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Improving Teaching and Learning with Data-Based Decisions: Asking the Right Questions and Acting on the Answers

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"**D**ata-based decisions"—the phrase has become a buzzword in education over the last few years. However, it does make sense that using information to help clarify issues, identify alternative solutions to problems, and target resources more effectively will lead to better decisions. The real question should not be *whether* to integrate the use of data in decision making, but *how*.Finding good data and using it effectively is actually a complex process—one that many schools and districts are just beginning to address.

One specific type of data-based decision making that shows promise for helping schools dramatically increase student achievement is the use of assessment data to drive instructional improvement. In 1994, Glaser and Silver envisioned a future where:

> Testing is seen as being less about sorting and selecting and more about offering information on which students and teachers can build. As assessment and instruction are more closely linked, achievement measurement will be integral to learning rather than imposed by some external shaper of students' fates (1994, 26).

Today, assessment and instruction *are* becoming more closely linked in many schools. However, it is interesting that much of the current movement toward using assessment data to shape instruction actually first focused on assessments "imposed by some external shaper of students' fates"—the state-required accountability tests. Student performance on these tests, in addition to being used to rank schools and students, is increasingly being incorporated into schools' instruction improvement efforts.

Evidence that Data Can Improve Instruction

There is a growing body of evidence that the use of high-quality, targeted assessment data, in the hands of school staff trained to use to use it effectively, can improve instruction. For example:

- Schools demonstrating success with "closing the gap," profiled by the North Carolina Department of Public Instruction in a 2000 study, were more likely than others to assess students periodically for diagnostic purposes and to disaggregate the data (Evaluation Section, Division of Accountability Services, North Carolina Department of Public Instruction 2000).
- In a study of four school districts (each serving high percentages of students who would typically be characterized as at-risk) that significantly increased student performance on state-mandated tests, Cawelti and Protheroe identified as a central finding of the study the following:

> Large gains in test scores require: 1) extensive efforts to align instruction with test content; 2) detailed analysis of student responses to the tests or assessments designed to parallel these; and 3) the provision of immediate and appropriate corrective instruction for individual students as indicated by that analysis (2001, 3).

All four of these districts began their improvement efforts by carefully reviewing test data, a process that has grown significantly more sophisticated over time.

- "Using data to drive improvement" was identified as a key to success in a report developed by the National Education Goals Panel after a series of hearings designed to find examples of successful schools and to understand why those schools were succeeding. Specifically, the successful schools "use performance information to determine where they were succeeding and where they needed to direct their efforts for improvement" (Rothman 2000, i).
- In a study of Maryland elementary schools, Schafer et al. (undated) found that in schools they characterized as more successful, "principals are involved with assessment of student improvement and make classroom decisions based on these assessments."

A key element observed in all these successful schools and districts was a well-organized approach to using assessment data. This did not happen overnight. Typically, it was an evolutionary process that may have included some false starts.

Asking the Right Questions

In any school or district using data to make decisions, a key step should be developing the right questions. While these questions should be tailored to fit the needs of the school, Hibbard and Yakimowski (1997) suggest that school staff begin with five "guiding questions" as they start discussions about their use of assessment data for decision making:

- What should students know, and how should they be able to use what they know?
- How well should students perform?
- What will we do to assess student performance?
- How well do students actually perform?
- What will we do to improve student performance?

In their view, these questions should lead teachers and other staff members to "purposeful conversations…about improving student performance" (67-68).

It's also important to consider assessment in broad terms, from standardized tests required by the state to teacher-developed approaches that may be quite informal. In its *Guide to Classroom Assessment* (see Figure 1), the North Carolina Department of Public Instruction (1999) provides some examples of questions that can be addressed using a variety of sources of assessment data.

Figure 1: Examples of Links between Purposes and Methods of Assessment

Purpose	Primary Users	Typical Questions	Type of Information Needed	Possible Assessment Methods
Program Evaluation	• Superintendent • Local boards • Principals • State policymakers	1. Are our programs producing student learning? 2. Which schools need more assistance?	• Periodic assessment of group achievement	• Multiple-choice tests • Performance tests/tasks
Instructional Leadership	• School administrators	1. Are teachers and instructional strategies in given areas producing results? 2. What kinds of professional development would help? 3. How shall we spend building resources in support of instruction? 4. What does this teacher need to ensure student competence?	• Periodic Assessment of group achievement • Examination of student work (synthesis of group results) • Continuing assessment of group achievement	• Multiple-choice tests • Possible: open-ended tests; performance tasks; portfolios
Instruction: Classroom	• Teachers	1. Are my teaching strategies working? 2. What do these students need help with? 3. What do students understand and what can they apply?	• Continuous assessment of group achievement & performance • Continuous assessment of individual performance summarized over time	• Multiple means: multiple-choice, open-ended, performance • Multiple means as above, plus observation and class discussion
Instruction & Diagnosis: Individual	• Teachers	1. What does this student need help with? 2. What misconceptions/ strengths does he/she have?	• Continuous assessment of individual mastery/performance	• Multiple means: analysis of student work, conversations, observations

While all these sample questions provide a place to start, schools and districts need to develop their own particular focus. Often, that focus can provide the key to effective improvement. Consider the example of

the Brazosport Independent School District. When nine of its 18 schools were designated as low-performing on the state-mandated assessment, the district knew that it had to take aggressive action. One piece of the initial, and very intensive, analysis of assessment results was an effort to identify particularly effective teachers.

The instructional process used by one of these teachers—which included periodic assessments routinely used to diagnose which students had mastered objectives and which students needed more instruction—was used as a model to educate other teachers. The first school in which the model was piloted, which had received a "warning" based on its students' scores, received a significant gains award from the state after one year and "Recognized" status after two years (Cawelti and Protheroe 2001).

Collecting and Analyzing the Data

The Importance of Good Data—
Identifying the key questions is only a first step. The next step, data analysis, requires the availability of high-quality, targeted data in a format that helps to address the questions. Districts and schools making intensive use of data from state-mandated assessments stress how important it is to have data available that:

- can be easily disaggregated not only by school but by classroom and specific groups of students; and
- provide a detailed analysis of results by objective or skill in addition to overall scores.

Although much of the current emphasis on using assessment data began with data from high-stakes tests, schools and districts that are the most effective users of assessment data have begun to recognize and capitalize on the power of classroom assessment. Damian urges teachers and school leaders to embed assessment in "every aspect of our planning, thinking, and doing" instead of viewing assessment as a "once-a-year crisis" (2000, 16).

Niyogi highlights the special characteristics of high-quality classroom-based assessments that make them potentially powerful tools:

Assessment should be used not simply to judge how much kids know but to illuminate the nature of their knowledge and understandings in order to help kids learn….Common sense tells us that on-going, classroom-based assessment can serve this purpose. Teachers interacting with students will observe the nuances of their cognitive growth and development over time, their individual strengths and weaknesses in ways that would be extremely difficult, if not impossible, to capture through standardized or conventional testing alone (1995, 3).

Responding to What the Data Tell Us

Aligning the Curriculum—
Many districts that have made effective use of assessment data found early on that what was needed as a first step was an intensive review of their curriculum. They compared what was taught to state standards and the content of state-mandated assessments. In addition, they carefully reviewed the curriculum across grades. For example, teachers from kindergarten through 12th grade, with the assistance of central-office staff, would meet repeatedly to talk about the desired sequence of mathematics skills and then make changes in the sequence and timing of instructional objectives. Cromey and Hansen found that, in the schools they studied:

alignment began with a detailed analysis of the local curriculum. This analysis required reflecting on several other sources of data, including the state content standards and results from state and local assessments for each subject area and grade, K-12. Therefore, schools with good assessment

systems integrated their own history of assessment performance into the alignment and development process. The specific approach to this work varied, but four common activities [curriculum analysis, realignment of the local curriculum, alignment of the local assessment system, and reflection on data from the curriculum analysis and from results of state and local assessments] tended to drive the process (2000).

Improving Teaching Strategies—

Meyers and Rust stress the importance of helping teachers learn how to "assess their own work and its impact on their students" (2000, 34). To be successful, school leaders need to engage in conversations with teachers, using assessment data to diagnose strengths as well as areas in which the teachers need to modify their instruction. In addition, providing the opportunity for teacher collaboration and discussion about practice, using assessment data as a springboard, has been a powerful tool for improvement.

For example, the Barbour County School District in West Virginia uses class-based profiles generated from SAT-9 data that include information about the performance of individual students on each concept tested. These data sheets are analyzed to identify areas of strength and weakness for individual students as well as for groups of students:

> The data not only help teachers see specific areas of difficulty for each student, it also helps teachers and principals to pinpoint objectives that either need to be covered more thoroughly or taught in a different way. Teachers can then be given support—staff development, assistance from a master teacher, etc.—with either content or instructional approaches to improve their teaching (Cawelti and Protheroe 2001).

Providing Special Instruction for Students Who Need It—

While use of assessment data can help to identify students who are not mastering particular objectives—or who are just generally below grade level—that knowledge is meaningless without providing support for these students. In their study of "high-performance districts," Cawelti and Protheroe found that a common characteristic was the districts' recognition of the need for:

> instructional processes that enable teachers to accomplish three things on a daily and weekly basis: (1) organizing instruction to regularly administer interim assessments of skills taught before moving on to new material, (2) providing tutoring or extra help for those students who fail to master the skills taught and enrichment learning activities for those who have mastered the skills, [emphasis added] and (3) providing frequent practice throughout the year to ensure retention for students who have initially mastered the skills needed (2000, 98).

The provision of these services was handled in a variety of ways—through tutorials, afterschool programs, summer school, etc. Often, it required very detailed efforts to create school and grade-level schedules that made it possible to group students by skill level for parts of every day. Instruction was typically provided in small groups, with opportunities available to help teachers refine the skills they needed to work with students who needed additional help to achieve mastery. The efforts required leadership on the part of the school principal, commitment from the entire school staff, and a highly organized and flexible system—but results in the form of higher student achievement proved the value of the efforts.

Providing Support for Staff

Stiggins (2001) views two conditions as essential to schools' efforts to integrate assessment into the teaching and learning process:

1. To assess student achievement accurately, teachers and administrators must understand the achievement targets their students are to master. They cannot assess (let alone teach) achievement that has not been defined…Meeting this condition would require, for example, that schools and districts review the curriculum and define a path for students to move along towards competence.
2. The second condition is an assessment-literate faculty. Assessment literacy comprises two skills: first is the ability to gather dependable and quality information about student achievement; second is the ability to use that information effectively to maximize student achievement (19-20).

This second element has been addressed head-on by schools and districts that have incorporated the use of data in their improvement efforts. Opportunities to learn how to analyze assessment data have typically been provided in a variety of ways, including:

- staff development focused on how to "read" and analyze reports of assessment results;
- presentations by central-office staff or principals to school staff, followed by a discussion of possible next steps;
- one-on-one sessions of a principal, assistant principal, or lead teacher with a teacher to review and discuss results from that teacher's classes and students; and
- training of an in-school data expert, typically a teacher, who works with grade-level or subject-area teams of teachers to analyze the data.

In addition, a key component of effective systems is the provision of time on a continuing basis for teachers to discuss the data and to work together to develop "solutions." Teachers view this time as an opportunity both to develop their skills in data analysis and to brainstorm and share effective instructional strategies. While common planning time is often difficult to provide, Cromey and Hanson describe the specific systems used in four schools they visited (see Figure 2).

Figure 2: Scheduling Approaches for Teacher Collaboration

	School A	School B	School C	School D
Time and Planning Strategies	1. Once every month, the school day begins two hours later—teachers meet during this time to engage in the activities described below. School makes up this accumulated time by extending the school year.	1. School staff are released early from school once per week for at least 45 minutes. This time is added to other days throughout the week. 2. Entire staff meets once a week for one hour before school. Staff decreased the "nuts and bolts" of the meetings and prioritized work related to assessment.	1. Same-grade teachers meet informally during weekly planning periods and formally every six weeks. To accommodate these planning periods, students in entire grades are sent to "specials" (e.g., gym, art classes). Time is also allotted at regularly scheduled staff meetings. 2. Teachers are released from teaching duties several days each year and are replaced by substitute teachers. 3. Teachers meet with principal up to three times each year.	1. Teachers request time to meet with each other during school hours; substitutes are hired to support this. In addition, teachers meet after school. 2. Teachers meet in "within-grade" and "subject-area" teams during their planning hours once per week.

Activities	a. School staff rewrite district standards and realign the assessments they use accordingly. b. School staff continuously re-evaluate this work, and discuss and plan changes as needed.	a. Schools use allotted time to align curriculum across grades and with the state standards. This process is driven by student assessment data. b. School staff continuously re-evaluate this work and discuss and plan changes as needed.	a. Staff discuss students' progress according to the "developmental continuums" written by school staff. b. Teachers administer individual assessments to students. c. Staff discuss reports on assessment data from district research department.	a. Staff share knowledge gained from professional development activities that addressed curriculum and assessment. They also discuss student mastery of standards and other outcomes and possible intervention strategies.

Summary

Aldersebaes, Potter, and Hamilton speak of "using data to ignite change" (2000, 20), with school staff using "meaningful" data to:

- uncover needs, priorities, and resources;
- build a school profile to better understand the school's strengths and weaknesses;
- develop intrinsic motivation through identifying a need for change;
- create a focused direction for change accompanied by realistic goals; and
- establish a baseline against which to measure progress and design a plan to evaluate programs or practices.

Educators across the country who have learned how to effectively use assessment data have indeed ignited change and achieved positive results at the district, school, classroom, and student levels. The preceding discussion has identified essential elements of effective use of data to improve instruction. These include: 1) good data; 2) staff expertise with collection and analysis of data; 3) sufficient time structured into the schedule for staff to analyze the information; and 4) carefully designed changes in curriculum and instruction in that address the needs identified by the analysis.

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