Understanding How Teachers Use Student Assessment Data

This memo provides background information for educators and researchers who want to understand how teachers use data about student performance. It summarizes a review of research literature that includes instruments to collect information about teachers' use of data. It provides a description of the methods REL West staff used to search the literature for research that includes data collection instruments and a summary of the instruments that were located. For each research report, this memo includes an abstract of the research study and a detailed description of the instruments used in the research, including, in many cases, the actual questions asked of teachers.

The initial request was for information about how teachers use information from a "risk index" that identifies students who are at risk of academic failure. Because no information on teachers' use of a "risk index" was found, the review was broadened to other types of data use, as explained below.

Search method

Using the search terms "risk index," "risk indicator," and "at-risk students," we searched the following social science databases: ERIC, Education Research Complete, and Academic Search Premier. This initial search produced many studies that focused primarily on the health and safety issues facing at-risk youth and studies that were not helpful for the goal of this memo. For example, search results included articles about students at-risk of joining gangs, as well as some articles about the importance of identifying indicators that suggest students may not graduate. None of the studies found, however, examined how risk indicators were used by teachers. We then used search terms to capture studies that examined how teachers used data. We searched for "teacher data use," "school data use," and "data-driven decision making" to identify relevant studies. Two selection criteria were applied: the study needed to have a publication date between 2000 and 2012 and be peer-reviewed. This search yielded 252 studies for further review.

One researcher then reviewed abstracts to ensure that the identified research examined teacher use of data rather than administrator use of data, focused on K–12 teachers (not higher education faculty), and examined teacher practices rather than educational policy.

Based on this review of abstracts, 27 of the 252 identified references met the selection criteria. Additionally, three references were provided to us by subject-area experts—colleagues who had recently led a Bill & Melinda Gates Foundation–funded workshop to define "data literacy" and discuss how teachers could develop data literacy. This brought the total number of studies to 30.

Two researchers then examined the bibliographies of the 30 published research reports and journal articles to uncover additional references. Through this process, twenty additional references were found,

bringing the total number of references to 50. After reading these 50 reports, we found that only 17 included details about the research instruments or questions asked of teachers. These 17 studies are summarized in table 1, and, for each study, an abstract and details about the instruments used in the study are provided.

A brief summary of the identified research

The studies on teacher data use whose instruments are summarized in this memo focused on how teachers use results from benchmark (or interim) assessments. The benchmark assessments evaluate student achievement in a particular subject and are typically administered three or four times in a school year.

These research studies provide useful insights into factors that may influence teachers' use of data about students. According to some of this research, teachers' access to data is one factor that influences how and if they use it. Having timely access to data (Lachat and Smith 2004) is particularly important. Finding the right data to use can also be a challenge to teachers (Means et al. 2011).

Several researchers found that how teachers learn from the data is an additional factor that influences their data use. Means and colleagues (2011) concluded that data comprehension (figuring out what the data say) and data interpretation (making meaning of the data) are two important components of teachers' use of data. Teachers had more difficulty with data comprehension and interpretation when they worked individually than they did when they worked in small groups (Means 2011). Datnow and colleagues (2011) suggest that interpretation involves looking for patterns and anomalies in the data, identifying trends, and exploring root causes.

One key use of data is to identify and correct gaps in the curriculum (Faria et al. 2012). In a study by Brunner et al. (2005), 91 percent of teachers reported using data to determine students' academic strengths and weaknesses. Most teachers used this data to identify content that students lack and then focused instruction on that content.

Faria et al (2012) found that using data to inform instructional responses involved a range of strategies: tailoring instruction to individual students' needs, recommending tutoring and/or other instructional supports, or assigning/reassigning students to classes or programs. Teachers also reported that benchmark assessment data provide them with information that they may not otherwise have about students, help them set an appropriate pace for instruction, and clarify misunderstandings and/or errors (Christman et al. 2009). Detailed student data may also serve as the basis for conferences with parents and others (Brunner et al. 2005).

Summary of data collection instruments

As shown in table 1, the instruments used in the 17 research studies were, with few exceptions, self-report instruments that asked teachers, through interviews or questionnaires, about their practices, perceptions of, and training on using data. An exception is found in the study by Means and colleagues (2011), in which data scenarios—involving data reports and summaries—were presented to teachers, who were then asked about their interpretations of these data scenarios.

Questions asked of teachers about their practices included questions about whom they worked with to examine and interpret data (e.g., coaches, mentor teachers, peers); what they did with the information they learned from analyzing data (e.g., modifications they made to instruction); and how they learned about

instructional alternatives. Researchers also asked teachers about the types of data they had used (e.g., test scores, retention rates, attendance records) and the types of analyses they had undertaken. The frequency with which teachers accessed computerized data and the supports they received for data use at their schools were also studied.

Researchers also examined teachers' perceptions related to data use, including teachers' confidence in using computerized data systems, their perceptions of support for data use, their perceptions of how well prepared they were to use data, and their perceptions of the value of different types of data and analyses for informing instruction.

Seventeen studies solicited information on teachers' training for data use. Questions on this topic concerned both the formats or methods of training (e.g., college courses, workshops) and the topics studied.

The instruments described in these research reports were used with teachers in elementary and secondary levels. Three reported evidence of reliability; none reported evidence of validity.

Details of the instruments, by study (including, when provided, questions asked of teachers), are included.

References

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Table 1. Summary of identified research

Author(s) (year)	Purpose(s) of study	Data collection method	Type of data studied	Teachers studied	Info gathered about data use	Evidence of reliability/validity
Bakia, Yang, and Mitchell (2008)	Review methods to collect and analyze data from the National Educational Technology Trends Study	Survey	National Educational Technology Trends Study	Elementary to high school	Supports for and barriers to technology use in schools	No
Christman et al. (2009)	Examine the use and impact of interim assessment data in the School District of Philadelphia	Survey and semi-structured interviews	Benchmark assessments	Elementary and middle school	Satisfaction with benchmarks, professional development on data use, instructional practices, and use of data to inform instruction	Yes
Clune and White (2008)	Examine Providence Public School District officials' and teachers' experiences with interim assessments and their use of assessment results	Interviews and survey	Interim assessments	Elementary to high school	How and when interim assessment data are used, modifications to instruction based on results of assessments, and professional development related to assessments	No
Datnow, Park, and Wohlstetter (2007)	Qualitatively capture how four school districts used data effectively	Interviews and observations	Benchmark assessments	Elementary to high school	Two types of data use: access and interpretation	No
Dembrosky et al. (2005)	Examine how data-driven decisionmaking has improved student learning in six southwestern Pennsylvania school districts	Interviews	Pennsylvania System of School Assessment	Elementary to high school	Interest and willingness to use data, teacher collaboration, adequate time for inputting and using data, and training availability	No

Author(s) (year)	Purpose(s) of study	Data collection method	Type of data studied	Teachers studied	Info gathered about data use	Evidence of reliability/validity
Faria et al. (2012)	Document and understand current data use, and examine the relationships between student achievement and data use practices, across urban school districts	Survey	Benchmark assessments	Elementary and middle school	Information on context for data use, supports for data use, working with data, and instructional responses	Yes
Gallagher, Means, and Padilla (2008)	Examine teachers' access to and use of data from student data systems	Survey	Benchmark assessments	Elementary to high school	Confidence in and support for using data systems	Yes
Goertz, Olah, and Riggan (2009)	Examine how interim assessments are used by teachers, principals, and district leaders in two Pennsylvania school districts	Observations, interviews, and survey	Benchmark assessments	Elementary school	How teachers gather or access evidence about student learning, analyze and interpret that evidence, and use evidence to plan instruction	No
Hamilton and Berends (2006)	Examine how elementary and middle school teachers in California, Georgia, and Pennsylvania responded to standards-based accountability systems	Surveys and interviews	Standards-based accountability system	Elementary and middle school	Changes in instruction time, instruction alignment with state standards and assessments, and changes in instructional practices	No
Herman et al. (2008)	Examine the role of data in school improvement and the factors that support their effective use in four Pacific Northwest elementary schools	Observations, interviews, and survey	Benchmark assessments	Elementary school	Frequency of using student assessments and analyzing student work with other teachers	No

Author(s) (year)	Purpose(s) of study	Data collection method	Type of data studied	Teachers studied	Info gathered about data use	Evidence of reliability/validity
Lachat and Smith (2004)	Understand barriers in using data, examine use of disaggregated data, and examine policy and practice implications of achieving effective data use in high-poverty urban districts	Interviews	Benchmark assessments	High school	How data were used in schools, types of data that were most useful, what was learned from the data, and changes that occurred after data use	No
Lebron (2011)	Examine the types of data and data-analysis techniques teachers used to modify instructional practices in Illinois	Survey	Benchmark assessments	Public school teachers with public email addresses	Types of data used for decisions related to instructional practices	No
Marsh et al. (2005)	Examine use of a formative assessment in three urban school districts to assess instructional quality	Interviews, focus groups, and survey	Formative assessments (curriculum guides)	Elementary to high school	How useful, relevant to teaching, and supportive of professional growth and development the guides were	No
Marsh and Robyn (2006)	Examine which strategies improved student performance and which limitations impacted improvement efforts in schools and districts in three states	Survey and interviews	Standards-based accountability systems	Elementary and middle school	Availability and usefulness of test results and professional development activities	No
Means et al. (2011)	Examine teachers' use of data to inform instruction	Interviews including data scenarios	Student Assessment Data	Elementary and middle school	Use of data location, data comprehension, data interpretation, data use, and question posing to inform school-level decisions	No

Author(s) (year)	Purpose(s) of study	Data collection method	Type of data studied	Teachers studied	Info gathered about data use	Evidence of reliability/validity
Stecher and Hamilton (2006)	Determine how state standards-based accountability systems are affecting mathematics educational practice in California, Georgia, and Pennsylvania	Surveys and interviews	Standards-based accountability systems	Elementary and middle school	How frequently teachers used selected assessment-related activities; availability and usefulness of test results	No
Tyler (2010)	How teachers in Cincinnati Public Schools use data to improve their practice	Web logs	Benchmark assessments	Elementary and middle school	Frequency and variety of data usage	No

Identified research: Abstracts and instrument descriptions

Bakia, M., Yang, E., and Mitchell, K. (2008). *National Education Technology Trends Study: Local-level data summary.* Washington, DC: U.S. Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service. Retrieved June 1, 2012, from http://www2.ed.gov/rschstat/eval/tech/netts/netts-local.pdf.

ABSTRACT: This report reviewed the methods used to collect and analyze results from the National Educational Technology Trends Study (NETTS), a fall 2005 teacher survey administered to a sample of 975 schools. Ultimately, 4,935 teachers completed the survey, which asked about their use of technology in the 2004/05 school year. Teachers were asked to describe their access to technology and technical support, their participation in technology-related professional development, their use of technology for instruction, their students' use of technology for learning, and supports for and barriers to technology use in their schools. Teacher survey responses were examined for teachers at high-, middle-, and low-poverty (based on free and reduced-price lunch program participation) schools.

Survey items

Following are items included in the survey administered to 4,935 teachers. Only items related to teacher data use are included.

Use of technology-supported databases

1. In school year 2004/2005 and Summer 2005, did you have access to an electronic data management system that provided you with student data?
   Yes
   No
   Don't know

2. Who made this system available to you?
   Your state
   Your district
   Your school
   Don't know
   Other (Please specify)

3. What kinds of data and supports did you have access to through the electronic data management system(s)?
   a. Standardized test scores by grade from 2003/04
   b. Standardized test scores by grade from 2004/05
   c. Standardized test scores by grade from 2004/05
   d. Standardized test scores from 2003/04 for individual students
   e. Standardized test scores from years prior to 2003/04 for individual students
   f. Standardized test scores from 2004/05 for individual students
   g. Attendance data
   h. Student grade data
   i. Course enrollment histories for students
   j. Students' prior school(s) attended

k. Students' participation in supplementary education programs
l. Software for the analysis and interpretation of student data
m. Links between your students' assessment results and instructional resources tailored to their learning needs
n. Online assessments that your students could use
o. Estimations of achievement of adequate yearly progress (AYP)

4. In school year 2004/05, how often did you use an electronic data management system for each of the following purposes?
   (1=never, 2=a few times, 3=once or twice a month, and 4=once a week or more)
   - Used data to inform curriculum changes
   - Identified individual skill gaps for individual students so that you could give each student material tailored to his/her skill profile
   - Determined whether your class or individual students were ready to move on to the next instructional unit
   - Used data to evaluate promising classroom practices
   - Decided whether to give your students test-taking practices
   - Estimated whether your students would make adequate yearly progress (AYP)
   - Tracked standardized test scores to grade
   - Tracked individual student test scores
   - Tracked other measures of student progress
   - Used data to inform student placement in courses or special programs
   - Informed parents about student progress

5. In school year 2004/05, how often did you work with an electronic data management system in the following context to make instructional decisions?
   (1=never, 2=a few times, 3=once or twice a month, and 4=once a week or more)
   - On your own
   - Working with colleagues in your department or grade
   - As part of a district-level activity for your school staff
   - As part of a district-level activity with staff from other schools
   - In another setting. (Please describe)

6. What kinds of support did you receive in 2004/05 in using student data to guide decisions about instruction? (Mark all that apply)
   - Professional development on data-driven decision making at your school
   - Professional development on data-driven decision making offered outside your school
   - Support from a consultant or mentor teacher skilled in data analysis
   - Paid time set aside for examining student data and using the data to guide decisions about practice
   - Your principal's encouragement for using data in instructional decision making
   - Formal coursework covering data-driven decision making

Christman, J.B., Neild, R.C., Bulkey, K., Blanc, S., Liu, R., Mitchell, C., and Travers, E. (2009). *Making the most of interim assessment data. Lessons from Philadelphia.* Philadelphia: Research for Action. Retrieved June 1, 2012, from http://ies.ed.gov/ncee/edlabs/regions/northest/pdf/rel_2007039.pdf.

ABSTRACT: In this report, Research for Action (RFA) examined the use and impact of interim assessment data in the School District of Philadelphia. The Philadelphia benchmark assessments measure students' knowledge and skills based on curriculum goals, and are designed to inform teachers' instructional decisions. The resulting data allow teachers to identify students that need assistance. The School District of Philadelphia provides three tools to support teachers' use of the benchmark data: the Item Analysis Report, the Data Analysis Protocol, and the Teacher Reflection Protocol. These tools are designed to allow teachers to access and manage data, think through the steps of analysis and action as they review the data, and reflect on their instruction.

To learn about how teachers use the student assessment data, a districtwide survey was administered to 10,500 elementary and middle school teachers in the spring of 2006 and 2007. The teacher survey included questions on several different topics, such as satisfaction with benchmark assessments, professional development on data use, and technology access and support. The survey also asked teachers to report on their instructional practices and use of data to inform instruction.

Results from the teacher survey indicated that the teachers frequently used the benchmark assessments to identify particular curriculum topics on which students needed to improve and as a tool to examine what the students were learning in their classrooms. The survey results also indicated that about 45 percent of the teachers had examined the student assessment data more than five times during the year. In addition, 86 percent of the teachers said that they used the data to organize and develop course units and classroom activities.

RFA also examined student academic growth data (obtained from longitudinal data on students in grades 4 through 8 in the spring of 2005, 2006, and 2007), as well as qualitative data based on semi-structured interviews with school principals and teachers. In addition, RFA examined the association of various factors with student academic growth. RFA found that "instructional leadership" and "teacher collective responsibility" were strong predictors of learning growth. The results also revealed that teacher satisfaction with benchmarks was not associated with gains in student achievement.

The report concludes by encouraging school district personnel to support data use, allocate necessary resources (e.g., accommodating regular meetings of teachers), facilitate discussions about data, visit classrooms to see how teachers are using instructional strategies, and provide teachers with feedback.

Survey items

The authors report that some of their survey items were borrowed from the indicators of school leadership and climate that were developed by the Consortium on Chicago School Research.

Usefulness of Benchmarks to Inform Instruction (7 items with a Cronbach's alpha of 0.92)

To what extent do you disagree or agree with the following questions?
(Response categories: Strongly agree, agree, disagree, strongly disagree)

1. Benchmark test scores give me information about my students that I didn't already know
2. The benchmarks set an appropriate pace for teaching the curriculum to my students

3. Results on the benchmark tests give me a good indication of what students are learning in my classroom
4. At my school, the use of benchmark tests has improved instruction for students with skill gaps
5. The benchmark tests are a useful tool for identifying students' misunderstandings and errors in their reasoning
6. The benchmark tests are a useful tool for helping students identify what they know and what they still need to learn
7. The benchmark tests are a useful tool for identifying the content descriptors that students do and do not understand

Collective Examination of Benchmarks (3 items[*] with a Cronbach's alpha of 0.86)

During the past 12 months, how often did the following occur in your school?
(Response categories: never, 1–2 times, 3–5 times, more than 5 times)

1. Your grade group, field coordinators, or coaches met to discuss ideas for re-teaching a skill that students were lacking, according to the benchmark test
2. Your grade group, field coordinators, or coaches met to discuss re-grouping students for instruction on the basis of benchmark test scores

Professional Development on Using Data (4 items with a Cronbach's alpha of 0.84)

Over the past 12 months, which of the following have been the focus of a professional development session, faculty meeting, grade group meeting, or subject area meeting? (Check all that apply)

1. Assessing your students' performance data on the computer
2. Principal and/or school leadership team presentation about your school's performance data
3. Using student performance data to develop an action plan
4. Using student performance data to assess the effectiveness of teaching practice

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* The survey included three items, but only two were provided in the report.

Clune, W.H., and White, P.A. (2008). Policy effectiveness of interim assessments in Providence public schools. WCER Working Paper No. 2008-10. *Wisconsin Center for Education Research, 50.* Retrieved June 1, 2012, from http://www.eric.ed.gov/pdfs/ed503125.pdf.

ABSTRACT: Clune and White interviewed district officials and teachers in the Providence Public School District (PPSD) about their experiences with PPSD's interim assessments and their use of data from the assessment results. They conducted two rounds of interviews at the district and school levels in the spring of 2006 and in the fall of 2006, and in the fall also administered a survey.

Results from the Round One interviews at the district level revealed that district personnel were not clear to what extent the interim assessments would be used by teachers as a diagnostic tool for modifying their instruction to meet the needs of students. Results from the teacher interviews indicated that, in general, the teachers found that the interim assessments were well implemented and useful for shaping instruction. In Round Two, Clune and White administered a survey—in addition to another interview—to the teachers who had participated in Round One. They found that 86 percent of the teachers reported that they modified their instruction based on the interim assessment results, and 68 percent indicated that the assessments were useful in preparing students for the statewide assessment. In addition, the results indicated that most of the teachers valued the interim assessments because they allowed the teachers to monitor performance of current students. The teachers also responded that school support and leadership are essential in the use of the data.

Interview questions and survey items

Following are interview questions and survey items administered during Round One and Round Two of the study.

Round One teacher/principal focus group protocol

1. How have you used the interim assessments in your school? Since when? How did you get involved?
2. How do you use the interim assessments? Do you see the data results? What do you do as a result? Do you find the information provided by the assessments useful? Do you already know the information? How are you guided by the results?
   a. What modifications do you make in instruction or otherwise on the basis of the data from the assessments?
   b. Where do you acquire the knowledge about changes to make in response to the assessments (e.g., other teachers, school administrators, district-sponsored professional development)?
   c. Does your school have a process for interpreting and using data from the assessments (e.g., grade-level meetings)? Are the assessments built into your process for school improvement?
   d. Is the district supplying professional development related to the assessments? Who are the providers?
   e. How do you cope with and reconcile the multiple influences operating on instruction—e.g., besides the interim assessments, the curriculum, state testing, professional development?

Round Two teacher/principal focus group protocol

1. What do you see as the strengths and weaknesses, advantages and disadvantages, of the interim assessments as experienced in this school?

2. What organized efforts have occurred in this school to implement the interim assessments?
3. When you look at the data on student performance, do you think of ways to improve instruction? If yes, how, and if not, why not?
4. What changes to instruction have you made as a result of the interim assessments?
5. What sources do you find most useful in understanding student performance on interim assessments and deciding what to do about the results (including district professional development, school level meetings, [and] informal discussion with other teachers)?

Round Two teacher focus group survey

1. Have you made any modifications to instruction because of the interim assessments?
    Yes
    No

2. Did the results on this year's assessment (s) help you to modify instruction for this year's (2006–2007) students?
    Yes
    No

3. Do you find the interim assessments useful in preparing students for the state assessment?
    Yes
    No

4. Would you find the interim assessments more useful in giving feedback to your students if you could get the results immediately rather than waiting for 2 weeks or more?
    Yes
    No

Datnow, A., Park, V., and Wohlstetter, P. (2007). *Achieving with data: How high-performing school systems use data to improve instruction for elementary students.* Los Angeles: University of California, Center on Educational Governance. Retrieved June 1, 2012, from http://www.usc.edu/dept/education/cegov/focus/education-reform/publications/books-chapters/achieving%20with%20data-how%20high%20performing%20schools%20use%20data%5B1%5D.pdf.

ABSTRACT: Datnow, Park, and Wohlstetter conducted a qualitative case study of four school districts in response to NewSchools Venture Fund's request to capture how school systems use data effectively. Schools were selected based on their high level of engagement in data-driven decision making. This study included six elementary schools, one middle school, and one high school. Principals, assistant principals, and teachers were interviewed, and informal observations of the school and classrooms were also documented at each school. The study indicates that there are several key strategies of a data-driven school district:

- setting student achievement goals and developing systemwide curriculum;
- establishing a culture of data use by creating explicit expectations and norms, setting and modeling these norms by showing relevancy of data at the school level, and promoting accountability;
- investing in an information management system;
- gathering multiple types of achievement data and instructional data to make informed decisions;
- investing in professional development on data use; and
- providing teachers with structured protocols and tools to help facilitate data discussions.

Benchmark analysis protocol

The following benchmark analysis protocol based on the benchmark assessment results was developed by Garden Grove Unified School District (one of the districts in the study) personnel, in collaboration with Action Learning Systems. This tool was used by teachers in the Garden Grove Unified School District, but not by other school districts. The protocol is divided into two types: access and interpretation.

Access

Reflection on curriculum, assessment, and instruction

1. What standards were taught and assessed?
2. What strategies were used to teach these standards?
3. What other opportunities were students given to demonstrate mastery of these standards?

On-the-surface benchmark analysis

1. Patterns: Which items were all/most of our students successful in answering?
2. Patterns: Which items were all/most of our students unsuccessful in answering?
3. Anomalies: Which items do not fit either of the patterns mentioned above?

Under-the-surface benchmark analysis

Patterns (successful items):

1. What content were students expected to know?
2. What instructional strategies were used to teach this content?

3. What level of cognition do these items require students to use?
4. What instructional strategies were used to allow students to apply these levels of cognition?

Patterns (unsuccessful items):

1. What content were students expected to know?
2. What instructional strategies were used to teach this content?
3. What level of cognition do these items require students to use?
4. What instructional strategies were used to allow students to apply these levels of cognition?
5. Were students able to demonstrate mastery of content and level of cognition in a different context?

Interpretation

Trends (disparity, gaps)

1. Did certain class periods outperform others?
2. Did certain classrooms outperform others?
3. What instructional strategies were used in the classrooms that outperformed others?

Trends (proficiency bands)

1. Sort benchmark results by proficiency bands: Are there patterns in item performance?

Exploring root causes (successful items)

1. Based on benchmark results, which strategies and instructional sequences proved to be effective across the team and should continue to be used?

Exploring root causes (unsuccessful items)

1. Based on benchmark results, which strategies and instructional sequences did not yield the expected results?
2. Did the strategies and instructional sequences align with the level of cognition of the standard?

Dembrosky, J., Pane, J., Barney, H., and Christina, R. (2005). Data decision making in southwestern
    Pennsylvania school districts. Santa Monica, CA: RAND Corporation.

ABSTRACT: Six southwestern Pennsylvania school districts were studied to determine how data-driven
decision making (DDDM) has improved student learning. At least one elementary, middle, and high
school was selected from each of the six districts; two to four teachers from each school were interviewed
for 20–30 minutes.

Teachers reported using student data on three different teaching levels: whole-class instruction, group-
based instruction, and individualized instruction. Teachers reported classifying students both
homogeneously (grouping by similar performance level) and heterogeneously (grouping higher and lower
performance levels together) in group-based instruction. Individualized instruction was less common,
except among elementary and special education teachers. Teachers cited lack of preparation time and
large class sizes as reasons for not providing more individualized instruction.

State efforts to support and improve DDDM were utilized by only some teachers. Teachers did not
indicate using Pennsylvania's improvement plan, *Getting Results*; however, some teachers indicated
attending the Governor's Institute (the annual training seminar on DDDM) and finding it useful. Teachers
expressed confusion about the district offices' directions on DDDM, due to receiving mixed signals and
having too many changes to tools and programs. Teachers reported that student test results were not used
to evaluate teachers' performance.

The annual Pennsylvania System of School Assessment (PSSA) results were considered helpful to
teachers, but teachers also felt there were limitations to this test, including the test not being administered
frequently enough, the results being received too late to be used for teaching purposes, and the results
being from different groups of students each year. Additionally, there was concern that subjects not on the
PSSA now receive less focus instructionally.

Some teachers indicated focusing more on state assessments than other assessment data. However,
teachers also indicated they are frequently using other assessment data (for example, class projects,
student work, and results of district-developed student assessments that are administered several times a
year) to evaluate students. Throughout the districts studied, many teachers expressed the need for more
longitudinal data on their students' performance, as well as access to more non-assessment data (for
example, attendance, discipline, health, demographics).

The lack of technology (for example, computers and software) and technology support was identified as a
factor that negatively impacted DDDM. To address these technology support needs, districts either hired a
technology support person, offered students technology training to then assist teachers, or offered teachers
technology training to then support other teachers.

Teachers reported that the culture of DDDM was driven by several factors, including principal support,
interest and willingness to use data, teacher collaboration, adequate time for inputting and using data, and
training availability and quality. Many teachers reported appreciating principal feedback on data.
Teachers whose subjects were not on the state assessment felt less pressure from principals and districts to
use data, though many did evaluate assessment data from classroom-based and other non-standardized
tests. Other results included that high school teachers were less receptive to DDDM than elementary and
middle school teachers; that age and familiarity with technology were additional factors in teacher
perceptions of DDDM; that system errors and breakdowns increased teachers' mistrust of data systems;

and that teachers reported not having enough time to input and analyze data, and they often did not receive sufficient feedback about the data they entered.

In conclusion, researchers discovered many factors enabling and/or hindering the use of DDDM in these school districts. Based on the study's findings, the researchers provided several recommendations on how schools, districts, and policymakers could better support DDDM through improving policy, data sources, and technology resources, and through developing a DDDM culture. These recommendations included having the state develop a statewide student data system, having districts invest in technology that allows for more frequent assessments, and providing teachers with time to collaborate and analyze data.

Interview questions

A few samples of the open-ended teacher interview questions used in this study were provided:

- What data systems do you use?
- How frequently and in what ways do you use data?
- What kinds of data on student performance or other student characteristics do you have access to?
- Do you use data systematically or on a schoolwide basis?
- Is data used to evaluate your performance?
- Describe professional development you have received on data-driven decision making (DDDM).
- What support have you received from principals and others in using DDDM?

Faria, A., Heppan, J., Li, Y., Stachel, S., Jones, W., Sawyer, K., Tomsen, K., Kutner, M., Miser, D., Lewis, S., Casserly, M., Simon, C., Uzzell, R., Corcoran, A., and Palacios, M. (2012). *The use of interim assessment data in urban schools: Links among data use practices and student achievement.* Washington, DC*:* Urban Data Study: Council of the Great City Schools and American Institutes for Research.

ABSTRACT: This study had two objectives: (1) document and understand current data practices across urban school districts, in terms of their use and availability, and (2) examine the relationships between student achievement and data use practices. The study focused on elementary schools (grades 4 and 5) and middle schools (grades 7 and 8) across four school districts. Teachers who taught mathematics or reading in grades 4, 5, 7, or 8 were invited to participate in the study's survey. Survey items were focused on four key dimensions of data use: (1) context, (2) supports for data use, (3) working with data, and (4) instructional responses. Surveys were administered three times over the course of the 2009/10 school year. Elementary school teachers reported that they had more supports for data use in their schools and spent more time reviewing interim assessment data than did middle school teachers. Table 1 represents the Cronbach's alpha reliability coefficients for the data use scales from the teacher survey.

Survey items

Following are examples provided by the authors of items in the study's Teacher Survey of Data Use.

A. Context

1. How much do you agree or disagree with the following statements?
    (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree)
    -   The district interim assessments are well aligned with state and district standards.
    -   The district sets clear, consistent goals for schools to use data for school improvement.

B. Supports for Data Use

1. How much do you agree or disagree with the following statements?
    (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree)
    -   Interim assessment results are reported to me in a timely manner.
    -   Interim assessment data are easy to use.

C. Working With Data
(0=never, 1=1 or 2 times a quarter, 2=1 or 2 times a month, 3=1 or 2 times a week)

1. How frequently do you review student interim assessment data with classroom teachers?
2. How frequently do you review student interim assessment data with instructional coaches?
3. How frequently do you review student interim assessment data with students?
4. How frequently do you review student interim assessment data with parents/guardians?

(0=did not use in this way, 1=used minimally, 2=used moderately, 3=used extensively)

5. How much have you used the latest interim assessment results to identify individual students who need remedial assistance?
6. How much have you used the latest interim assessment results to identify areas where you need to strengthen your content knowledge or teaching skills?

D. Instructional Responses

(0=did not use in this way, 1=used minimally, 2=used moderately, 3=used extensively)

1. How much have you used the latest interim assessment results to tailor instruction to individual students' needs?
2. How much have you used the latest interim assessment results to identify and correct gaps in the curriculum for all students?
3. How much have you used the latest interim assessment results to recommend tutoring or other educational services for students?
4. How much have you used the latest interim assessment results to assign or reassign students to classes or groups?

(0=not at all, 1=to a minor extent, 2=to a major extent, 3=to a great extent)

5. To what extent has lack of time to study and think about available data hindered your ability to use data to make instructional decisions?

Gallagher, L., Means, B., and Padilla, C. (2008). *Teachers' use of student data systems to improve instruction: 2005 to 2007.* Washington, DC: U.S. Department of Education, Office of Planning, Evaluation and Policy Development.

ABSTRACT: This study examined K–12 teachers' access to and use of data from student data systems. The study addresses three research questions:

1. How broadly are student data systems being implemented in districts and schools?
2. How prevalent are supports for data use and tools for generating and acting on data?
3. How are school staff using student data systems?

A national survey was administered to 6,017 teachers during the fall of 2005, and to 1,779 teachers during the spring of 2007. Using data from the U.S. Department of Education's National Educational Technology Trends Study (NETTS) of teachers and school districts, this study examined data-informed decision making within schools. Results indicated that, in 2005, 48 percent of the teachers surveyed had access to an electronic student data system; this percentage rose to 74 percent in 2007. Of those teachers who had access to a data system, most of them used it to inform parents about their students' progress, and 65 percent used it to track individual students' test scores. In addition, 60 percent of the teachers reported receiving professional development on the use of interim assessment data. Twenty-five percent of the teachers reported receiving support from a consultant or mentor-teacher skilled in data analysis to help them use student data. Results also indicated that 63 percent of the teachers reported that they knew how to use interim assessment data to refine their teaching, while 15 percent did not. The internal reliability was 0.76 for the "confidence" section of the teacher survey and 0.61 for the "institutional support" section.

Survey items

Following are examples provided by the authors of items from the national teacher survey.

Confidence Using Student Data Systems

(On a Likert five-point scale: 1=strongly disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, and 5=strongly agree)

- I know how to use data to refine teaching
- I know how to work with colleagues to monitor progress
- I'm often uncertain how to interpret *[sic]*
- I have trouble finding information
- Professional development prepared me for data driven decision making
- The student data system is hard to use
- I can form data queries

Support for Using Student Data Systems

- I can turn to someone for help
- I am comfortable having colleagues with me *[sic]*
- My school has improved through student data system use
- Available data not helpful in deciding what to teach [sic]
- Time is available as part of regular day [sic]
- If I use student data system it had to be my own time [sic]

Perceptions of the Potential Benefit from Different Forms of Professional Development

Teachers who had access to a student data system were asked whether or not they could benefit from seven forms of professional development related to data-informed instruction and using a data system, as follows:

- Developing diagnostic assessments
- Adjusting content and approach based on data
- Identify types of data to collect for progress monitoring
- Proper interpretation of test scores
- Mechanics of using student data system
- How to formulate questions addressed with data
- Techniques for collaborating with colleagues

Goertz, M.E., Olah, L.N., and Riggan, M. (2009). *From testing to teaching: The use of interim assessments in classroom instruction*. Philadelphia, PA: Consortium for Policy Research in Education.

ABSTRACT: The main purpose of this study was to examine how elementary school mathematics interim assessments are used by teachers, principals, and districts. Focusing only on grades 3 and 5, the authors developed case studies of nine elementary schools located in two Pennsylvania school districts Philadelphia and Cumberland (a pseudonym for the anonymous suburban district in the study). The schools were selected based on three criteria; they all: (1) made adequate yearly progress in the 2004/05 school year; (2) had a range of mathematics performance results around the district average (the average proficiency level ranged from 41 percent to 62 percent for the Philadelphia schools, and from 80 percent to 93 percent for the Cumberland schools); and (3) reflected the ethnic and socioeconomic diversity within each district. The study's framework focused on how teachers gather or access evidence about student learning, analyze and interpret the evidence, use the evidence to plan instruction, and carry out improved instruction. Data were collected from classroom observations, teacher interviews, school and district leader interviews, observation of district and school meetings, artifacts, and a survey of teachers' content knowledge for teaching mathematics.

To develop the case study of each school, the authors addressed four questions:

1. What policy supports at the school and district levels enhance the use of interim assessments to change instruction? How do instructional support, the nature of professional development, the sophistication of local data systems, and the school- and teacher-level incentives for improved instruction affect teachers' use of interim assessment data?
2. How do elementary school teachers, individually and collectively, learn from interim assessment results in mathematics and apply that knowledge to instructional decisions about content, pedagogy, and working with individual students?
3. In what ways are interim assessments situated within the wider context of teachers' formative assessment practices and tools?
4. What are the relationships among teacher capacity, analysis of assessment information, and teaching practice?

Results from this study indicated that district leaders and principals wanted to use the interim assessments as "teaching tools" that provided support to teachers' instruction and provided information regarding their students. According to the authors, the school principals modeled data analysis and monitored teachers' use of the data. In addition, all of the school principals interviewed in this study reviewed results of the interim assessments with teachers. Results from the teacher interviews showed that the teachers were in agreement with the principals that the main purpose of using the data was to help inform instruction. Teachers did not receive training in how to analyze the benchmark data. Instead, they learned these skills from the principals during grade groups and professional development meetings.

The study's findings identified four steps that were commonly taken by teachers when assessing the test results: (1) identifying weak points in the results (by focusing on items or content that proved challenging to the students); (2) validating specific items (to ensure that they accurately reflected their students' mathematics understanding); (3) identifying context for interpretation; and (4) developing an instructional response.

Both districts provided teachers with multiple types of support for using the interim assessment data: user-friendly access to online data, resources, and reports through SchoolNet (a districtwide database for the assessment data and other student data); tools for analyzing the data; professional development

(e.g., on the district curriculum and on the use of SchoolNet); and additional time (e.g., to reteach skills, to analyze data, and to partake in professional development).

Interview protocols

Following are descriptions of the teacher interviews that were administered in the fall, winter, and spring, as well as sample questions from the teacher survey.

Fall interviews

The fall teacher interviews consisted of two parts: a semi-structured interview and a questionnaire involving a data analysis scenario. Interview questions focused on teachers' professional backgrounds, their general assessment practices, and the ways in which they monitor student understanding of mathematical content. For the data analysis scenario, teachers were given a one-page document with hypothetical interim assessment results, and were asked if they had seen something like it before. Teachers were also asked to imagine that the data described their class and to think aloud based on what they saw in the assessment results. The scenario was followed by six questions designed to call attention to patterns in the data.

Winter interviews

The winter interview questions attempted to link teacher behavior observed during the study authors' classroom visits with teachers' intentions and with teacher use of assessment information. These interview questions also asked about professional development opportunities available to teachers since the first round of interviews and about other potential supports for interim assessment use.

Spring interviews

The spring interviews further explored teachers' use of interim assessment results. This final round of interviews asked teachers about the role of classroom assessments in informing their work.

Survey

Participating teachers were given a survey with nine multiple-choice items from the Content Knowledge for Teaching Math (CKT-M) instrument developed by researchers at the University of Michigan.

No actual survey questions were provided in the report. The following topics were addressed in the survey: Using the item analysis report, identify the weakest skills/concepts for your class for this benchmark period.

- How will you group or regroup students based on the information in the necessary item analysis and optional standards mastery reports? (Think about the strongest data and how those concepts were taught.)
- What changes in teaching strategies (and resources) are indicated by your analysis of benchmark reports?
- How will you test for mastery?

Hamilton, L.S., and Berends, M. (2006). *Instructional practices related to standards and assessments.* Santa Monica, CA: RAND Corporation.

ABSTRACT: This paper reviews how elementary and middle school teachers in California, Georgia, and Pennsylvania have responded instructionally to the standards-based accountability systems being adopted in their respective states. Its data come from surveys and interviews conducted over two years with a representative sample of K–8 teachers from the three studied states. It is important to note that the authors did not explore the differences between each state, but regarded each state as a separate case study. Additionally, most results were reported for all grades combined, despite the fact that state testing only occurs at certain grade levels.

The authors asked teachers about changes they made, as a result of state accountability tests, to the amounts of instruction time they devoted to various content areas. In all three states, both elementary and middle school teachers indicated increasing the instructional time spent on mathematics and English language arts (both subjects are assessed by states' No Child Left Behind testing). For science, however, only Georgia middle school teachers reported allocating more instructional time. Pennsylvania elementary school teachers reported decreasing the time spent on science instruction, even though science tests were being added to the state's accountability system. Except for elementary science teachers, close to 90 percent of teachers in California and Georgia aligned their science instruction to state science standards and assessments. In Pennsylvania, aligning instruction to content standards was less common for teachers.

Furthermore, the authors asked teachers to rate the degree to which they changed their teaching in mathematics or science due to the state accountability tests. Three-quarters of elementary mathematics teachers indicated that they focused more on state standards than they would have if there were no state test, and almost as many teachers reported that they focused more on state-tested topics than on other topics. Many elementary mathematics teachers indicated including narrower forms of test preparation targeted toward the state assessments. In science, the state accountability tests seemed to affect changes in elementary teaching less significantly than in mathematics, though many science teachers reported making changes to focus on standards and on state-tested topics.

Mathematics and science teachers were also asked whether their instruction was different as a result of mathematics and science assessments. Ninety-five percent or more of the teachers indicated using common instructional practices, including introducing content through formal presentations or direct instruction. Another common practice, particularly with mathematics teachers, was assigning homework. In mathematics, 80 percent or more of the teachers in all three states indicated that they had undertaken at least one of the following instructional strategies: re-teaching topics because performance on assessments or assignments did not meet expectations; planning different assignments based on student performance; reviewing assessment results to identify which topics required more or less emphasis in instruction and which students needed supplemental instruction; and having students help other students learn mathematics content. Seventy percent or more of elementary mathematics teachers responded that they provided extra help to students outside of the classroom, while only 25–41 percent of elementary science teachers provided this support. All teacher responses indicated that they used the instructional strategies (e.g., re-teaching, and planning different assignments based on performance) more frequently than in the past school year, with a few exceptions.

No actual survey items were provided in the report. However, the authors indicated the topics of the items studied and how they were measured, both of which are described as follows.

Amount of instructional time

Teachers were asked to what degree they made changes to the amount of instruction time they devoted to various content areas due to the state accountability tests.
(Response categories: decrease, no change, increase, I don't know)

- Mathematics
- Science
- Reading/Language Arts/English
- Social Studies
- Arts/Music
- Physical Education

Instruction alignment with state standards and assessments

Teachers were asked to what degree they aligned their instruction with state content standards.
(Response categories: strongly disagree, disagree, agree, strongly agree, I don't know)

- Mathematics content standards
- Science content standards

Teachers reported whether or not they aligned their instruction with state assessments. (Only teachers in grades with correlating state assessments were asked this question.)
(Response categories: strongly disagree, disagree, agree, strongly agree, I don't know)

- Mathematics standards
- Mathematics assessment
- Science standards
- Science assessment

Changes in instructional practices

(Response categories: no difference, differs by a small amount, differs by a moderate amount, differs by a great deal)

Survey prompt: "Think about ways in which your teaching is different because of the [state test] than it would be without the [state test]. How much do the following statements describe differences in your teaching due to the [state test]?"

- Assign more homework
- Search for more effective teaching methods
- Focus more on standards
- Focus more on topics emphasized in assessment
- Emphasize assessment styles and formats of problems
- Spend more time teaching test-taking strategies
- Spend more time teaching content

- Focus more on students who are close to proficient
- Offer more assistance outside of school for students who are not proficient
- Rely more heavily on multiple-choice tests
- Rely more heavily on open-ended tests

Frequency of instructional practices

Mathematics and science teachers were asked about the frequency with which they used various instructional techniques and whether this frequency changed since the previous school year.

(Response categories: never, rarely, sometimes, often)

- Plan different assignments or lessons based on performance
- Assign science homework
- Re-teach topics because performance on assignments or assessments did not meet expectations
- Have students do hands-on laboratory science activities or investigations
- Introduce content through formal presentations or direct instruction
- Review assessment results to identify individual students who need supplemental instruction
- Review assessment results to identify topics requiring more or less emphasis in instruction
- Provide help to individual students outside of class time
- Confer with another teacher about alternative ways to present specific topics or lessons
- Conduct a pre-assessment to find out what students know about a topic
- Have students help other students learn science/mathematics content
- Refer students for extra help outside the classroom

Herman, J.L., Yamashiro, K., Lefkowitz, S., and Trusela, L.A. (2008). *Exploring data use and school performance in an urban public school district: Evaluation of Seattle Public Schools' comprehensive value-added system* (CRESST Report 742). Los Angeles: National Center for Research on Evaluation, Standards, and Student Testing. Retrieved June 1, 2012, from http://www.eric.ed.gov/pdfs/ed503302.pdf.

ABSTRACT: This study examined the role of data in school improvement and the factors that support their effective use. The authors identified seven "Beat the Odds" elementary schools in the Pacific Northwest that served low-socioeconomic-status students and six comparison schools that were demographically similar to the seven Beat the Odds schools. Beat the Odds schools are those that showed higher-than-average growth trajectories in both reading and mathematics performance. Four school sites agreed to participate in the study site visits. Observations of school presentations, special interviews, and a survey were conducted for each of the participating teachers during the site visits. Study participants were given monetary incentives: a $5 gift certificate to Starbucks was provided for completing a survey, and a $50 check was provided for participating in an interview. Each school site also received an honorarium of $500 for participation in the study.

Five primary components of data use were defined for this study: (1) types of evidence or indicators used (e.g., parent survey data and classroom observations); (2) identification of goals/objectives through needs analysis (intended to measure the link between the school data and the types of goals set out in the school transformation plan); (3) identification of solution strategies (i.e., whether the school identified strategies based on review of literature); (4) analysis of progress (i.e., the degree to which schools planned for formative assessments); and (5) inclusion of stakeholders (i.e., the degree to which various stakeholders were included throughout the transformation process).

Most teachers reported that their classroom planning was guided by the school's transformation plans, and few reported using data beyond test scores. The majority of teachers met monthly with other faculty and staff to examine the alignment of assessment and curriculum. Teachers in only two of the four schools reported receiving support or professional development around the use of assessment results. Ninety-six percent of all the teachers said they had access to a range of information, but felt overwhelmed with all the data. Across the four schools, teachers indicated that district data were not usually helpful in planning instruction and that they felt that the data might not be reflective of their students' actual progress—because the data reflects how students perform on standardized tests, rather than taking into account individual student growth over time.

Survey items

Following are examples of some of the items included in the teacher survey.

On average, how much class time did you spend this year preparing for the Washington Assessment of Student Learning (WASL) doing the following activities?
(Response categories: 2 days or less, 3 to 5 days, 1 to 2 weeks, 2+ weeks)

1. Reviewing important concepts found in the Washington content standards
2. Discussing and reviewing WASL-type multiple choice questions
3. Reading and answering questions about passages similar to those on WASL
4. Reviewing techniques for organizing ideas in written responses

Lachat, M. A., and Smith, S. (2004). *Data use in urban high schools.* Providence, RI: Education Alliance, Brown University, Northeast and Islands Regional Educational Laboratory.

ABSTRACT: The purposes of this study were to understand barriers in using data, examine the use of disaggregated data, and examine policy and practice implications of achieving effective data use. Five low-performing urban high schools located in three high-poverty urban districts were part of the study. Schools were selected based on these criteria:

- Schools were representative of high-poverty, urban, low-performing schools that serve a diverse student population.
- Schools were engaged in reform activities supported by district and school reform plans.
- School and district commitments had been made to dedicate significant resource support to high school reform.
- School and district commitments had been made to ensuring broad and inclusive participation in the high school reform initiative.
- School and district commitments had been made to cooperate with the Regional Educational Laboratory that conducted the study.

Both qualitative and quantitative methodologies were used in this study. Quantitative analyses focused on longitudinal changes in multiple student performance indicators such as school attendance, dropout rates, and participation in higher level courses. Qualitative procedures included documenting school reforms, documenting field notes, cataloguing the various types of data used, and conducting individual and group interviews. Two types of interviews were conducted: (1) individual interviews with school principals, assistant principals, and other school leaders; and (2) semi-structured group interviews with teachers and data teams in each of the schools. These interviews primarily focused on how data were used in the schools, which types of data were most useful, what interviewees learned from the data, and what changes occurred after use of the data.

The study addressed two questions: (1) How were data used in the five low-performing high schools? and (2) What factors and conditions either supported or acted as barriers to data use? Results from the five schools showed that the uses of data helped teachers and school staff identify issues that would not have been identified without a data-driven approach to school reform. Data use also fostered the use of state standardized assessments by teachers. The study identified six factors that influenced the use of data: (1) the use of a data team to facilitate data use, (2) timely access to high-quality data, (3) the transition to a data-driven school culture, (4) the use of questions to focus collaborative data analysis and use, (5) time for the analysis and interpretation of data, and (6) school leadership that supported data use.

Interview questions

Following are the questions administered during this study's group interviews.

1. How are you using data in this school to support the high school reform process?
   a. What kinds of data are being used?
   b. How are you using it?
   c. What kinds of data are most useful to you?
   d. How has the use of data connected to the Smaller Learning Communities you have established in the school?
   e. How has the use of data connected to the implementation of standards based instruction?

2. Tell me some of the things that you saw in the data.

     a. What did you learn from the data?
     b. What did it tell you about the school or student learning?
     c. What actions were taken?

3. Has anything changed over the past few years about data use in the school?
     a. How has it changed?
     b. Who is now using data?

4. What conditions or factors supported the use of data in the school?
     a. What kinds of obstacles have you had to overcome?
     b. What were the major barriers to data use?
     c. How would you describe your successes around data use in this school?

Lebron, R. (2011). *The exploration of the use of data to modify instructional practices by representative teachers in the state of Illinois* (Doctoral dissertation: Aurora University). Retrieved from ProQuest Dissertations and Theses (Accession Order No.AAT 3455036).

ABSTRACT: This study examined the types of data and data-analysis techniques teachers use to modify instructional practices. The following research questions were used to determine what data teachers used to make decisions and what methods they used to analyze the data:

1. What importance do teachers place on various types of data (described as outcome data, instructional processes data, and perception data) and data analysis techniques to modify their instructional practices?
2. What relationships exist between the teachers' years of experience and the types of data they use to modify their instructional practices?
3. What relationships exist between the teachers' years of experience and the types of data analysis techniques they use to modify their instructional practices?
4. What relationships exist between the number of types of training received in data analysis and the types of data used, and importance of the types of data analysis techniques used by teachers?
5. What relationships exist between the number of hours of training received in data analysis and types of data used, importance of the types of data used, types of data analysis used, and importance of the types of data analysis techniques used by teachers?

A survey was administered to a sample of public-school teachers in Illinois (excluding the Chicago Public Schools system) with email addresses available on their school websites. Of the 16,811 teachers contacted for this research, 981 completed the survey. Most teachers reported using data analysis techniques to inform their instructional practices. The majority of teachers reported not using graduation and retention-rate data. This study found a weak correlation between the number of types of training teachers participated in and the teachers' use of different types of data to modify instructional practices.

Survey items

Following are the items from the study's survey that assessed data use by teachers.

Demographic information

Note: Demographic questions regarding gender, racial/ethnic background, grade level of the students, and years of teaching are posed in the survey, but only the questions concerning data use are included here.

1. In the last five years, have you completed a university or college course on using data to make educational decisions?
   Yes
   No
2. In the last five years, have you completed a workshop or seminar on using data to make educational decisions?
   Yes
   No
3. In the last five years, have you attended session(s) at a professional conference on using data to make educational decisions?

Yes

No

4. In the last five years, have you read professional literature on using data to make educational decisions?
   Yes
   No

5. In the last five years, have you attended a professional development activity in your school or in your school district on using data to make educational decisions?
   Yes
   No

6. Have you engaged in any other activities that helped you use data to make educational decisions?
   Yes
   No
   If yes, list the activities:

7. What is the total number of hours you participated in the professional development activities indicated in numbers 2 through 6?

Data collection

Do you use the following types of data for decisions related to change in your instructional practices? Rate the importance of each type of data to change in your instructional practices.

1. Standardized tests other than state tests
   Yes
   No

2. Importance of the previous type of data when making instructional decisions
   Completely unimportant
   Moderately unimportant
   Somewhat unimportant
   Somewhat important
   Very important
   Extremely important

3. Student performance measures developed by the school or district
   Yes
   No

4. Importance of the previous type of data when making instructional decisions
   Completely unimportant
   Moderately unimportant
   Somewhat unimportant
   Somewhat important
   Very important
   Extremely important

5. Classroom assessments developed by teachers
   Yes
   No

6. Importance of the previous type of data when making instructional decisions
   Completely unimportant

Moderately unimportant
Somewhat unimportant
Somewhat important
Very important
Extremely important
7. Instructional strategies
   Yes
   No
8. Importance of the previous type of data when making instructional decisions
   Completely unimportant
   Moderately unimportant
   Somewhat unimportant
   Somewhat important
   Very important
   Extremely important
9. Instructional time
   Yes
   No
10. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
11. Retention rates
    Yes
    No
12. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
13. Graduation rates
    Yes
    No
14. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important

15. Student attendance
    Yes
    No
16. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
17. Student discipline
    Yes
    No
18. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important

Data analysis

Do you use the following types of data analysis for decisions related to changing your instructional practices? On a scale ranging from 1 to 6, rate the importance of each type of data analysis to change instructional practices. For the purposes of this study, data analysis is defined as methods of studying data to determine its essential features and their relationship with other data.

1. Identification of patterns and trends over time
    Yes
    No
2. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
3. Identification of patterns and trends at one point in time
    Yes
    No
4. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important

Very important
Extremely important
5. Chart progress of subgroups of students
    Yes
    No
6. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
7. Chart progress of individual students
    Yes
    No
8. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
9. Intersect two types of data (e.g., how gender affects student performance in math)
    Yes
    No
10. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
11. Intersect three types of data (e.g., how gender and attitude about math affect student performance
    in math)
    Yes
    No
12. Importance of the previous type of data when making instructional decisions
    Completely unimportant
    Moderately unimportant
    Somewhat unimportant
    Somewhat important
    Very important
    Extremely important
13. Intersect four types of data (e.g., how gender, attitudes about math, and instructional strategies
    affect student performance in math)

Yes

No

14. Importance of the previous type of data when making instructional decisions

Completely unimportant

Moderately unimportant

Somewhat unimportant

Somewhat important

Very important

Extremely important

15. Pose questions or hypotheses and then analyze data to find answers

Yes

No

16. Importance of the previous type of data when making instructional decisions

Completely unimportant

Moderately unimportant

Somewhat unimportant

Somewhat important

Very important

Extremely important

Marsh, J.A., Kerr, K.A., Ikemoto, G.S., Darilek, H., Suttorp, M., Zimmer, R.W., and Barney, H. (2005). *The role of districts in fostering instructional improvement: Lessons from three urban districts partnered with the Institute for Learning.* Santa Monica, CA: RAND Corporation.

ABSTRACT: The authors evaluated three urban school districts to assess the instructional quality and performance of the districts' schools. The three districts were selected based on several factors, such as district size and whether district leaders had focused on supporting districtwide instructional improvement. Both quantitative and qualitative data were collected over a two-year period. During the first year, interviews were administered to school principals and teachers, and focus-group discussions with teachers were conducted. In the spring of the second year, a survey was administered to the principals and teachers, which centered on teachers' use and perceptions of curriculum guides and their use of student assessment data. More than 60 percent of the teachers reported that they used curriculum guides to help them stay on track for teaching state standards. The study found that teachers' use of student test data differed across districts.

Survey items

Following are items from the survey that was administered to principals and teachers during the spring of the second year of the study.

1. How well prepared do you feel to perform the following tasks? (Mark one number in each row)
   (Response categories: Not well prepared, minimally prepared, moderately prepared, very well prepared, N/A)
   a. Understanding and implementing the curriculum guide(s)
   b. Implementing your school improvement plan
   c. Interpreting and using reports on student test results
   d. Preparing your students to perform better on the state assessments

2. If the following sources of information were available to you this year, how useful were they for guiding instruction in your classroom(s)? (Mark one number in each row)
   (Response categories: Not available, not useful, minimally useful, moderately useful, very useful)
   a. Schoolwide student performance results on state test(s)
   b. Your students' performance results on state test(s) disaggregated by student groups (for example, grade level, classrooms, student characteristics)
   c. Your students' performance results on state test(s) disaggregated by subtopic or skill
   d. Your students' performance on district assessments
   e. Results of systematic review(s) of student work

Marsh, J., and Robyn, A. (2006). *School and district improvement efforts in response to the No Child Left Behind Act*. Santa Monica, CA: RAND Corporation.

ABSTRACT: Elementary and middle school teachers in California, Georgia, and Pennsylvania were surveyed and interviewed to discover which strategies improved student performance and which limitations or enablers impacted improvement efforts. Results indicated that analyzing student test data, aligning curriculum and teaching with standards and assessments, and providing assistance to low-performing students were considered the most important efforts in improving educational performance.

The results section was partitioned into several subsections, summarized as follows:

State test data. Teachers were asked about the availability and usefulness of mathematics and science test results. The majority of mathematics teachers in all three states found the test results disaggregated by subtopic/skill more useful than the test results summarized by student subgroups. Approximately one-quarter of California science teachers reported that state science test results were available, and one-quarter of California science teachers found the results moderately or very useful. About 75 percent of Georgia science teachers reported having access to the state science test results; half of these teachers considered these results moderately or very useful when separated by subtopic or skill. Pennsylvania did not administer a state science test.

Timeliness and quality issues. With the exception of Pennsylvania elementary school teachers, at least half of the elementary and middle school teachers from the three states reported receiving state test results in a timely manner. Most of the teachers from the three states, except Georgia elementary mathematics teachers, found some misalignment between curriculum and state assessments.

Use of data. In all three states, more mathematics teachers than teachers in other subjects indicated that test results helped them to identify their needed areas of improvement (related to knowledge and skills) rather than helping them to identify their students' instructional needs. Furthermore, the majority of teachers reported that test results were useful to help identify and correct curriculum and instruction gaps. Finally, a third of the teachers in all three states reported using the assessment results to help them focus more on students who were close to proficient.

Local assessment data. Teachers in all three states reported that they changed their instruction based on student results from local assessments, such as progress tests. Many teachers in California and Pennsylvania found progress tests to be more useful than state assessments when evaluating student mastery of content standards and identifying gaps in curriculum and instruction; Georgia teachers found state tests and progress tests almost equally as useful. Furthermore, teachers in Georgia administered progress tests every six to eight weeks, while teachers in California and Pennsylvania administered progress tests two or three times a year. Receiving quick feedback from progress tests enabled teachers to use results to adjust their instruction accordingly.

Curriculum and instruction alignment. Districts implemented plans to centralize and standardize instruction. In schools with high levels of student mobility, teachers viewed this centralization positively. Furthermore, some viewed the centralization and standardization of instruction as an accountability mechanism for teachers. Across states, teachers reported that monitoring and feedback on implementation of the state standards were useful and indicated that curriculum guidelines were also useful. However, some teachers were uncertain how to use the guidelines, especially in terms of pacing and adjusting for special-education students.

Supporting varying student performance levels. With the exception of Pennsylvania elementary school teachers, approximately half or more teachers in all three states expressed concern that high-achieving

students were not adequately challenged due to state accountability systems that focused on lower-performing students.

Additional improvement strategies. The main emphases of professional development that teachers reported included curriculum and instruction alignment with state standards and tests, mathematics and mathematics teaching, and instructional strategies for low-performing students. California teachers were more likely to report professional development emphasis on English language learners and less likely to report emphasis on student preparation for state tests than Georgia or Pennsylvania teachers.

Improvement hindrances. Teachers reported that a lack of materials was a significant obstacle to improvement, especially in science. Additionally, teachers indicated having insufficient time to teach curriculum. Finally, teachers expressed a lack of guidance on how to modify teaching for special-education students and reported multiple external factors (both social and psychological) that impact students' ability to learn.

In conclusion, the study found that many strategies have been utilized to improve student achievement, though perspectives vary with regard to the success and usefulness of each strategy, and that future studies are needed to provide comprehensive understanding of how these improvements have impacted students' learning.

Survey items

The survey itself was not provided in the report. However, the authors described the items that teachers responded to, summarized as follows.

Teachers were asked about the availability and usefulness of mathematics and science test results.
(Response categories: not available, available and not useful, available and minimally useful, available and moderately useful, available and very useful)

- Mathematics test results summarized by student subgroup
- Mathematics test results disaggregated by subtopic/skill
- Science test results summarized by student subgroup
- Science test results disaggregated by subtopic/skill

Teachers were asked to what extent they agreed with a statement about the timeliness of the state test results (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- I received the test results in a timely manner

Teachers were asked to what extent they agreed with statements about state tests (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- State test results allowed me to identify areas where I need to strengthen my content knowledge or teaching skills
- State test results helped me identify and correct gaps in curriculum and instruction
- State test results helped me tailor instruction to individual student needs

Teachers were asked to what extent they focused on students who are close to proficient.
(Response categories: not at all, a small amount, a moderate amount, a great deal)

- I focus more on students who are close to proficient

Teachers were asked whether they administered math and science progress tests (2004/05 school year).
(Response categories: yes or no)

- Math progress test
- Science progress test

Teachers were asked to what extent they agreed with statements about mathematics state tests and progress tests (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- Tests are a good measure of students' mastery of state content standards
- Test results help me identify and correct gaps in curriculum and instruction

Teachers were asked to respond to selected statements about features of progress tests (2004/05 school year).

- District or school requires you to administer a progress test
- Progress tests administered two to three times per year
- Progress tests administered approximately every six to eight weeks
- Progress tests administered approximately every two to four weeks
- Results are available the same or next day
- Results are available within one week
- Test contains only multiple choice questions
- Administered on a computer
- There are consequences for teachers associated with performance on the tests

Teachers were asked about the usefulness of district/state actions to align math curriculum/instruction with standards.
(Response categories: not useful, minimally useful, moderately useful, very useful)

- Detailed curriculum guidelines aligned with state standards
- A "pacing plan" or "instructional calendar"
- Monitoring and feedback on implementation of the state standards
- Mapping out alignment of textbooks and instructional programs to state standards
- Sample lessons aligned with state standards

Teachers were asked to what extent they agreed that, as a result of the state accountability system, high-achieving students were not receiving appropriately challenging curriculum or instruction.
(Response categories: strongly disagree, disagree, agree, strongly agree)

Teachers were asked to report the emphasis on selected professional development activities.
(Response categories: no emphasis, minor emphasis, moderate emphasis, major emphasis)

- Aligning curriculum and instruction with state and/or district content standards
- Instructional strategies for low-achieving students
- Preparing students to take the state assessments
- Instructional strategies for English language learners
- Mathematics and mathematics teaching
- Interpreting and using reports of student test results
- Instructional strategies for special education students
- Science and science teaching

Means, B., Chen, E., DeBarger, A., and Padilla, C. (2011). *Teachers' ability to use data to inform instruction: Challenges and supports.* Washington, DC: U.S. Department of Education, Office of Planning, Evaluation and Policy Development.

ABSTRACT: This study explored teachers' use of data to inform instruction. The study examined five major processes for using student data to inform school-level decisions: (1) data location (i.e., finding the right data to use), (2) data comprehension (i.e., figuring out what the data say), (3) data interpretation (i.e., making meaning from the data), (4) data use (i.e., applying the data to planning instruction), and (5) question posing (i.e., figuring out questions that will generate useful data). In the first round of data collection, ten school districts were selected. Districts that demonstrated significant data use in the first round were invited to participate in the second round of data collection. Interviews involving data scenarios were administered to teachers, either individually or in small groups. Some of the interview questions required the teachers to look at data tables and graphs. Findings from this study indicated that some teachers struggled when asked to locate appropriate data and then perform calculations to support comparisons. Teachers had the most difficulty with data comprehension, data interpretation, and data querying when they worked individually, but performed better when they worked in small groups.

Interview items

Following are descriptions of the types of data scenarios that teachers were asked about during this study's interviews.

During the interviews, respondents were given seven different data scenarios[*] in which the interviewer showed them either a table including a hypothetical classroom data set or a figure of a reading achievement score histogram, to see whether or not the teachers understood and could make sense of the data being displayed. For example, in one of the scenarios, the interviewer showed a histogram of a school's grade 3 students' proficiency classifications on the state reading test. Teachers were asked to identify the proportion of students achieving proficiency and to examine the display for a possible error. In another scenario, the interviewer showed a table with reading achievement test scores and scores on two classroom assessments for 15 students. Teachers were asked what instructional decisions they would make based on this data and how they would place several students who have high scores on some measures and low scores on others.

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* See the study report for actual data scenarios used in this study.

Stecher, B., and Hamilton, L. (2006). *Using test-score data in the classroom*. Santa Monica, CA: RAND
Corporation.

ABSTRACT: In this study, elementary and middle school mathematics teachers from California, Georgia, and Pennsylvania were surveyed and interviewed to determine how standards-based assessment results are used, which reporting features are useful, and which supports are available to make instructional decisions using data, in order to determine the extent to which state standards-based accountability systems under No Child Left Behind are affecting educational practice and, consequently, student performance. Although data from the spring of 2004, 2005, and 2006 were collected, most results centered on 2005 data. Overall results indicated that most teachers felt "a great deal of pressure to improve students' scores on tests," and that they believed both classroom and state tests were useful for improving students' content knowledge.

In all three states, approximately half of elementary and middle school teachers used test results weekly to determine which topics needed to be retaught and which students needed additional instruction. Additionally, teachers indicated using test results more frequently in 2004/05 than in the previous year. Furthermore, teachers reported increasing their focus on state standards and seeking more effective teaching methods due to the state assessment system. Most teachers concentrated on instructional practices that emphasized test styles and formats, test-taking skills, and topics tested. Teachers reported a concern that these practices lead to inflated test scores, thus reducing test validity. Most teachers in the three states, especially Georgia, agreed that test results were useful to help them individualize instruction, improve curriculum, and identify their needed areas of instructional improvement.

Across the three states, 80 percent of teachers indicated having access to mathematics test results by subgroup and subtopic/skill. More teachers reported the subtopic/skill results as useful than reported the subgroup results as useful. Compared to Georgia, fewer California and Pennsylvania mathematics teachers indicated subgroup and subtopic/skill results as useful to them. Indication of the timeliness and clarity of the reports varied between the three states. About 70 percent of California and Pennsylvania middle school teachers and all Georgia teachers reported that they received timely reports; however, California and Pennsylvania elementary school teachers reported that they received reports in a less timely manner. Most teachers in the three states, especially Georgia, indicated that the test results were clear and easy to understand. The majority of teachers in Georgia, but not in California or Pennsylvania, believed that the state assessment was a good measure of students' mastery of content standards. In all three states, few teachers agreed that the test and curriculum aligned. Compared to the other two states, fewer California teachers indicated that the state mathematics test adequately measured mathematical reasoning and problem solving. Additionally, only half of California teachers reported aligning their teaching to the assessment, compared to 80 percent of Georgia and Pennsylvania teachers. In California and Pennsylvania, approximately two-thirds of middle school teachers believed the state test was too difficult for most of their students.

All three states reported that workshops were available to instruct teachers on how to interpret test results, but Georgia teachers were more likely to find these workshops useful. Likewise, more Georgia teachers indicated having access to workshops and test analyzing software than teachers in the other two states. Also, in all three states, more elementary school teachers than middle school teachers reported receiving professional development training that included test preparation and results analysis. Most teachers indicated that their principals encouraged them to review state content standards and adapt the standards into their instruction; more teachers in Georgia than in the other states indicated that their principals aided them in adapting their curriculum. Additionally, more teachers reported using progress tests. Most

teachers believed that progress tests are good preparation for state tests and good measures of student mastery, and that they assist teachers in finding and correcting gaps in curriculum and teaching.

Across all three states, Georgia teachers appear to view data use most favorably. Furthermore, preliminary analysis of resources seems to indicate that teachers' use of data varies at the school and district levels. In teacher responses about data usefulness, school-level intra-class correlations were about 0.10, while district-level intra-class correlations were smaller. Additional examination suggests that school and district data-use promotion can have small influences on better data use by teachers.

In conclusion, the study found that more teachers are using state assessment data to identify students who need additional help, as well as to make changes to their own instruction, and that many teachers are concentrating on test preparation, specific assessment topics, and assessment styles and formats, which has led to a concern about possible inflated test scores. Additionally, many teachers are using progress tests to assist their instruction, and these teachers find these results more useful than state tests. Overall, Georgia teachers indicated that workshops and training to understand data were useful, and they seemed to view assessments more positively than California and Pennsylvania teachers; the high level of variation among the states needs further analysis.

Survey items

No actual survey items were provided in the report. However, the authors indicated the topics of the survey items studied and how they were measured, both of which are described as follows.

Teachers were asked how frequently they used selected assessment-related activities (2004/05 school year).
(Response categories: never, rarely [a few times a year], sometimes [once or twice a month], often [once a week or more])

- Review assessment results to identify individual students who need supplemental instruction
- Review assessment results to identify topics requiring more or less emphasis in instruction
- Re-teach topics because student performance on assignments or assessments did not meet expectations

Teachers were asked to compare the frequency with which they used selected assessment-related activities during the 2004/05 and 2003/04 school years.
(Response categories: more frequently, the same, less frequently)

- Review assessment results to identify individual students who need supplemental instruction
- Review assessment results to identify topics requiring more or less emphasis in instruction
- Re-teach topics because student performance on assignments or assessments did not meet expectations

Teachers were asked about the extent to which they used certain practices in response to the implementation of the state mathematics assessment (2004/05 school year).
(Response categories: not at all, a small amount, a moderate amount, a great deal)

- Focus more on standards
- Search for more effective teaching methods
- Focus more on topics emphasized in assessment
- Emphasize assessment styles and formats of problems

- Spend more time teaching test-taking strategies
- Spend more time teaching content
- Assign more homework
- Focus more on students who are close to proficient
- Offer more assistance outside of school for students who are not proficient

Teachers were asked to what extent they agreed with selected statements about the use of state tests (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- The test results helped me identify and correct gaps in curriculum and instruction
- The individual student results helped me tailor instruction to individual student needs
- The test results allowed me to identify areas where I need to strengthen my content knowledge or teaching skills

Teachers were asked about the availability and usefulness of mathematics test result summaries (2004/05 school year).
(Response categories: not available, available and not useful, available and minimally useful, available and moderately useful, available and very useful)

- Mathematics test results summarized by student subgroup
- Mathematics test results disaggregated by subtopic/skill

Teachers were asked to what extent they agreed with selected statements about the features of the state test results (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- I received the test results in a timely manner
- The test results were clear and easy to understand

Teachers were asked to what extent they agreed with selected statements about the quality of the state mathematics assessment (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree, I don't know)

- The mathematics assessment is a good measure of students' mastery of content standards
- The mathematics assessment includes considerable content that is not in our curriculum
- The mathematics assessment omits considerable content that is in our curriculum
- The mathematics test adequately measures mathematical reasoning and problem solving
- I have aligned my teaching with the mathematics assessment
- The mathematics test is too difficult for the majority of my students

Teachers were asked about the availability and usefulness of resources for using mathematics test results (2004/05 school year).
(Response categories: not available, available and not useful, available and minimally useful, available and moderately useful, available and very useful)

- Workshops or meetings where mathematics test results are presented and explained
- Training on how to use mathematics test results for instructional planning or school improvement
- Computer software or systems for re-analyzing mathematics test results

Teachers were asked about the emphasis that professional development had on selected features (2004/05 school year).
(Response categories provided: moderate, greater emphasis)

- Professional development emphasized preparing students to take the state test
- Professional development emphasized interpreting and using reports of student test results

Teachers were asked to what extent they agreed with statements that the principal at their school engaged in selected behaviors (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- The principal at my school encourages teachers to review the state content standards and incorporate them into their teaching
- The principal at my school helps teachers adapt our curriculum based on an analysis of state test results

Teachers were asked to what extent they agreed with selected statements about various features of progress tests (2004/05 school year).
(Response categories: strongly disagree, disagree, agree, strongly agree)

- Progress tests are a good measure of student mastery of content standards
- Progress tests are good preparation for the state mathematics assessment
- Progress tests help identify and correct gaps in curriculum and instruction
- There are consequences for teachers associated with performance on the tests

Tyler, J.H. (2010, January). *Evidence based teaching? Using student test data to improve classroom instruction.* Paper presented at the American Economics Association Annual Meeting, Atlanta, GA.

ABSTRACT: The purpose of this study was to examine how teachers used data to improve their practice. In particular, this study was interested in how Cincinnati Public Schools (CPS) teachers utilized their time when they logged in to the district's online data tool. This tool—known as the CPS Dashboard system—contains benchmark assessment data on all CPS students. The study addressed two questions: (1) How much do CPS teachers use the Dashboard system? and (2) In what ways do CPS teachers use the system, and, in particular, to what extent do teachers view student test data? The study's data came from the CPS Dashboard's web logs, which generated user information such as the amount of time teachers spent in the system. The findings indicated that most teachers spent the most time on student-level pages (which include information on multiple students in a teacher's class, such as test scores) and on resource pages (which include model lesson plans and related resources for the teachers). Overall, the level of teacher usage of the Dashboard was low. On average, teachers logged in two times per week for a total of 6.3 minutes per week. One rationale for the low usage of the Dashboard was the perceived lack of validity of the benchmark tests—that is, some of the teachers felt that the material tested on the benchmark assessments had not yet been covered in their classes.

Teacher data-use information

Following are the types of web-log data that the CPS Dashboard system generated on CPS teachers each time they logged in to the system.

- Average number of logins
- Time on class pages
- Time on individual student pages
- Time on item pages
- Time on resource pages
- Time on student pages
- Hits on print on class pages
- Hits on print on individual student pages
- Hits on print on item pages
- Hits on print on resource pages
- Hits on print on student pages
- Hits on class pages
- Hits on individual student pages
- Hits on item pages
- Hits on resource pages
- Hits on student pages