White Paper

Making The Data-Driven District Work:

Meeting the Information Requirements of Plan-Do-Study-Act Cycles

Introduction:
Iredell-Statesville Schools

Continuous cycles of student assessment, intervention and re-assessment have proven effective in many schools that had previously been defined as "failing" under the No Child Left Behind Act (NCLB). In particular, the use of Plan-Do-Study-Act (PDSA) cycles—small-scale tests of planned actions followed by assessment and improvement of the initial plan—are gaining popularity in public school districts. Constant, rigorous application of the PDSA model can help educators rapidly recognize and respond to the changing instructional needs of students, resulting in improved student outcomes.

The PDSA approach need not be limited to issues strictly related to assessment. Attendance, discipline, graduation rates and professional development are all factors in school performance that may be improved through rigorous measurement and analysis.

However, the drive to constantly measure school performance and test the effectiveness of planned procedures creates the need for a continual accurate stream of "just-in-time" data. Moreover, this data must be presented to teachers, administrators and support staff in a way that is understandable and aligned to the district's school improvement goals. Providing the right information in the right format at the right time has been a formidable hurdle for many districts attempting to implement data-intensive improvement models.

This white paper will present Iredell-Statesville (NC) Schools as a case study of the data needs created by a systemic and systematic PDSA approach. It will also discuss the solutions the district adopted to meet its robust data demands—TetraData® Warehouse, TetraData Analyzer™ and TetraData DASH™ from Follett Software Company.

Contents

Systemic Quality and the Need for Data

Even prior to the passage of NCLB, there was focused discussion regarding the application of Total Quality Management techniques to the field of K-12 education. Central to this discussion was the notion of continual process improvement, whereby student performance would be measured and those measurements would be utilized to fine-tune instruction. Outcomes would achieve the goal of improved student learning, particularly among minority, disadvantaged and non-English speaking students. Indeed, the concept of using data to improve school effectiveness is explicitly built into several key aspects of NCLB.

One widespread approach to continuous improvement is the Plan-Do-Study-Act model, or PDSA. As applied to education, PDSA is a systematic, data driven seven-step process:

- **Define the System**—The specific system in need of improvement is defined, as are the justifications for modifying the system.

- **Assess the Situation**—Baseline data documenting current performance levels is identified and analyzed to determine the magnitude of the problem.

- **Analyze the Cause**—Staff and administrators review baseline data to determine the root cause of the current results. In addition, best practice research is reviewed to identify system improvement mechanisms.

- **Implement Improvement Theory**—An improvement theory based on best practices is developed and effectuated. Part of the intervention plan includes identifying which data will be collected and analyzed to measure success or failure.

- **Study the Results**—Once the improvement plan has been implemented, new data is compared to the baseline data to see whether the improvement plan has positively impacted the system in question.

- **Standardize Improvements**—If the intervention has indeed been successful, staff look for ways to incorporate the improvement mechanism into the system and make it part of day-to-day practice.

- **Plan for Continuous Improvement**—Lastly, provisions are made to sustain the improvement and identify further areas for improvement.

The PDSA model can be used on a number of levels, from targeting a specific skill or knowledge goal in a single classroom to developing a strategic improvement plan for an entire district. Accordingly, the speed at which a PDSA cycle is completed can range from years to days, or even hours.

This systems approach may also be applied to other aspects of performance for which districts are held accountable. Districts may use the PDSA approach to increase the effectiveness of professional development, increase graduation rates, reconfigure classes or reduce the cost of textbooks.

As this summary makes clear, data are critical to success of the PDSA process. Measurable information is needed at every step, from identifying areas of improvement to evaluating the success of intervention. The faster the cycle runs, the more quickly data must be gathered and analyzed. Herein lays the problem. Many school administrators eager to implement the PDSA model find themselves stymied in their attempts to gather and distribute data needed to make the process work:

- Student assessment is often lacking or occurs too infrequently to impact instruction.
- Assessments and other metrics are not aligned to district goals.
- What information the district has generated is typically scattered among dozens of discrete databases.
- Interrelating two kinds of data, i.e., comparing student formative assessments with demographic information, may require manual intervention and hours if not weeks of staff time.

Dr. Terry Holliday, Superintendent for Iredell-Statesville Schools (I-SS) in Statesville, NC, neatly summarizes the problems districts face when implementing a rigorous, data-driven process: "Every school superintendent, school principal and classroom teacher realizes the importance of data-driven decision making. The problem is having the data when you need the data and having the data in a format that is understandable."

Iredell-Statesville's Approach

I-SS is one of the fastest growing school districts in North Carolina, serving more than 21,000 students in a region that encompasses affluent, rural and urban populations. The district includes 19 elementary schools, seven middle schools and five high schools. In addition, there are two early college high schools and two nontraditional schools. More than one third of the students in the district qualify for free or reduced lunch and nearly 1,200 students are classified as having limited English proficiency.

Prior to 2001, I-SS showed decidedly lackluster student performance, ranking well below state average in many academic indicators. Since 2002, I-SS has been building a systems approach to teaching and learning, utilizing the PDSA model for continuous improvement.

The I-SS instructional model focuses on raising student achievement and closing achievement gaps between different types of students. Known as the "Learning Triangle," this model emphasizes integration of instruction and assessment in conjunction with the collective knowledge, competencies and skills of the employees who make up the district's Professional Learning Communities (PLC). The PLC are teams of educators who meet frequently to review performance data, to plan improvements based on data and to discuss best practices. Serving as a resource for the PLC are Instructional Facilitators. These "data experts" drive the PDSA process for the school.

For each PDSA cycle, educators at I-SS must answer five critical questions:

1. What do students need to learn?
2. How will they learn it?
3. How will we know if they've learned it?
4. What will we do if they don't learn it?
5. What will we do if they already know it?

To gather the facts needed to answer these questions, staff administers a variety of assessments that are aligned to the district's student achievement goals. The PLC must complete planning templates specifying what data is being used to justify a particular intervention and what data will be used to evaluate success.

Not all of the PDSA process at I-SS stem from assessment data. For instance, principals are expected to keep close tabs on indicators concerning discipline and suspension, initiating the PDSA process to reduce those figures if indicated. The entire district's operational and support services are managed with that same systems approach.

Data Tools Support Continuous Improvement

To provide the constant data flow needed to make the I-SS systemic improvement plan work, the district recently adopted a set of data storage and analytics tools from Follett Software Company. First among these was a TetraData Warehouse, a strategic data platform that integrates and stores data from administrative and educational systems. This enables comprehensive and customized data analysis and reporting. I-SS has a myriad of data that must be communicated rapidly to teachers, principals and administrators. The district's warehouse combines student demographic information, state test scores, district quarterly assessments, staff demographics, certification levels, and more.

Serving as the visual "front end" for this warehouse is TetraData DASH, a K-12 education indicator dashboard and data portal that helps districts communicate and maintain vision alignment. DASH gives stakeholders from the school board to the classroom a quick, easy way to monitor and respond to district performance, turning numbers into pictures that are readable at a glance.

DASH displays key Education Performance Indicators as defined by the National Center for Education Statistics. It also can display indicators defined by the district itself. Colorful "gauges" on the district's DASH home page give stakeholders the ability to monitor district performance, as well as factors affecting achievement, all from a single screen, with drill-down into more specific details down to the student level. Depending on the data integrated in the warehouse, DASH can show staff and administrators how schools are doing, what the environment is like, how qualified teachers are and how students are progressing.

DASH contains a set of standard reports essential to high performing school districts. These reports are available for every school, grade, teacher and class. DASH reports include the following:

- Demographics—school, grade level, class, teacher
- Achievement history
- At risk analysis
- Enrollment
- Test history
- Progress
- Schedule
- Attendance

Using DASH, district staff can now see custom-designed reports interrelating any or all of that data simply with one quick click. DASH allows the district to quickly communicate the results of their quarterly Predictive Assessment. Teachers use these data to determine how to adjust teaching strategies so that students will be successful.

All systems at I-SS are subject to the same data-driven approach. This helps account for the fact that the district maintains one of the lowest per-pupil expenditure rates in the state. The use of TetraData tools is critical to the I-SS approach. For instance, the analysis of bus discipline data provided the impetus for I-SS to change its plan for handling this process. As a result, principals cut bus referrals by over 50%, sharply reducing the amount of time spent on discipline and allowing for more time spent on instructional issues.

The TetraData solution saves tremendous amounts of time by alleviating the need to compile reports manually. A typical report showing state test scores disaggregated by the NCLB subgroups would usually take district staff six to eight hours to prepare for a single school. Using DASH, the same report can now be generated from the district's data in just five minutes.

Using DASH, teachers can quickly gather reports from monthly and quarterly formative assessments and have them in time for meetings with Professional Learning Communities to assess previous interventions and plan new ones. Principals are also able to quickly obtain the data indicators they need

to pursue school-wide PDSA cycles, evaluate their staff and prepare for their own quarterly evaluation meetings with the superintendent.

Improved Student Performance

By 2007, I-SS ranked near the top of North Carolina's 115 school districts by several measures, a dramatic improvement over its standing just four years prior. During that period, I-SS went from 75th to 15th in state reading assessment. At the same time, student SAT scores improved from 57th in the state to 10th.

State Recognition

The district's success in implementing a data-driven systems approach has positioned I-SS as an education leader in the state. The North Carolina Department of Public Instruction recommends I-SS as a provider of training and support for the North Carolina principal evaluation instrument, which is part of the 21st Century evaluation standards recently adopted by the State Board of Education. Several North Carolina schools and districts that have not yet met AYP are turning to I-SS for principal and support staff professional development. I-SS is also developing a Leadership Academy aimed at preparing school leaders at every level—district, school and classroom—to ensure broad and effective dissemination of the district's data driven philosophy.

National Recognition

I-SS has also received national recognition for its rigorous application of the PDSA process. The district ranked among the top six percent of all 2007 Baldrige National Quality Program applicants and was the only education organization to receive a Baldrige National Quality Award site visit in that year. The district's systems approach was a major focus on the 2008 Education Leadership Summit for Superintendents, sponsored by the American Society for Quality.

Summary

The results produced by Iredell-Statesville Schools illustrate the effectiveness of the Plan-Do-Study-Act approach to school improvement. They also illustrate the enormous demands that this approach can place on a district's data infrastructure. By adopting a data warehouse specifically designed for the education setting matched with an intuitive front end that provides teachers, staff and administrators with the specific information they need to complete the PDSA cycle, I-SS has been able to drive school improvement and become a national leader in the field of data-driven education.

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