How do teachers apportion their time on Dashboard each week? According to Figure 8, teachers who login to Dashboard spend from 20 to 50 percent of their time looking at student performance data, figures that seem reasonably high given all of the other types of information (e.g., viewing test items or resource pages) a teacher can access on Dashboard. Thus, concerns about how much teachers are using student performance data on Dashboard to inform and improve their practice should focus more on whether they login at all and how much time they spend while logged in, rather than in what they are doing while they are on Dashboard.

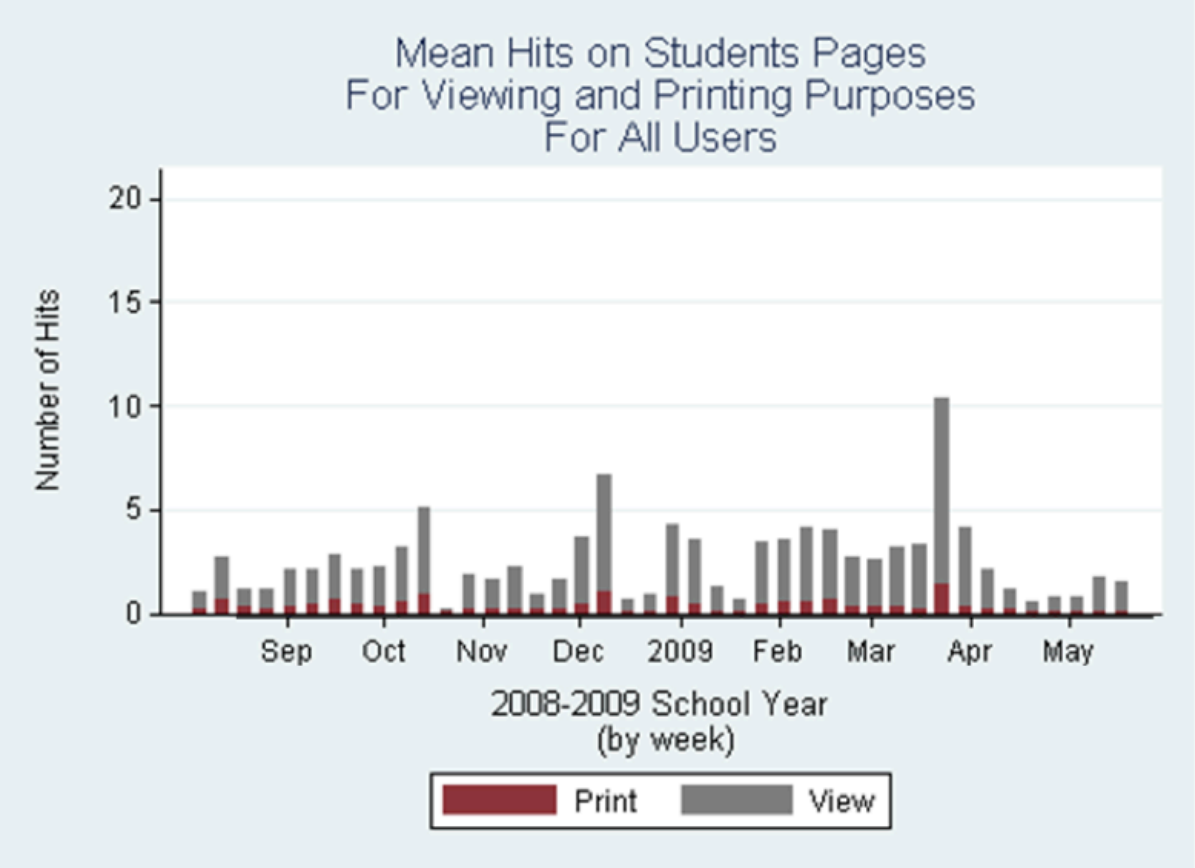
FIGURE 8. PROPORTION OF TOTAL LOGIN TIME SPENT ON "STUDENTS-IN-CLASS" AND "INDIVIDUAL STUDENTS" PAGES



[3] Tyler, J. (2011). *If You Build It Will They Come? Teacher Use of Student Test Score Data on a Web-Based Tool.* NBER working paper, submitted for publication

PART I: TEACHER USAGE OF STUDENT PERFORMANCE DATA ON THE DASHBOARD SYSTEM (CONT'D)

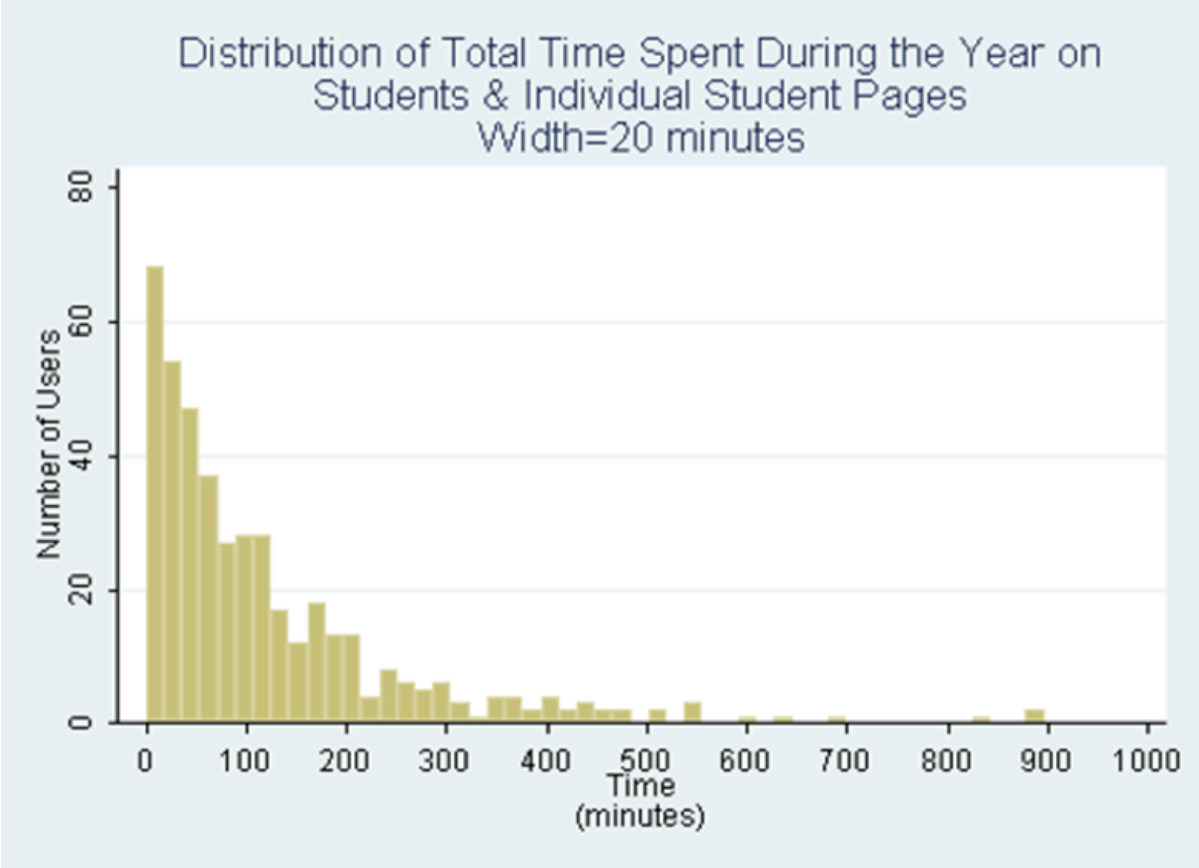
FIGURE 9. COMPARISONS OF MEAN VIEWING PAGE HITS VERSUS MEAN PRINTING PAGE HITS FOR "STUDENTS-IN-CLASS" AND "INDIVIDUAL STUDENT" PAGES BY WEEK



As discussed earlier, we will underestimate the extent to which teachers use student performance data on Dashboard to inform their practice if we ignore the practice of printing information off of Dashboard. Figure 9 suggests, however, that teachers' primary use of Dashboard is as an interactive tool rather than a printing tool. In every week of the school year the number of "viewing" hits by teachers on students-in-class and individual student pages easily dominates the number of "printing" hits on these pages.

If we summarize teacher use of student-level data by combining the time that teachers spend on either students-in-class or individual student pages, then Figure 10 displays the distribution of total time during the year spent by teachers on those pages combined. Based on the information in Figure 10, 17 percent of the target sample teachers (73 of 429 teachers) spent a total of 20 minutes or less during the entire school year viewing these types of pages and 43 percent of the teachers (187 out of 429) spent an hour or less during the year on these student-level pages. There is a long right hand tail to this distribution, however, and a third of the teachers spent more than two hours during the year on these pages and 20 percent spent more than three hours

FIGURE 10. DISTRIBUTION OF TOTAL TIME SPENT ON "STUDENTS-IN-CLASS" AND "INDIVIDUAL STUDENT" PAGES DURING THE 2008-2009 SCHOOL YEAR



In summary, the analysis of Dashboard web logs indicates relatively low levels of usage of Dashboard, at least as this tool is used to access and view information on student performance data. Web log data from 2010 was utilized to explore the extent to which Dashboard usage might be increasing over time. The aggregate usage statistics were very similar across the two years, although teachers in 2010 did spend about 10 more minutes total during the year viewing students-in-class pages than did teachers in 2009.

There are 243 teachers with Dashboard data in both 2009 and 2010 who can be used to study within-teacher changes in Dashboard usage. As with the aggregate results based on the full samples in both years, there is no evidence of within-teacher changes in Dashboard usage between 2009 and 2010; thus, the aggregate results are not being driven by compositional changes in teachers across the years, but by the fact that individual teachers had very stable Dashboard habits across the two years.

Finally, the data from 2010 was used to examine the extent to which student test score gains might be related to a teacher's use of a student's individual-level Dashboard data. Using both the end-of-the-year state test scores and the benchmark tests, models were fit correlating student test score gains with time spent by the teacher on the student's Dashboard data. In results that are presented in detail in a current working paper,[3] the overarching story is that there is no correlation between teacher use of student data on Dashboard and student test score gains. This outcome is hardly surprising given the very small amounts of time that teachers spend viewing individual student level data on Dashboard.

PART II: TEACHERS' PERSPECTIVES ON THE OPPORTUNITIES AND CHALLENGES OF DATA USE

Analyzing district-provided web logs, this project documented teacher usage of data on a web-based tool, the Data Dashboard, at a level that is unique in the field. The results of this analysis indicate very low levels of teacher usage of Dashboard as a tool for accessing and utilizing student performance data.

To better understand these low usage levels and examine the opportunities and obstacles that arise for teachers who use Data Dashboard, we conducted two focus groups of teachers in April of 2010. Each focus group was composed of eight Cincinnati Public School teachers who were identified by their principals as "typical" data users. We look at teachers' early interactions with Data Dashboard, the school and district level actions that support teachers' engagement in data-driven decision making, and the impediments that Cincinnati teachers have encountered in using Dashboard in that effort (Tyler, 2010). At that point the teachers were not told of the emerging evidence on Dashboard usage.

Specifically, the following research questions are examined:

1. How does the district support data use?

- How do the district and school leaders support classroom teachers in their effort to use data to inform instruction?
- To what extent have Cincinnati public schools developed a culture of data-use, and what has fostered or hindered that process?

2. How are teachers using data to inform and change practice?

- To what extent do Cincinnati classroom teachers use the Data Dashboard, now that rich student, class, and school level data has been made available to them?
- How does the use of the Data Dashboard inform instructional planning and implementation?

3. What impediments to effective use of data have Cincinnati public school teachers encountered?

This section discusses the results and lessons from those focus group discussions.

HOW DOES THE DISTRICT SUPPORT DATA USE?

Training and Support for Teachers

Research has shown that adequate training, support, and time are critical components for teachers to successfully use data as a tool to guide classroom instruction and ultimately improve student achievement (Lachat & Smith, 2005; Wayman, 2005). In the first three years Dashboard was online, district instructional support teams were able to work with teachers on using the Dashboard system as a part of their regular support activities within schools. The Dashboard-related training in these instances was on-site, carried out by the coaches on the instructional support teams, and instituted either by a request by a teacher or by coach initiation to look at Dashboard data.

But beginning in the 2008-2009 school year, these instructional support personnel were targeted exclusively at 15 "Elementary Initiative" (EI) schools, schools designated to receive extra services in an attempt to combat low student performance. Thus, teachers in the EI schools have received more support on all facets of instruction, including the use of Dashboard, than other teachers in the district.

CPS does hold two to three Dashboard sessions annually on a voluntary basis for teachers in the district. These sessions are convened in the central facility that the district uses for professional development activities, and the mode of instruction tends to be a combination of demonstration, lecture, and guided practice. These sessions are voluntary, typically last three hours, and have drawn from 5 to 20 teachers per session. The district also convened one district-wide professional development day where teachers had to login to Dashboard, pull up a given report, and answer a set of questions.

In sum, the bulk of the training in the district around the use of Dashboard data has been voluntary, and the total number of different teachers who have received training on Dashboard is difficult to document.

Developing a Culture of Data Use

Creating a culture that values data as an instructional decision making tool is also critical to the success of any data initiative (Datnow, Park & Kennedy, 2008). The literature suggests that this success is dependent on the support and expectations that the district and school leadership put on data-driven decision making (Datnow, Park & Kennedy, 2008; Wayman, Stringfield & Yakimowski, 2004). In our focus groups most teachers noted that they were expected to use the Data Dashboard on a regular basis to make instructional decisions and access resources. Some teachers indicated these expectations came from the district's central office while others cited their principal as the source of expectations. Teachers also noted that teacher team leaders and fellow colleagues encouraged regular data use. While most teachers claimed that their principal valued the Data Dashboard as an important teacher responsibility, one teacher explained that although she uses her Data Dashboard regularly, she is not expected to by her principal. As a result, many colleagues at her school do not. This further supports the notion that strong leadership is critical to developing a culture around data use.

For the 15 intensively supported "Elementary Initiative" (EI) schools mentioned above, one of the EI goals is to use data to improve teaching, differentiate instruction to meet the needs of individual students, track learning results for each student, and create a collaborative learning culture (Cincinnati Public Schools, 2008). This conscious effort to develop a culture of data use was evidenced in the focus groups. Teachers from these schools explained that they met weekly with turnaround teams who helped them analyze their Dashboard data and plan instruction accordingly. A number of teachers, mostly from EI schools, also described how established systems and routines such as weekly data meetings or data folders helped encourage the examination of data. Teachers who were not part of EI schools voiced their desire for similar district support and more cross-school collaboration.

According to the teachers, data systems were viewed in a positive light as long as they were designed to support the teachers. Some teachers reported routines that were designed to monitor or evaluate teachers' use of the Data Dashboard, which served as a deterrent for teachers. Participants explained teachers were less likely to use the tool if they felt the amount of time they spent on the system was monitored.

Dashboard Accessibility and Support Features

Research suggests that teachers will embrace a data initiative if it efficiently helps improve their instruction. For example, several teachers cited the usefulness of instructional supports housed in the data system. When the focus group participants were asked to specifically identify supports that helped them translate their data into information that would guide their instruction, they noted the instructional tools section of the Data Dashboard. Teachers said they used the model lessons to help familiarize students with the state testing format and to teach material that would be on the state tests.

However, if the time required to engage in data-driven instruction outweighs the instructional improvements, then teachers will resist (Wayman, 2005). Several teachers noted that they spent hours during the evenings and on weekends accessing data because the effort makes teaching more efficient. This indicates that when teachers recognize the value of data-driven instruction a strong commitment to data use is beginning to develop.

HOW ARE TEACHERS USING DATA TO INFORM AND CHANGE PRACTICE?

The Data Dashboard system contains data from both end-of-year statewide assessments as well as results from the quarterly formative benchmark assessments administered by the district. In addition to these test results,

PART II: TEACHERS' PERSPECTIVES ON THE OPPORTUNITIES AND CHALLENGES OF DATA USE (CONT'D)

the Data Dashboard also contains item-level information from the assessments and instructional tools designed to help teachers' lessons, including model lessons and intervention strategies. The following section looks at how focus group participants use data from the Dashboard to set priorities for what they teach, identify and meet the needs of struggling students, facilitate conversations about progress with students and parents, view students' past records to identify persistent problems and monitor progress over time, and prepare students for the end-of-year statewide assessment.

Cincinnati teachers use the data to set priorities about what they teach: Many focus group participants said they use the student performance data from benchmark assessments to prioritize what they teach. The organized data allows teachers to focus and plan their lessons around objectives that students struggle with as opposed to re-teaching concepts they have already mastered. This practice is consistent with literature on effective instructional practice, which claims that teachers who analyze student assessment data in relation to standards create more developmentally appropriate lessons (Supovitz & Klein, 2003).

Some participants acknowledged that they used the Data Dashboard to help reflect on the effectiveness of their own teaching and their use of particular instructional strategies. If a teacher noticed that her students did not score well on a specific indicator or standard, then she would re-assess how she taught that particular standard and employ a different instructional strategy.

Cincinnati teachers use data to meet the needs of individual students, especially those who are struggling: A number of teachers explained that they use information from the Data Dashboard to help group students for instructional purposes. The data allows teachers to identify and group students who are either struggling or excelling with similar concepts and differentiate their instruction accordingly. As one teacher explained, "Dashboard is beautiful because it will tell you the indicator and all the kids' names that need to be re-taught" (Tyler, 2010). Participants also cited the detailed benchmark assessment data as a way to identify struggling students who need extra resources such as tutoring. For teachers who work with special education students, they noted that the benchmark performance data helped them write Individualized Education Plans (IEPs), since the Dashboard data documents particular needs and growth over time.

It is important to note that although the data helps teachers identify and target students that need additional help, it does not replace professional judgment. While a students' knowledge gap is noted, the data does not explain why the student is struggling.

Cincinnati teachers use data in conversations with parents and students: Some teachers said that Data Dashboard helped them have evidence-based conversations with parents and students. When having these conversations, documented data from the Data Dashboard allowed teachers to support their professional judgment and provide concrete, objective evidence. Some teachers also noted that they used data from the Data Dashboard to help motivate students to work on a particular skill or to provide them with a clear picture of their progress and learning. Various methods noted by teachers were printing out students' assessment results so they could be shared with families, meeting with students individually to discuss their progress and to set goals, or, as one teacher did, projecting class results on the white board to show individual and class progress.

Cincinnati teachers view students' past records to identify persistent problems and monitor progress over time: A number of teachers described using past records on the Data Dashboard to identify persistent problems or to monitor student progress and improvements over time. This was noted as being especially helpful for students who chronically struggled. One teacher explained how she used the data to show struggling students the progress and improvements they had made, which allowed her to a focus on achievements rather than bad performances.

Cincinnati teachers use data to prepare students for the statewide assessment: A common concern explored in the literature is that assessment and data collection is used to improve test-taking skills rather than to help make constructive changes in student learning (Murnane, Sharkey & Boudett, 2005). Due to a considerable amount of accountability pressure felt around state assessments, focus group participants acknowledged that they used the Data Dashboard to identify skills their students were lacking as a way to prep for the state assessments. Teachers also acknowledged using the data to identify test-taking skills, question formats, wording, and vocabulary that would be on the state assessment. It was noted that principals encouraged their teachers to use the data to prepare.

WHAT IMPEDIMENTS TO EFFECTIVE USE OF DATA HAVE CINCINNATI PUBLIC SCHOOL TEACHERS ENCOUNTERED?

Given these findings of the potential value of the Data Dashboard for teachers, what is driving the low average usage uncovered by the web log analysis? In asking teachers to describe some of the challenges they faced in using data more regularly to inform their instructional decisions and strategies, we found that there were often significant barriers to data use driven by school-level factors such as time constraints and a lack of training and support, concerns around the benchmark data that the Dashboard system disseminates, and design components of the Data Dashboard itself.

Time constraints: Time constraints are often cited in the literature as a barrier to the use of data to inform practice (Ingram, Louis & Schroeder, 2004). Almost all focus group participants noted time constraints as an impediment to effective use. Teachers explained that to effectively analyze and make instructional decisions based off of data from the Dashboard system, they needed to spend time accessing the data after school, in the evenings, and on the weekends. Participants expressed frustration that they were expected to use their own time to access data since planning periods were not sufficient.

Data initiatives are more likely to be successful if teachers can work collaboratively. This collaboration allows teachers to learn from each other, strategize how to use information to create instructional changes, and share best practices (Brunner et al., 2005; Supovitz & Klein, 2003). The CPS common benchmark assessments create an opportunity for teachers throughout the district to share data and discuss ideas that could collectively improve instructional practices and increase subsequent student performance. However, despite a few exceptions, it did not appear that the district developed the time or space for effective collaboration. However, teachers at EI schools noted that they had collaborative data meetings to set instructional priorities, although they still needed to look at their data at home due to time constraints.

Benchmark testing issues: In their research, Ingram, Louis and Schroeder (2004) suggest that teachers need to have faith in the accuracy and value of their data in order to use it to make instructional decisions. In the focus groups, many teachers expressed frustration with the misalignment of the benchmark assessments and the Ohio Achievement Assessment (OAA), Ohio's end-of-year statewide assessment. Teachers believed that the benchmark did not adequately prepare students for the rigor of the state exam. Additionally, teachers noted errors on the benchmarks as well as a lack of alignment with the curriculum pacing guides. Some teachers were concerned that since benchmarks don't test the same skills and concepts each quarter, it was difficult to monitor student progress and assess the effectiveness of re-teaching a concept. One suggestion was to update the benchmark assessments more frequently.

Limitations of the Data Dashboard technology: Some teachers reported difficulties navigating the Data Dashboard system and said that manipulation of the data is limited. Other teachers cited a lack of comfort with computers and the information management system as a barrier. However, teachers enthusiastically noted that the district had made some big improvements to the Data Dashboard, which made the system more accessible and easier to use.

PART II: TEACHERS' PERSPECTIVES ON THE OPPORTUNITIES AND CHALLENGES OF DATA USE (CONT'D)

Teachers also cited a concern about their limited access to students. It was explained that teachers could only see data for their current students, even though for comparison purposes it would be helpful to have data on other students in their learning teams and students they have taught in previous years.

Support for data-driven instruction: Even with encouragement and expectations around data use, teachers do not always have the expertise to analyze data. A data initiative needs to be paired with school conditions and practices that support teachers' data use (Lachat & Smith, 2005). While some focus group participants said a variety of people modeled effective data use for them, including district curriculum managers, principals, coaches, team leaders, and colleagues, others claimed to have little to no support around how to use their data to guide instruction. It was suggested that although school and district leadership encouraged data use, it was not always sufficiently supported.

Support from school leadership: In order to maintain a data-use initiative, research suggests that teachers need to be supported by school leadership. Principals should model data use and create conditions that encourage teachers to use data (Wayman, 2005; Supovitz & Klein, 2003; Murnane, Sharkey & Boudett, 2005). Most teachers noted the importance of strong leadership in developing a culture of data use and indicated that their principal was a driving factor in their own data use. However, there were some teachers who claimed that their administrators used Dashboard to evaluate and compare their performance with others.

These teachers expressed their frustrations and noted the importance of a principal who supported data-driven instruction and worked collaboratively to set instructional priorities with staff.

Formal professional development and training: Research has noted a lack of professional development as a serious impediment to the success of many education reforms (Wayman, 2005). CPS teachers said that although the district provides professional development trainings on data use, they are not mandatory. However, EI schools appear to have a much stronger level of support, with formal data-use training, established data use structures and routines, and turnaround teams to assist teachers with their data use. EI teachers described weekly meetings in the "data room" to collaboratively address instructional strategies. Teachers at other schools, who mentioned a lack of this level of support, said they had district curriculum managers and team leaders they could turn to for support

CONCLUSION AND RECOMMENDATIONS

CONCLUSION AND RECOMMENDATIONS

Cincinnati, like many other districts across the nation, has made substantial investments in systems that can help teachers use student performance data to inform their instructional practice. The low levels of teacher usage of the Dashboard system documented in this project suggest that districts may well face a steep learning curve in how to make those investments return dividends in the form of increased student achievement. My work in Cincinnati suggests some ways that the district may be able to make the Dashboard tool a more useful piece of the school reform puzzle in that district.[4]

Additional Design Features

The first set of suggestions have to do with additions or modifications of the Dashboard tool itself. While some teachers with whom I have visited in the district are clearly comfortable and adept at navigating Dashboard, a surprising number are still less then fully functional on the tool. One addition to Dashboard that could perhaps help is a "site map" or a hyperlinked table of contents page—an easily accessible page that would present the structure of Dashboard and allow teachers to advance directly to desired pages with a single click.

A second suggestion would be to make Dashboard searchable. Both of these ideas respond to concerns voiced by some teachers that they know Dashboard contains a wealth of information, but they either do not know how to readily access the information they desire during a particular Dashboard session, or they know where the data is but they feel it takes too many clicks to get to the relevant page.

Third, some teachers in the focus groups suggested that a page with "thumbnail reports" would be helpful. The idea is that the ability to quickly view and click on thumbnails of report layouts would be an efficient way for a teacher to select the desired report relative to having to click through links to get to a report.

A final suggestion is that online tutorials on how to perform certain tasks in Dashboard would be useful for some teachers. These online tutorials could be made easily available from Dashboard pages.

Interactive Professional Development

Given the uneven Dashboard training across the district that teachers report, another suggestion is that the district should consider investing in additional Dashboard training. Perhaps the most effective way to do this would be to have training directed at three different levels: (1) beginning Dashboard use (e.g., navigation, how to find what you want, etc.), (2) how to analyze your students' Dashboard data, and (3) how to use Dashboard data as input into decisions about instructional practice. Based on comments from teachers, it is critical that any Dashboard instruction be constructed around authentic use, with the teachers working on computers with their own students' data as opposed to being shown or told what to do in a simulation by someone. It was reported that too often coaches on the instructional support teams would either give step by step instructions on how to navigate to a particular page and what to click on once there, or even take over a teacher's computer and do it themselves, instead of engaging in a slower, more interactive training session with the teacher. Teachers reported that any Dashboard-related learning in these settings was usually transitory.

A final suggestion in the area of training and professional development, while more costly, is that the district should consider having at least one, and ideally more than one, district-wide professional development day directed at how to effectively use Dashboard. Since this will be most effective if teachers or grade-level or content teams within schools are looking at data, the professional development activities would not be centralized. The day would be scheduled so that data from an early-year benchmark exam was up and ready for use. This day would be entirely devoted to going over the student performance data on Dashboard and using the gathered information to guide upcoming curriculum planning.

[4] I thank my research assistant, Christina McNamara, a student in Brown's Urban Education Policy program for many of the ideas in this section.

Increased Support and Oversight for Data Use

In addition to providing much needed time for teachers to work with the data, providing colleagues the opportunity to concurrently work on the Dashboard system could help promote collaboration and offer support for teachers who have technology questions. In order to help teachers better understand and analyze their data, the district should provide a data analysis document that all teachers need to complete after receiving their students' Benchmark assessment results on Dashboard. Examples of data questions that might be on this form include:

- the identification and listing of all individual standards that were mastered by, say, 80 percent or more of the class and standards that were not mastered by the class,
- the identification and listing of students whose scores went up from the previous benchmark and students whose scores went down,
- a listing of the top three or five students who made the biggest gains as well as those whose scores went down the most, and
- narrative reflection regarding both teacher and student actions that might have led to the observed movements in student performance.

The district should then make sure that these data forms are themselves collected and analyzed both as a way to identify teachers who may need extra assistance in how to analyze and use student data, and as a way to hold teachers accountable for engaging in the professional development exercise at a high level. It may well be that building administrators are in the best position to analyze the data forms. While the suggestion here is that these data forms should be an integral part of the proposed professional development day, the district should consider the possibility and feasibility of having teachers fill out such forms after each Benchmark assessment.

This would not only hold teachers accountable for viewing and using their students' data in making instructional decisions, but it could provide teachers who need it a structured way to do so.

Increased Communication and Outreach

A final suggestion has to do with clarifying the nature and purposes of the benchmark assessments. Some teachers in the focus group discussions expressed frustration that the benchmark assessments did not always retest old standards and thus they were not able to tell if they had successfully retaught a previously failed objective. However, retesting of material is not typically the purpose of benchmarks. Another misconception of teachers revealed in the study is that benchmark assessments can be used to measure student growth. However, since benchmark assessments tend to test new material each time, they technically cannot be used to measure "growth." These types of misconceptions suggest that teachers should receive some additional training on the purpose of benchmark assessments so that they better understand the data that flows from these assessments.

Teachers also expressed frustration with the communication of district expectations. It is clear that district administration expects teachers to use Dashboard and incorporate this use into their regular time use. What has not been communicated clearly, however, is where this time is supposed to come from. Any substantive changes in the use of Dashboard data is unlikely if, at the end of the day, teachers see this as just one more task that has been added to their weekly schedule.

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