# Intersections:

## New Routes Open When One Type of Data Crosses Another

### by Victoria L. Bernhardt

All too often, schools in this country conduct their education programs with little formal analysis of how well those programs work. Teachers and administrators rely instead on "gut feelings" about what's working and what isn't. They try to be optimistic, hoping that they are doing the right things, but they never get a clear sense of whether their program is working particularly well. Neither do they analyze their goals and challenges systematically, which robs them of the chance to ask better questions and get answers that can lead to meaningful change in classroom practice.

There are many reasons schools don't use data well. In many schools and districts, data analysis has never been viewed as a high priority. Many state education departments also put little emphasis on schools gathering data, and thus provide little incentive for districts and schools to devote time, money, and staff resources to using data in new ways. Also, campus-level educators often lack the training, equipment, and time to develop and carry out complex analyses. And many educators fear data analysis, instead of embracing it as a way to make their jobs easier and more rewarding.

These are serious issues, which educators must address in the years to come. But meanwhile, schools can still be using data to provide meaningful, ground-level guidance on teaching practice. You don't need an advanced degree in statistics and a roomful of computers to start asking data-based questions about your school, and using what you learn to guide reform.

Here we present a model that lets a school quickly begin posing and answering data-based questions about teaching and learning. As educators become more familiar with collecting and interpreting school data, they can begin "running data at each other," framing questions that require analysis of multiple types of information. Educators can combine two, three, and four categories of data in ways that can provide new insight into student learning and how to improve it. This process can help:

- Replace hunches and hypotheses with facts
- Identify the root causes of problems, not just the symptoms
- Assess needs, and target resources to address them
- Set goals and keep track of whether they are being accomplished
- Track the impact of staff development efforts

## Beyond Test Scores

Gathering data in a school means looking at students, teachers, and the school community in many different ways. Test scores alone won't tell you who your students are, which ones are doing well, and why others are not as successful. A better-rounded picture of a school and its students gives teachers much clearer information to use when examining their daily practice.

An effective data analysis of a school or program can include four different types of data:

1. ***Student learning data*** describe an educational system in terms of standardized test results, grade point averages, standards assessments, and other formal assessments. Analyzing one year of student learning data, for example, schools can answer questions like, *How did students at the school score on a particular standardized test?* Over time, schools can answer questions such as, *Are there differences in student scores on standardized tests over the years?*
2. ***Demographic data*** provide descriptive information on items such as enrollment, attendance, grade level, ethnicities, gender, home backgrounds, and language proficiency. Demographics are very important, because they describe the part of our educational system over which we have least control. Demographics help in the understanding of past trends, and help predict future trends. One year of demographic data can answer questions like, *How many students are enrolled in the school this year?* Over time, that same question can be rephrased as, *How has enrollment in the school changed?*
3. ***Perceptions data*** help us understand what students, parents, teachers and others think about the learning environment. Perceptions are important since people act based on what they believe and perceive. It's important to know how students, teachers, and parents think about school, so we know what is real and what is possible. Perceptions data can be gathered in a variety of ways, such as questionnaires, interviews, and observations. One year of perception data could answer the question, *What are current parent, student, or teacher perceptions of the learning environment?* Over time, the question we might want to answer is, *How have perceptions of the learning environment changed?*

## Why Schools Don't Use Data Well

### Lack of Cultural Emphasis

Within the school and district, data analysis is not deemed particularly important. District personnel are still working within antiquated job definitions that do not include helping schools with data as a priority. Likewise, many state education departments put little emphasis on data analysis, providing little incentive for districts and schools to change. Teachers and administrators don't see data collection as part of their jobs, perceiving it instead as a waste of time: After all, they might say, we're here every day, we already know what the problems are. There is no person or group of people specifically assigned to this task in a school.

### Lack of Training

Too few people at the school level are adequately trained to gather and analyze data, or to establish and maintain databases. There are not enough good examples of schools gathering, maintaining, and benefiting from the use of data. Teachers don't have access to adequate computer resources, including hardware and specialized data software, nor would they know how to use them.

### Fear

Many educators are afraid that data analysis will turn up something they do not want to see, such as evidence of their incompetence. They've seen test scores and other data analyses used to "beat up" other educators—a district may, for example, use student test scores as evidence that a particular school should be reconstituted.

4. ***School process data*** define programs, instructional strategies, and classroom practices. This is the measure that seems to be the hardest for teachers to describe, yet it is the one type of data that's most readily available to document. To collect school process data, educators must systematically examine their practice and student achievement, making sure both are aligned with specifically defined, desired student outcomes. One year of school process data can answer the question, *What are we doing to teach reading?* Looking over time, we can answer questions like, *How have we been teaching reading for the past five years?*

## Dual Measures

One category of data by itself gives useful information especially over time. Used together, however, different measures can provide much deeper insight. Crossing two measures, we begin to see a much more vivid picture of the school, allowing us to pose and answer questions such as:

- Do students who attend school every day get better grades? (Looking at *Demographics* and *Student Learning*)
- Do students with positive attitudes about school do better academically, as measured by teacher-assigned grades? (*Perceptions* and *Student Learning*)
- Did students who were enrolled in interactive math programs this year perform better on standardized achievement tests than those who took traditional math courses? (*Student Learning* and *School Processes*)
- What strategies do third-grade teachers use with students who are not native English speakers? (*Demographics* and *School Processes*)
- Is there a difference in how students enrolled in different programs perceive the learning environment? (*Perceptions* and *School Processes*)
- Is there a gender difference in students' perceptions of the learning environment? (*Perceptions* and *Demographics*)

## Three-Way Intersection

Examples of how three measures can intersect at the school level could include:

- Do students of different ethnicities perceive the learning environment differently, and do they score differently on standardized achievement tests in patterns consistent with these perceptions? (*Demographics* and *Perceptions* and *Student Learning*)
- Which program is making the biggest difference this year with respect to student achievement for at-risk students, and is there one group of students that is responding "better" to the processes? (*School Processes* and *Student Learning* and *Demographics*)
- Is there a difference in students' reports of what they like most about the school that is connected to whether they participate in extracurricular activities? Do these students have higher grade point averages than students who do not participate in extracurricular activities? (*Perceptions* and *Student Learning* and *School Processes*)
- What instructional process did non-English speaking students respond to best in their all-English classrooms this year? (*Perceptions* and *Demographics* and *School Processes*)

## Intersection of Four Measures

When educators examine data from all four categories over time, they are able to pose and answer questions that will predict if their actions, processes, and programs will meet the needs of all students. An example of a question that addresses demographics, perceptions, school processes, and student learning follows:

> *Are there differences in achievement scores for eighth-grade females and males who report that they like school, by type of program, and grade level in which they are enrolled?*

## Addressing a Problem

Here is an example of how a school has used multi-category data analysis to define and address a problem: The author has worked as a consultant with a large elementary school in Northern California, where 42% of students are members of minority groups, 40% arrive speaking languages other than English, and 36% receive free or reduced-price lunch.

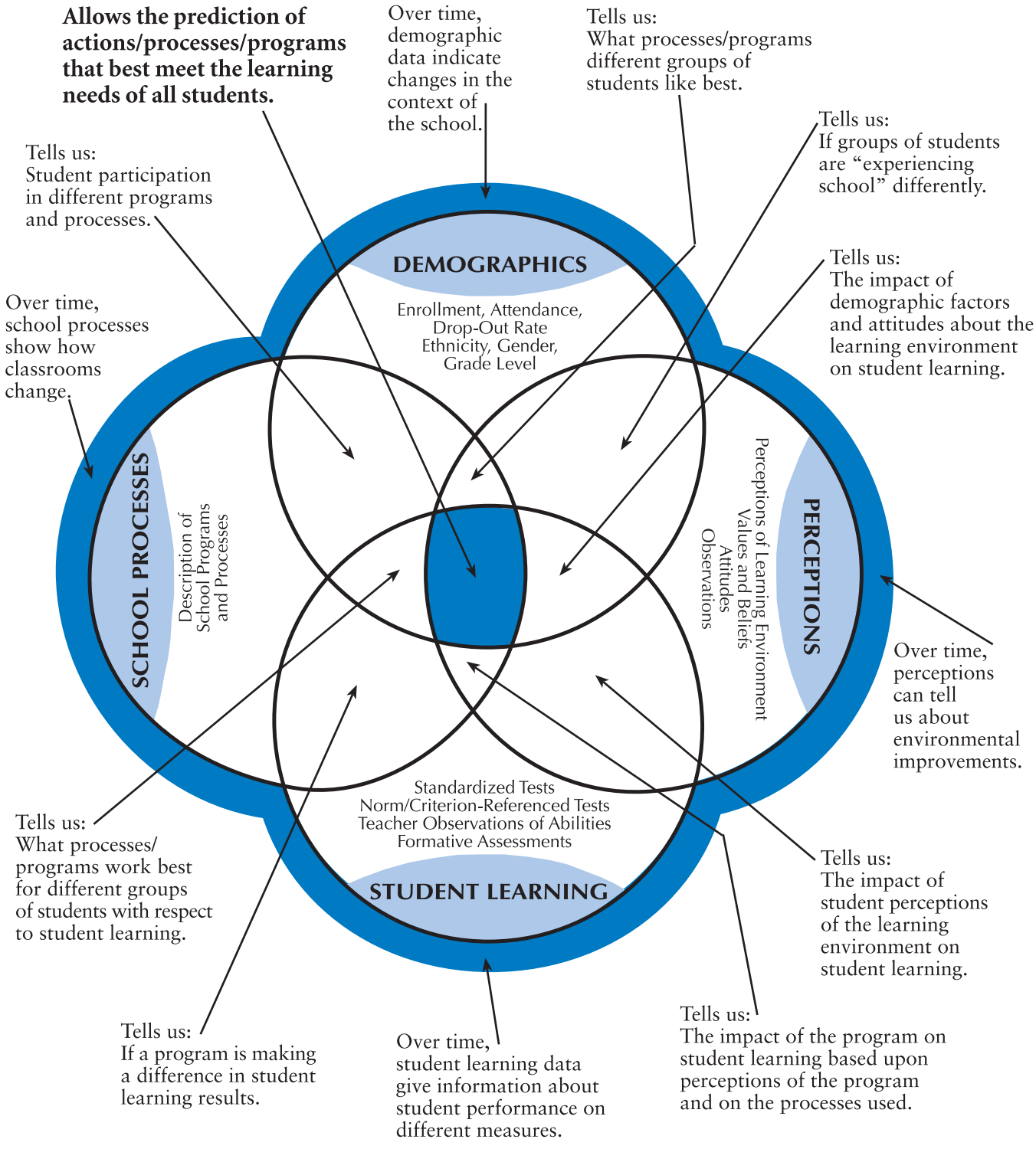
> Three years ago the district superintendent announced that all students should be reading on grade level by third grade.
>
> The school began by looking at student scores on standardized tests, and the number and percentage of students not meeting the grade-level standards. Next they created a two-measure analysis, breaking down the test scores by demographic qualities—including gender, ethnicity, and language fluency—to see who the low-performing students were.
>
> The school then added a third measure, breaking down these results by which academic program the students were in. At this point they were able to see a simple but powerful truth: students who were not fluent in English were having the greatest trouble reading on grade level, and they weren't responding well to the school's reading intervention program. Based on these findings, teachers spent extra time reading with these low-achieving students, to identify their specific reading problems.
>
> Teachers soon realized that these students did not adequately understand the meaning of many words, even though they were completing their assigned work in reading. The teachers decided newly arriving students should go first to classrooms where they would receive more work on word concept skills, and then into the reading intervention program. The teachers also sought professional development training on how to provide individualized reading instruction within groups of students.
>
> This change in instruction has yielded results: Reading scores for non-English speakers improved immediately and have continued to improve. In fact, by the second year of the change, second graders with limited English skills were scoring better on standardized reading tests than third graders in this category had scored in the past.
>
> Non-English speaking students still don't score as well on the tests as native English speakers, but the gap has narrowed, and their test scores continue to improve. What's more, teachers at the school are far more familiar with using data—many have become adept at using new database software purchased by the district, which lets them perform data analyses more easily—and will continue to examine student achievement systematically as they seek further improvement.

## Conclusion

Educators don't need advanced degrees in statistics to begin gathering and using data in ways that will benefit schools and children. Teachers and school-level administrators can begin by asking questions about student achievement and teaching practice, and gathering many kinds of data so they can answer those questions in a systematic way.

While the deepest insight into schools and students can be gained by crossing different measures, to gain a more well-rounded picture of the school and its challenges, even a relatively simple analysis of school data can help teachers shape their practice more effectively.

# Multiple Measures of Data




*Note:* From *Response to Intervention (RtI) and Continuous School Improvement (CSI): Using Data, Vision, and Leadership to Design, Implement, and Evaluate a Schoolwide Prevention System* (p.21), by Victoria L. Bernhardt and Connie L. Hébert, 2011, New York, NY: Routledge. © Education for the Future, Chico, CA (*http://eff.csuchico.edu*). Reprinted with permission.

# About the Author

Victoria L. Bernhardt, Ph.D., is Executive Director of the *Education for the Future Initiative,* a not-for-profit organization whose mission is to build the capacity of all learning organizations at all levels to gather, analyze, and use data to continuously improve learning for all students. She is also a Professor (currently on leave) in the College of Communication and Education, at California State University, Chico. Dr. Bernhardt is the author, or co-author, of numerous books, including:

- *Data Analysis for Continuous School Improvement,* Third Edition, provides an updated continuous school improvement framework, explains the components and structures for using schoolwide data for the purpose of continuous school improvement, and organizes the information for easy retrieval and application.
- *Response to Intervention (RtI) and Continuous School Improvement (CSI): Using Data, Vision, and Leadership to Design, Implement, and Evaluate a Schoolwide Prevention System* (2011) (with Connie L. Hébert) describes how to get all staff working together to design, implement, and evaluate a schoolwide prevention system, and shows specific examples of how to do this.
- *From Questions to Actions: Using Questionnaire Data for Continuous School Improvement* (2009) (with Bradley J. Geise) describes how to create, administer, analyze, and use questionnaires as a tool to improve teaching strategies, programs, and learning organizations.
- *Data, Data Everywhere: Bringing All the Data Together for Continuous School Improvement* (2009) is an easy-to-read primer that is conversational and accessible. This newest book will help your faculty and staff become comfortable with using data to drive a continuous school improvement process.
- *Translating Data into Information to Improve Teaching and Learning* (2007) helps educators think through the selection of meaningful data elements and effective data tools and strengthens their understanding of how to increase the quality of data and data reports at each educational level.
- A four-book collection of using data to improve student learning—*Using Data to Improve Student Learning in Elementary Schools (2003); Using Data to Improve Student Learning in Middle Schools (2004); Using Data to Improve Student Learning in High Schools (2005);* and *Using Data to Improve Student Learning in School Districts (2006)*. Each book shows real analyses focused on one education organizational level and provides templates on an accompanying CD-Rom for leaders to use for gathering, graphing, and analyzing data in their own learning organizations.
- *Data Analysis for Continuous School Improvement* (First Edition, 1998; Second Edition, 2004) helps learning organizations use data to determine where they are, where they want to be, and how to get there—sensibly, painlessly, and effectively.
- *The School Portfolio Toolkit: A Planning, Implementation, and Evaluation Guide for Continuous School Improvement,* and CD-Rom (2002), is a compilation of over 500 examples, suggestions, activities, tools, strategies, and templates for producing school portfolios that will lead to continuous school improvement.
- *The School Portfolio: A Comprehensive Framework for School Improvement* (First Edition, 1994; Second Edition, 1999). This first book by the author assists schools with clarifying the purpose and vision of their learning organizations as they develop their school portfolios.

Dr. Bernhardt is passionate about her mission of helping all educators continuously improve student learning in their classrooms, their schools, their districts, and states by gathering, analyzing, and using actual data—as opposed to using hunches and "gut-level" feelings. She has made numerous presentations at professional meetings and conducts workshops on the school portfolio, data analysis, data warehousing, and school improvement at local, state, regional, national, and international levels.

Dr. Bernhardt can be reached at:

Victoria L. Bernhardt
Executive Director, *Education for the Future Initiative*
400 West First Street, Chico, CA 95929-0230
Tel: 530-898-4482 — Fax: 530-898-4484
e-mail: vbernhardt@csuchico.edu
website: *http://eff.csuchico.edu*