Making Sense of All Your Data

By Mary Ann Lachat, Martha Williams, and Stephen C. Smith
Schools today are more data rich than ever, requiring staff members to develop their data literacy—that is, their knowledge of how to use assessment data with other types of data to identify areas of effectiveness and to target instructional improvement efforts. Administrators and teachers are expected to use combinations of data (diagnostic and standardized test data, state assessment data, and local assessment data) to close achievement gaps, address literacy, evaluate and demonstrate program effectiveness, and improve instruction. In addition, reforms aimed at establishing standards-based instruction, connecting learning tasks to real-world situations, personalizing learning, and responding to diversity require the systemic use of a wide array of data by various groups and individuals.

We have worked with many high schools to improve their use of data as a core component of their school reform initiatives. Over the past five years, we have also conducted a case study for the Northeast and Islands Educational Laboratory at Brown University that examined the factors and conditions that either facilitated or impeded data use in five urban secondary schools. Our experiences have led us to identify three practices that are particularly important when developing data literacy among staff members and establishing purposeful data use:

• Organizing data use around essential questions
• Using technology that allows purposeful data disaggregation
• Using a data team and a data coach.

Essential Questions
Organizing data use around the most essential questions about student performance is an effective strategy for building staff members’ ability to use data and maintaining a clear focus on student progress and program effectiveness. In our work, we have used a framework of essential questions to guide data use and to develop the data literacy of staff members. This set of essential questions focuses attention on what’s important and what to look for as the basis for decision making.

After some initial training on creating data-related questions, teachers and administrators quickly learn how to analyze, interpret, and use data effectively. The questioning approach enhances staff members’ ability to use various types of assessment data in combination with other pertinent data to identify factors that may influence performance. These skills are the core of data literacy. The research and practice literature supports this approach and strongly suggests that basing the collaborative examination of data on clearly focused questions can be a key factor in effectively using that data to address equity and performance issues (Holcomb, 2001; Love, 2004).

In our case study, school staff members who initially felt that they didn’t know how to analyze or interpret data later reported that the questioning approach gave them a lens for looking at the data and more confidence in understanding student performance patterns and identifying the implications for school improvement (Lachat & Smith, 2004). The process of questioning and collaboratively exploring
District/School
Student
Information

State Assessment
Date Files

Test Pattern
Data Files

Other
Data

STUDENT DATA

Examples:
» Gender
» Ethnicity
» Disability
» Economic Level
» English Proficiency
» Mobility
» Other Characteristics

EDUCATIONAL DATA

Examples:
» Grade Level
» Sending School
» Prior Education
» Subjects & Courses
» Special Education
» Bilingual/ESL
» School-to-Career
» Title I
» Other Programs

PERFORMANCE DATA

Examples:
» State Assessment Results
» Standardized Test Results
» Diagnostic Assessments
» Classroom Assessments
» Grades
» Attendance
» Discipline
» Drop-out Rates
» Graduation Rates

Integrated
Database

DISAGGREGATION ACROSS:

Multiple Student
Factors

Multiple Education
Factors

Multiple Student
Groups

Multiple Performance
Measures
solutions helps staff members, who represent different perspectives in a school, be more objective in considering how school policies, programs, instructional practices, teacher beliefs, and other aspects of the school environment might be affecting student performance.

**Technology**

Using data effectively at the school, program, learning community, and classroom levels requires disaggregating assessment results by multiple student characteristics, programs, interventions, educational supports, instructional practices, and such indicators as grades and attendance. It means being able to connect information about students who have particular characteristics to the programs and practices to which they have been exposed and the knowledge and skills that they have acquired. We call this capacity *purposeful data disaggregation*.

In contrast to looking at the relationship between achievement and a single factor, such as ethnicity, purposeful disaggregation responds to the most important questions that principals and teachers must answer about the progress of students and the effectiveness of programs. In all of the schools we worked with, the key technology tool used to perform this type of data disaggregation was a data warehouse application that created a fully integrated database that linked data from school information systems, state assessment files, standardized test files, and other data sources, as shown in figure 1.

All of the schools had previously received student performance data with minimal or no disaggregation. The data warehousing application generated a wide range of disaggregated data in combinations that allowed staff members to examine the progress of specific groups of students—students in specific course sections, students assigned to different smaller learning communities (SLCs), students participating in specific programs, and students receiving specific instructional interventions.

Teacher teams could easily examine the performance of student groups by looking at combinations of performance indicators that included attendance, course grades, performance on state assessments, standardized tests, and diagnostic assessments. The teams came to realize that the disaggregated data were *their* data and could be used to answer their questions. This fostered staff members’ confidence and data literacy and led to other targeted uses of data in addressing student performance issues.

For many years, the research and school reform literature has cited the importance of data disaggregation (Holcomb, 1999; Johnson, 2002; Lachat & Williams, 2003; Love, 2004). More recently, the use of data warehousing technology has been supported in the research literature. Wayman, Stringfield, and Yakimowski (2004) regard data warehousing as necessary and recommend that schools develop their ability to warehouse data to better support data use at the school level. Other researchers also have cited the importance of presenting data in formats that are meaningful to school leaders through the use of data warehousing and advanced data system technology (Mandinach, Honey, Light, Heinze, & Rivas, 2005; Rudner & Boston, 2003; Schwartz, 2002).

**A Team Approach**

A data team can help support the use of data. A data team expands the control of data beyond a handful of administrators and allows a group of staff members to develop and model data analysis skills. Some of the key functions of a data team include working with staff members to focus data use on a set of essential questions, identifying data that should be disseminated to different groups in the school, developing a schedule for data dissemination and analysis, helping staff members analyze and interpret data, engaging staff members in setting targets for improvement, supplying individual teachers with data, and responding to data requests from staff members.

A data team is most effective when the membership comprises school leaders, teachers, guidance personnel, and SLC representatives. The team should also include professional support personnel, such as special education and ESL teachers, instructional or literacy coaches, and transition coaches who can offer important follow-up assistance. Broad involvement increases the potential for schoolwide data use, although it may consume a large amount of time. This can be accomplished by maintaining a relatively small nucleus of permanent members and by including other personnel in targeted data-use meetings and follow-up activities. The core group might also be a subteam of an established group in the school, such as a school improvement team.

The use of a data coach as a mentor to the data team is a related strategy that can strengthen the use of data in the school. The primary role of the data coach is modeling various uses of data, which the data team can then model for school staff. The coaching process includes modeling how department chairs, teacher teams, and instructional and literacy coaches can use data to examine the effectiveness of instructional strategies; how SLC teams can use data to monitor the progress
of students on multiple measures; and how data can be used to identify areas of strength in student learning, as well as areas for improvement. As data teams mature, the role of a data coach decreases as team members and other school staff members develop a deeper understanding of the function of data use in the school.

**A Combined Strategy**

These three practices work best in conjunction with one another: essential questions that guide data analysis, data warehousing technology that supports extensive data disaggregation, and a data team that ensures that the data is available and put to use. Working with a data coach helps ensure that data are routinely examined and used to plan and evaluate improvement.

Data warehousing technology is a tool for integrating and disaggregating data to answer questions. When data are disaggregated by various combinations of student groups, problems and successes can be more easily identified and priorities can be defined for the areas where change and improvement are needed the most.

The use of data warehousing technology to disaggregate test data and course grade data for students enrolled in 9th- and 10th-grade academies opened the door for one high school data team to define a set of questions about grading criteria across academies and whether the academies were providing sufficient classroom support to improve students’ reading skills. Using common planning time, the data team met with 9th- and 10th-grade interdisciplinary teams to examine the data and discuss the questions. The focus on a set of questions helped to diffuse some defensiveness across the academies, and ultimately led to plans for developing assessment criteria for student work products and common end-of-course examinations for core courses in English language arts and mathematics. The discussions also identified the need for teacher professional development in content-area literacy strategies that teachers could use to improve students’ reading and writing skills in content-area classrooms.

Our study of data use in five urban secondary schools showed that giving staff members disaggregated data that was linked to essential questions had the following effects:

- Revealed inconsistencies in staff expectations and assessment criteria within subject areas
- Confirmed or discredited assumptions about students and their performance
- Showed the effectiveness of reading and math interventions
- Helped the school determine the progress and benefits of different SLCs
- Allowed school staff members to determine the school’s progress in improving the longitudinal performance of specific student groups on multiple performance indicators (Lachat & Smith, 2004).

### Defining Essential Questions

This is a framework for defining essential questions a school might focus on to make data-based decisions.

- Are specific reading and math interventions improving literacy skills and reducing achievement gaps for selected groups of students?
- Do previous assessment results and attendance rates of entering freshmen indicate the need for targeted interventions and instructional supports at the ninth-grade level?
- Which small learning communities are making the greatest progress in improving student performance in areas related to attendance, discipline, course grades, state assessment results, and postsecondary transitions?
- Are there unique characteristics of high-performing and low-performing students that indicate equity issues need to be addressed more effectively?
- How do students’ course grades compare to their results on state assessments and standardized tests?
- Do grading patterns reflect consistency in grading criteria across subject-area course sections or across learning communities as schools align instruction more closely with standards?
- How do assessment results for students new to the district in grades 9 or 10 compare to the results of students who have been in the district for their middle school years?
- Does a cohort of students show longitudinal improvement in their performance on state assessments and standardized tests?
Achieving the goal of routine, systemic data use, however, requires more than essential questions, technology, and data teams. Important issues—such as limited staff time, reluctance and defensiveness, and entrenched beliefs—must be addressed. Schools should integrate the use of data into existing structures, such as department meetings, school improvement meetings, meetings of SLC staff members, and common planning time meetings among teachers. School leaders must reinforce the message that using data to monitor student performance and to target improvements is an integral part of every agenda, not merely an addition to the agenda.

The strategic use of data can make a difference in meeting the needs of every student. Taken together, the practices we have described support a culture of inquiry, continuous improvement, accountability, and purposeful data-driven decisionmaking—cornerstones of efforts to ensure the success of all students. PL

References