

Better Performing Schools Through Better Information Tools for Teachers and Students:

*The Case for Integrating Data Systems and Applying the
Results to School Improvement*

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Note: This paper was prepared with support from Pinnacle/GlobalScholar but is otherwise the responsibility of Interactive, Inc. All generalizations and opinions are those of the author.

Research indicates that applying data to school leadership and classroom instruction can improve student achievement and help teachers be more effective. But, most schools have more data than their teachers or administrators use. The path out of that dilemma is lit by digital information management tools. This paper outlines the components of school-based learning management systems, the empirical support for their use and the criteria that school leaders can apply in selecting and deploying an LMS.

2.0 School data: The promise and the problem

GlobalScholar's *Pinnacle Suite* is a single, easy-to-use web-enabled system that merges the information that schools and teachers use all the time—student information, test information and curriculum information—into practice-oriented, results-oriented reports.

Not many schools or districts have that practical capability. For example, “Response to Intervention” (RTI) is a recent initiative in which student data is supposed to be used to change teacher performance. But, in a recent study of how districts were tracking student performance and RtI outcomes, only half the responding districts reported using software (Spectrum K12 & Council of Administrators of Special Education [CASE], 2008)!

Do you...

- * Struggle with inconsistent information from different data systems?
- * Have trouble sharing data among curriculum, assessment, special education and human resources?
- * Worry that your schools have more data capability than the teachers are using?
- * Get lots of questions from your board, your schools and the media that could be answered with better information?
- * Have problems maintaining your legacy systems?
- * Wish you had insisted on an integrated, multi-function system 10 years ago?

If so, you are worrying about the part of the iceberg that sinks the ship—the part that is below the waterline but nonetheless dangerous. The problems come from the lack of consistency among the sources of data and the way they are technically managed—and both can be improved. This white paper discusses the opportunities to improve schooling with data.

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3.0 School improvement from school data

3,500 of our nation's schools are in the most drastic "restructuring" phase of failing to make Adequate Yearly Progress (AYP)... 40% of those schools have done nothing in response.

Students in Newark, New Jersey have made massive gains in student achievement, surpassing the statewide average in almost every category. Question: How? Answer: Interim assessments, clearly defined standards and data-driven instruction.

It is not easy to insure that all children learn. There are 3500 schools in the most drastic "restructuring" phase of failing to make *Adequate Yearly Progress* (Scott, 2008), although a General Accounting Office study shows that 40% of those schools have **done nothing in response** (Tomsho, 2008)! Making progress requires estimating AYP midway through the school year in order to target help toward groups and individuals (Kitchens, 2005). Fulton County, Georgia enrolls 75,000 students and attributes the fact that every one of its elementary schools made their AYP goals to the county's data-driven decision making initiative (CoSN, 2008).

The enrollment of two schools in Newark, New Jersey is 85% Black and 90% eligible for free-and-reduced meals. Between 2003 and 2007, only seven percent of the students in one of the schools passed the state math test, but four years later "...each school made massive gains in student achievement, outstripping the district average by at least 30 points on both math and English/language arts assessments and surpassing the statewide average in almost every category (Bambrick-Santoyo)." Question: How? Answer: Interim assessments, clearly defined standards and data-driven instruction.

The Broad Foundation gives an annual prize for the most-improved urban system. In 2004, each one of the top five candidates had higher achievement scores than other similar districts, and each was using interim assessment data to drive improvement in classroom instruction. In an article entitled, "Not Just a Necessary Evil: When Teachers Embrace Standards and Testing" *Education Week* reported, "When teachers see measurable success, they feel good." And, "Teachers thrive when... they have immediate access to data about their students' progress. Some of the teachers who were the loudest resisters have come back and said, 'Hey, this thing works.'"

4.0 Learning Management Systems

State-of-the-art student information systems can satisfy the appetite of modern school improvement for information and, beyond that, for information made meaningful.

Learning management systems have four pillars: (1) student information, (2) curriculum information, (3) test information, and (4) analytics to connect those data to classroom and school improvement. In this section we outline the components of each part and the student and teacher results associated with using Learning Management System (LMS) components.

4.1 Student information systems

Every school has a student information system, although their capability varies widely. Older systems, focused solely on capturing grades, schedules and attendance are being replaced with more robust, full-featured systems that can satisfy the appetite of modern school improvement for information and, beyond that, for information made meaningful.

What To Look For In A Learning Management System: *Test Information*

- Unique student ID numbers
- Class schedules and master schedules
- Pre-instruction, learning diagnostics
- Discipline, guidance and counseling
- Promotion, advancement, diploma status
- Special program eligibility (G&T, ELL, special ed, etc.)
- Prescription for teaching and learning based on diagnoses
- Authentic task, portfolio and/or project-based information
- Integration ability across vendors and systems over time
- Interim, formative assessments and other forms of progress reporting
- Course grades (unit, semester and EOY), portfolios, EOY high-stakes tests
- Attendance and absence linked to average daily attendance reports for financial aid
- Grade publishing
- Health services
- Class web pages
- SIF compliant

4.2 Curriculum information

An analysis of unusually effective schools in Ohio linked school achievement to curriculum mapping. The schools "...developed yearlong curriculum maps for each subject and each grade level that sequence the topics, process, skills and materials needed to help every student master the performance indicators by the end of each school year." Between the beginning and end of the analysis period, "...the percentage of students passing the (Ohio) test increased in 36 of the 40 subtests at grades 4 and 6." (March and Peters, January 2002.)

Curriculum information is more than the names of the required textbooks. In the 1970s, we discovered the "implementation problem" in schools. Regardless of federal or state or local directives, teachers—behind a couple of million closed classroom doors—were determining how much of what to teach to whom. The New York State Education Department requires that all of the AYP-deficient schools in the state undergo an "audit of curriculum," which is similar to "curriculum mapping" often associated with the professional organization, Phi Delta Kappa.

Curriculum mapping looks for the gaps between what is written, what is taught, and what is tested. It follows the logic of "opportunity to learn," i.e., that students should be tested (only) on things that teachers have had a chance to teach and thus, that students have had a chance to learn. A learning management system should support schools in assembling data to assess the following components.

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Unless we can harness technology to practical classroom needs, the latest school improvement visions like Response-to-Intervention will also die a rhetorical death. Data-Driven Decision-Making (D3M) gets more practical as each generation of technology makes data collection and analysis faster and easier.

Researchers Black and Wiliam note that there has to be a “new way to enhance feedback between those taught and the teacher, ways that will require significant changes in classroom practice. . . . For assessment to function formatively, the results have to be used to adjust teaching and learning.”

The Components of Curriculum Mapping

The Written Curriculum

1. District and school improvement plans
2. Scope and sequence, syllabi, grade and course curriculum guides, pacing guides, textbook series
3. Special populations and special programs
4. (Digital) curriculum documentation
5. Curriculum prescription, preferred instructional strategies

The Taught Curriculum

6. Instruction in classrooms and across the school year
7. Curriculum coordination vertically and horizontally
8. Teaching and learning delivery systems (e.g., IWB's, handhelds, laptops, etc.)

The Tested Curriculum

9. Alignment to local and state standards and objectives
10. Formative, interim assessment data collection and use
11. Gradebook information with quizzes, unit tests, teacher-made, criterion-referenced tests
12. End-of-year, norm-referenced, high stakes tests
13. Evaluation and supervision of teaching to increase student performance

Most curriculum mapping projects document that districts and schools know what they are supposed to be teaching (the written curriculum), and they know what they measure in students (the tested curriculum). They are much less clear about what, exactly, is happening in the classroom.

4.3 Assessment

Things have changed since “individualizing instruction” meant teachers filling notebooks with rows and rows of daily entries about the progress of 22 third graders. As long as “individualizing instruction” was that labor-intensive, it was rhetoric not reality. And, unless we can harness technology to practical classroom needs, the latest school improvement visions like Response-to-Intervention will also die a rhetorical death. Data-Driven Decision-Making (D3M) gets more practical as each generation of technology makes data collection and analysis faster and easier.

The ability of interim and formative assessment to power better student achievement is now well documented. For example, Black and Wiliam (1998) found significant gains for all learners across school subjects. There were improvements for all ability levels, but especially for typically lower achieving groups (Black & Wiliam, 1998, 2002).

Rodriguez compared the achievement of groups of otherwise similar students who did and did not have “embedded performance assessments” in their classrooms. “In classrooms with embedded performance assessment the mean change scores were 27 and 20 points for reading and math, respectively and

are substantially greater than those of the comparison group which gained nothing in reading and 6 points in math (Rodriguez, 2008).”

Black and Wiliam reported on their analysis of 20 rigorous studies of the relation between assessment and achievement (Black & Wiliam, 1998). “Typical effect sizes of the formative assessment experiments were between 0.4 and 0.7. ...An effect size of 0.4 would mean that the average pupil involved in an innovation would record the same achievement as a pupil in the top 35% of those not so involved. An effect size gain of 0.7 in the recent international comparative studies in mathematics would have raised the score of a nation in the middle of the pack of 441 countries (e.g., the U.S.) to one of the top five.”

Black and Wiliam continue that, for that kind of improvement to be widely available, there has to be a “...new way to enhance feedback between those taught and the teacher, ways that will require significant changes in classroom practice. ...For assessment to function formatively, the results have to be used to adjust teaching and learning...”

For example, Marzano compares the gains to be expected over a 15 week period with no assessments—no gain—and 5 assessments—a 20 percentile point gain (Marzano, 2006). The contribution from formative (frequent) assessment is to enable teachers to adapt what they do to what students have learned and should learn next (Chappuis & Chappuis, 2007). The gains are not surprising; both teachers and parents have always wanted to tune instruction to particular learning needs and learning styles. And tailored, customized alternative learning pathways are critical to narrowing achievement gaps (Duffy & Kear, 2007). School administrators recognize that mandates and best practice both point in the direction of more frequent assessment (AASA Staff Reports, 2006).

But, teachers are not and should not be clerks. They lack the time and expertise to build assessments for every subject, every week and to record and analyze those micro-test results. Most teachers do not test any more than they have to. Thus, while interim assessment helps students, most teachers do not use it. And that is even more true at the upper grades than the lower grades even though the differences among older students have become more divergent.

4.4 Analytics

Data-driven instruction is a tired term for an essential practice. Data-driven instruction and response-to-intervention are modern versions of Benjamin Bloom’s mastery learning counsel of almost 40 years ago (Bloom, Hastings, & Madaus, 1971). The power of digital technology makes Bloom more than a counsel of perfection. In a well-designed, teacher-friendly learning management assessment, analysis and reporting system, teachers can quickly examine data, understand the implications and adapt their instruction (Cantor, 2006). Or, as they say in Texas, ‘It’s not enough to weigh the cattle, you’ve got to feed them.’

The rest of the work happens after assessment. Actionable data is key. Thomas Guskey says, “...(F)ormative assessments alone do little to improve student learning or teaching quality. What really counts is what happens after the assessments.” (Guskey, 2008) Chrys Dougherty of the National Center for Educational Accountability said, “There’s a missing step in between publishing

Both teachers and parents have always wanted to tune instruction to particular learning needs and learning styles. And tailored, customized alternative learning pathways are critical to narrowing achievement gaps.

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all the numbers, and organizing them into something that clearly tells you what needs to be done, where the problems are, and where the successes are (Olson, 2003, Massell, 2001, Protheroe 2001, AASA 2004).”

School administrators are always the middle part of communications. Somebody needs to know something and the answers are somewhere else in the organization. Getting the right information—now—makes a difference. For example:

Ten Questions District And School Administrators Want To Be Able To Answer From Data

1. I think our elementary school Math series needs replacing. How can I know for sure?
2. We are getting a lot of complaints from Hispanic parents. How can I tell if their children’s achievement differs from others?
3. The 2 schools in the high property wealth end of town haven’t tried anything new for 11 years and point to high test scores as evidence of their success. Can I use data to help them do better?
4. Can I predict where my AYP schools will be next year?¹
5. I think I’ve got a lot of “kids on the bubble”. They are on the borderline between failing and doing better. How can I tell how to help them?
6. We have 4 years of test score data—one year with no technology and three years with a 4:1 and 5:1 student computer ratio. Is technology working?
7. Is there a relation between number of sports teams a student is on and achievement?
8. What are the early warning signs (from the data) of dropping out of school?
9. Does achievement vary by teacher salary or credentials?
10. How do all of the above vary when/if the data are disaggregated by race, FARM, language of origin, etc., etc.?

The efficiency mantra is “collect the data once and use them many times, by many people, for many purposes (Ligon, n.d.)” Analytics ought also to support schools and districts in reporting up. Those data eventually reach the US Department of Education which, since 2003, has been developing its *Performance Based Data Management Initiative* (PBDMI) and the related *Education Data Exchange Network* (EDEN).

What To Look For In A Learning Management System: *Analyzing, Reporting and Connecting to School Improvement*

- Reporting standards to satisfy superordinate reporting requirements (e.g., Federal and State reports)
- Multi-year trend analysis, year-over-year analyses
- Data aggregation and dis-aggregation especially by learner background descriptive characteristics
- Graphic representation of data
- Access and security protected
- Export capability in various formats (e.g., Excel, SPSS, etc.)
- Connection to actionable, practical school improvement variables

5.0 Taking stock of information management for teaching and learning

No Child Left Behind references “evidence-based decisions” and “scientifically based research” 111 times. The phrase “In God we trust; all others bring data” captures one long-term effect that NCLB will have on schools (Mann & Shakeshaft, 2003). Integrated, seamless learning management systems support school and classroom improvement. The practical context for that good news is the still incremental, still fragmented methods that have been used to build our separate, often incompatible and sometimes obsolete systems. The words that describe school data problems are telling—“silos,” “fiefdoms,” “incompatibility” and “unreliability.” But what shape is your district in? If you answer “no” to half these items about how easy-to-use is your district’s data system, then you need help.

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Ten Questions to Evaluate the Adequacy of Your District’s Data

Does my district have an automated database system for...

1. collecting student background information?
2. knowing which courses students take?
3. linking units within courses to state standards and objectives?
4. diagnosing student interim, formative learning needs?
5. diagnosing student summative, high-stakes, end-of-year performance for next year?
6. connecting those diagnosed learning needs to teaching actions?
7. analyzing, aggregating and disaggregating achievement data by student descriptive characteristics?
8. determining program eligibility?
9. keeping enrollment, promotion, graduation and dropout data?
10. tracking those measures over time?

6.0 About GlobalScholar's Pinnacle Solutions

Pinnacle has brought together all the previously separated pieces that school people need for data-driven decision-making—especially a student information system integrated with a curriculum management system that is aligned, online or offline, to state and local performance standards.

The Pinnacle Suite's multi-function, end-to-end capabilities turn data into action.

Data sits. Information prompts. GlobalScholar's *Pinnacle Suite* gradebook and analytics capabilities turn data into action. Pinnacle has been supporting 1,000 districts for 22 years including with the first Windows-based gradebook and the first Internet-based access for parents to a gradebook. The Association for Supervision and Curriculum Development (ASCD) has 115,000 members nationwide and is the premier organization focused on curriculum improvement. ASCD and Dr. Robert Marzano recommend Pinnacle's standards-based gradebook.

Pinnacle is neutral about the sources of curriculum or test data: the system accommodates 120 different student information systems. It has brought together all the previously separated pieces that school people need for data-driven decision-making—especially a student information system integrated with a curriculum management system and aligned, online or offline, to state and local performance standards.

And Pinnacle adds curriculum resources to actionable data. The Pinnacle Suite's "Learning Links" connects students and their teachers to curriculum content, test prep and practice material, and especially to free after-hours online tutoring help with homework available to students anytime, anywhere. Pinnacle permits educators, students and parents to use information and to create and access instructional resources over the Web.

GlobalScholar's Pinnacle Suite has multi-function, end-to-end capability—student information, testing, gradebooks, curriculum, communications, transcripts, etc. and for all audiences, bottom-to-top—parents, students, teachers, administrators and school boards. School districts are increasingly requiring single, integrated SIS's, gradebooks, assessment and curriculum sources that come with analytic capability, i.e., they point to instruction with graphical clarity. When teachers have to make decisions about what a child should learn next or where they should be placed, they are in a 'better never than late' world. They have to have information that is timely and accurate. For that reason, districts and schools join teachers in looking for a data solution that is easy to implement, compatible (for example, it will map backwards) and with a realistic total cost of maintenance, updating and ownership.

Pinnacle can serve as an alternative to a conventional data warehouse often at one-third the initial cost (Levinson & Florio, 2007) and a fraction of the years-long schedule that is often necessary to create a conventional data warehouse.

Because it is easy to use and connected to teacher needs, the Pinnacle system defies the ordinary "90/10" rule of software—that 90% of the users access 10% of the functionality. And, in an internal study, the teachers' use of Pinnacle saved 10 days per year that would otherwise have been taken up with paperwork. Not only is that time that can be re-invested in instruction, it saves the district about \$200 per teacher day (the average salary). Those teacher economies combined with the savings in initiating, supporting and maintaining Pinnacle resulted in an estimated total savings of \$46 million for a district with 20,000 teachers.

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About Interactive, Inc.

Interactive, Inc. is listed on the US Department of Education's Institute of Education Science 'gold standard' Registry of Outcome Evaluators and was one of the Department's contractors for a longitudinal, statewide documentation of the effects of technology on student achievement and school improvement. The firm has completed 200+ evaluation research projects for public and private clients.

The firm's founder and managing director is Dale Mann, Ph.D., Professor Emeritus at Columbia University (Teachers College and the School for International & Public Affairs). Since 1985, he has concentrated in developing and evaluating the gains from e-learning, a field in which Mr. Mann has been identified as one of America's ten most influential leaders.