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Creating and Implementing High-Quality Data Systems at the State Level

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The American Recovery and Reinvestment Act of 2009 (ARRA) serves in part, in the area of education, to address the following four specific areas:

1. Making progress toward rigorous college- and career-ready standards and high-quality assessments that are valid and reliable for all students, including English language learners and students with disabilities;
2. Establishing preK to college and career data systems that track progress and foster continuous improvement;
3. Making improvements in teacher effectiveness and in the equitable distribution of qualified teachers for all students, particularly students who are most in need; and
4. Providing intensive support and effective interventions for the lowest-performing schools.

As with the second focus area, which is highlighted in this article, the establishment of data systems is imperative, and ARRA includes funding for implementation efforts. Doing so will capture the continuum of information ranging from prior to entry into school throughout the college and career levels for individuals. Creating such data systems will allow pertinent information about students and teachers to be maintained at all levels and will serve to advise the academic plan for all persons. Such a system will provide more than just the warehousing of these data. Adults who are responsible for educating students and preparing them for post-secondary education and careers will be able to access the information necessary to pair resources and instruction with the specific needs of individual students at all points along the pre- and post-school-level continuum.

To echo the ARRA front taken relative to calling for the establishment of longitudinal data systems, the Race to the Top (RT3) funding competition also called for similar initiatives. In fact, the Data Quality Campaign (DQC), upon review of the RT3 proposal, suggested upgrading the language of "expansion of statewide data systems" from invitational to a competitive priority. DQC deemed that it would be difficult to develop a credible proposal for RT3 without a comprehensive data system that is fully integrated into all reform efforts. This suggestion was adopted and included in the final requirements for RT3 applications submitted by states opting to participate in the competition.

Both ARRA and RT3 call for data systems that will be established to include the following 10 essential elements as set forth by DQC (2010):

1. Statewide student identifier
2. Student-level enrollment data
3. Student-level test data
4. Information on untested students
5. Statewide teacher identifier
6. Student-level course-completion/transcript data
7. Student-level SAT, ACT, and Advanced Placement data
8. Student-level graduation and dropout data
9. Ability to match student-level P–12 and higher education data
10. State data audit system

DQC also indicated that these elements are to be collected and shared in a manner that protects privacy of information while providing valid data to aid in tailoring instruction to meet students' needs and identifying initiatives that show evidence of improving student achievement.

Each year, DQC surveys all 50 states to determine state progress toward implementing the 10 essential elements of a longitudinal data system. Recent survey results indicate that 12 states in the nation have longitudinal data systems that include all 10 elements. Those states are Arkansas, Delaware, Florida, Kentucky, Tennessee, Utah, Washington, and Wyoming; and from the southeast region served by the Southeast Comprehensive Center are Alabama, Georgia, Louisiana, and Mississippi.

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Components of Data Systems

"The use of student data systems to improve education and help students succeed is a national priority" (ED, 2010, p. ix). Federal and state accountability requirements are pressing state education agencies (SEAs) to transition to high-quality, consolidated and responsive data systems that track individual records and achievement variables over students' learning careers and allow for the analysis of longitudinal data (Palaich, Good, & van der Ploeg, 2004). For example, the federal government solicits data from states on adequate yearly progress, teacher qualifications, school report cards, program expenditures, program enrollments, and disaggregated achievement results by subgroups. In addition, establishing longitudinal data systems and using data for student and teacher improvement is one of the core reforms identified in ARRA. The federal government expects states to invest in developing or enhancing their data systems, train school staff to use data, track the number of students who graduate from high schools and complete 1 year of college credit, link districts' multiple data systems, and launch an online system of individualized education programs for students with disabilities (ED, 2009). Typically, SEAs install one or more of the following four key components to support districts and schools with data collection, usage, and databased decision making (LaPointe, et al., 2009):

- Centralized data system/warehouse—a centralized repository of data from multiple sources ranging from classroom assessment data to school-level information about students and staff
- Tools for data analysis and reporting—user-friendly software tools (resides online or on a personal computer) that allow teachers, administrators, and agency staff to collect, organize, analyze, and manipulate data to make decisions
- Training on data systems/warehouses and tools—technical training for teachers, administrators and agency staff on the effective use of data system/warehouse tools
- Professional development in using data to make decisions—a professional learning structure to build the capacity of teachers and administrators to make instructional decisions based on data

State Actions to Leverage Data

Data are useful only when they are transformed into actionable information, which SEAs can utilize to take actions for school improvement and systems change (Data Quality Campaign [DQC], Inaugural Overview, 2010; DQC, The Alignment, 2010). In addition to the 10 essential elements, DQC outlines three connected, overarching imperatives for changing states' culture around data use and 10 state actions:

- Expand the ability of state data systems to link across P–20/workforce pipeline
  1. Link data systems
  2. Create stable, sustained support
  3. Develop governance structures
  4. Build state data repositories
- Ensure that data can be accessed, analyzed, and used by stakeholders
  5. Implement systems to provide timely access to information
  6. Create progress reports with individual student data to improve student performance
  7. Create reports with longitudinal statistics to guide systemwide efforts
- Build the capacity of all stakeholders to use longitudinal data for effective decision making
  8. Develop a research agenda
  9. Promote educator professional development and credentialing
  10. Promote strategies to raise awareness of available data

Setting the Context for Implementing Electronic Data Systems

In it's blueprint for reform (ED, March 2010), the federal government called on states and districts to establish data systems that collect information that is critical to determining how well schools and districts progress in preparing students to graduate from high school college and career ready. For example, SEAs and districts will have access to federal funds to build longitudinal data infrastructures that can track the equitable distribution of teachers, monitor the effectiveness of traditional and alternative teacher preparation programs, disaggregate student performance data, improve students' safety, health and wellbeing, and so forth. To prepare staff and infrastructures for efficient and effective use of these multiple data systems, it is recommended that SEAs take the following actions (a) establish a data task force, (b) determine the scope, (c) assess for readiness, (d) invest in data technologies, (e) build capacity, (f) provide leadership, (g) ensure technical assistance and technology support, (h) collaborate with all stakeholders, (i) assess risk, (j) attend to information quality, (k) address system quality, (l) evaluate impact, and (m) estimate cost.

Establish data task force. SEAs should create a state-level education data task force consisting of knowledgeable committee members with diverse expertise in data systems and educational practices. The task force will have the responsibility of overseeing the development and regulation of the state's education data system. Some of the responsibilities of the task force might include (Palaich, Good, & van der Ploeg, 2004; National Center for Education Statistics, 2004):

- providing the vision, oversight, and governance of technology investments;
- defining and prioritizing what to study and measure;
- recommending policies and regulations;
- creating common state data standards for data quality;

- setting clear goals, data standards, collection guidelines and data management practices; and
- identifying and recommending service providers and vendors to provide technology, training, and technical assistance to local education agencies (LEAs) and SEA staff.

Determine the scope. In its readiness guide for school and district leaders, Learning Point Associates and Educational Service Agency Alliance of the Midwest (2006), offer some key elements to consider in order to set the context for creating electronic data systems, which is also applicable to SEAs. Before stakeholders and decision makers venture into building a data system, they should think about the scope of the data system. For example, what do they want the system to do for the state? What kinds of questions should the data system help the state to answer? Will students, parents, and community members use (parts) of the system? "The answers data provide are also strongly influenced by the questions asked" (Palaich, Good, & van der Ploeg, 2004, p .6). The state's goal for what its students should know and be able to do after completing their school career should guide the depth and breadth of the data system. The system should be able to record multiple data elements, answer big-picture questions, yet be flexible and easy to use.

Assess for readiness. Another element for consideration is to assess the state's readiness for implementing a longitudinal data system. Learning Point Associates and Educational Service Agency Alliance of the Midwest (2006), suggest that SEAs begin to think about the state's intended outcomes from a longitudinal, coordinated electronic data system. SEAs should ask the right questions about a data system and the state's readiness and capacity to ensure that it builds a system that is aligned with the state's goals to improve student outcomes. Aligning goals and divergent objectives across the system will allow the system to establish a common language and culture for data (Wohlstetter, Datnow, & Park, 2008). Data use requires time, training, continuous support, supervision, and leadership. In the early stages, the state should gauge its readiness for implementing a systemic, comprehensive data system. For example, what will be the level of fiscal support? What technical assistance and professional learning support will be made available to all stakeholders?

Invest in technology (hardware, software, networking). Invest in data technology and build flexible data mechanisms with interoperability capacity (multiple software packages that exchange information easily in a timely fashion and coordinate operations) to link historically disparate data systems (Palaich, Good, & Van der Ploeg, 2004; Adeboye, 2007). For example, does the system have the capacity to link student achievement data to teacher performance data and preservice teacher preparation program data. The SEA also should address security, confidentiality, and privacy wall issues.

Build capacity. Provide technical training and professional learning to increase the capacity of staff to collect, analyze, and use data to drive decisions.

Provide leadership. To provide leadership to schools and districts on data systems and use, Wohlstetter, Datnow, and Park (2008), recommend (a) designating state-level staff who will be responsible for directing data management efforts; (b) setting up communication systems that support a strong, formal, systematic, two-way information flow that is timely from districts (e. g., student achievement, organizational, staff competence, parent satisfaction, and school finance data) to SEA and vice versa; (c) empowering schools with decision-making authority regarding data use; and (d) developing a reward or compensation system tied to improved student outcomes.

Plan for technical assistance and technology support. To provide consultation and technology support to district and SEA staff through data retreats, help lines, as well as regular contacts via e-mail, telephone, listservs, and forums to improve data discussions among school, state, and district staff.

Collaborate. SEAs need to collaborate with schools, districts, and other relevant stakeholders across the state to assist in the data decision-making process, because SEAs do not have complete control over the quality of the data received (NCES, 2004).

Assess risk. Data systems should be designed to help the state make accurate predictions about future performance of students and teachers with confidence (LPA & Educational Service Agency Alliance of the Midwest, 2006). For example, how will individual students, schools, or districts do next year and subsequently? To increase confidence in predictions and minimize the amount of risk in program and instructional decisions based on data, states should require that the system use data modeling, a conceptual representation of the data structures (tables), to ensure that all provided data objects are completely and accurately represented (Schools Interoperability Framework, 2005).[1]

Attend to information quality. The technical aspects of data quality can be complex, and there are many challenges to data integrity, validity, reliability, precision, and meaning (LPA & Educational Service Agency Alliance of the Midwest, 2006). In creating a data system, some solutions to these challenges are to (a) focus on the purposes for data use, (b) lay out a logical design for how the state will use the data, and (c) use data technology experts/consultants to build a data system that incorporates essential elements and models districts' practices for teaching and learning. For example, do SEA staff know the data elements that exist and where they are located? The Forum Guide to Education Indicators (National Forum on Education

[1] PK-12 Data Model, National Forum on Education Statistics, http://nces.ed.gov/forum/data_modeling.asp

[2] Forum Guide to Education Indicators, National Forum for Education Statistics, http://nces.ed.gov/forum/pub_2005802.asp

Statistics [NCES], 2005)[2] is a useful tool in understanding how to appropriately develop, apply, and interpret education indicators (a measure of the status of, or change in, an educational system with regard to its goals) in a data system. In addition, the quality of information used to make instructional and program decisions depends upon the staff that enter data into a computer. A helpful resource on best practices for data entry is the Forum Guide to Building a Culture of Quality Data (NCES, 2004).[3]

Address system quality. The quality of the data system impacts the quality of instructional/program decisions made by staff (LPA & Educational Service Agency Alliance of the Midwest, 2006). The system will be useful to staff if it possesses the following attributes: quick to access, easy to use, requires shorter contact times, offers a mode of presentation that fits into staffs' daily routines, provides early warning indicators, has the ability to interconnect data elements to each other over time (e. g., connecting student grades/performance to teacher attributes), and is interactive.

Evaluate impact. Building a data system is an investment, and states and districts want a good return on their venture—improving student outcomes (LPA & Educational Service Agency Alliance of the Midwest, 2006). As the state designs its data system, it is important for stakeholders and decision makers to think about and discuss what impact the data system is expected to have on teaching and learning to help staff align their data use around the core issues of instructional productivity.

Estimate cost. Building a systematic, comprehensive data system is costly in terms of hardware, software, time, personnel, training, maintenance, and other operational costs. So, the state should plan a budget to accomplish the initiative (LPA & Educational Service Agency Alliance of the Midwest, 2006).

Implementing Data Systems

According to Fixsen, Naoom, Blase, Friedman, and Wallace (2005), implementation can be defined as "a specified set of activities designed to put into practice an activity or program of known dimensions" (p. 5), and has six stages—exploration and adoption, program installation, initial implementation, full operation, innovation, and sustainability. To implement the key components and elements of data systems, implementation research findings indicate that states should consider using the six stages of implementation to guide their efforts.

Exploration. In this stage, the state will explore the feasibility of implementing comprehensive, flexible longitudinal data systems. The exploration activities would result in the conceptualization of a clear state implementation plan for longitudinal data systems with tasks and timelines to facilitate installation and initial implementation (Fixsen, et al., 2005). Early on as the state sets out to explore possibilities, it is critical to involve stakeholders from all levels of the system to facilitate the sharing of educational data with other organizations and individuals and to help states/agencies link information and bridge standalone data sets (Palaich, Good, & van der Ploeg, 2004). Other stakeholders and data consumers include state policymakers and education agencies, district leaders, school leaders, teachers, students and parents, and community members.

Installation. The state will analyze the system and begin to develop its competencies to implement comprehensive data systems. The SEA will organize and facilitate data discussions and gap analysis work sessions for district and state agency staffs to help them take stock of the existing conditions and practices in the system that support the creation and implementation of an LDS and identify where they should focus their competency building efforts. The state tasks to be accomplished in the installation process are developing or refining existing state policies to support data systems; establishing linkages between existing systems and policies; building or realigning support structures (for example, creating a state-level data task force, data collection systems, dissemination mechanisms); ensuring availability and allocation of resources (personnel, time, and funds); hiring personnel or repurposing staff roles; and creating mechanisms for feedback and reporting progress.

Initial Implementation. In this stage, the state begins to plan actions and strategies for systemwide implementation of the data system. The state-level data task force will oversee and facilitate the planning and implementation process. The task force will develop a detailed plan that outlines action steps and the support necessary to carry out the plan; map out and refine the components of the state's plan for a longitudinal data system, implementation processes, and evaluation methods; and develop a strategy for multilevel professional development, as well as a strategy for disseminating the plan to stakeholders at each level of the system and sharing information.

Full Implementation. The state will fully implement all aspects of the data system and monitor progress. At this point, the focus shifts from the state-level facilitators to the local infrastructure leaders, coordinators, and data system facilitators implementing the actions and strategies. Throughout the implementation of plans, state agency leaders will provide support, technical assistance, technology support, and resources that are needed to maintain momentum and keep the effort on track. In addition, the data task force will continue to oversee the statewide scale-up, monitor the fidelity of implementation, and address unique implementation challenges as they arise.

[3] Forum Guide to Building a Culture of Quality Data, National Forum on Education Statistics, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005801

Innovation. In this stage, the state will be assessing and reflecting on outcomes and lessons learned. The data task force will analyze and reflect on evidence of implementation and impact, refine plans, and decide on a focus for continuing to enhance the state's data systems.

Sustainability. The state's data task force will establish mechanisms for sustaining the ongoing implementation of the longitudinal data system using federal, state, and local resources. Furthermore, the state's implementation plan should include strategies for responding to changing conditions in the state system (for example, changes in staff, funding streams, program requirements).

Conclusion

Research on this issue indicates that the establishment of comprehensive data systems is essential to all states as an integral part of educational reform. Again, DQC and other organizations recommend that data systems be comprised of the 10 aforementioned essential elements. Systems containing these pertinent elements will provide the foundation for effective educational improvement planning and implementation for all students in all public schools in all states in our great nation.

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Additional Resources

Data Quality Campaign
http://www.dataqualitycampaign.org
The Data Quality Campaign was established in 2005 as a national, collaborative effort to encourage and support state policymakers to improve the availability and use of high-quality education data to improve student achievement. The Web site provides tools and resources to help states implement and use longitudinal data systems.

EdFacts, U.S. Department of Education (ED)
http://www2.ed.gov/about/inits/ed/edfacts/index.html
EDFacts is an ED initiative that centralizes performance data supplied by K–12 state education agencies with other data assets, such as financial grant information, within the department to enable better analysis and use in policy development, planning, and management.

Education Information Management Consortium (EIMAC), Council of Chief State School Officers (CCSSO)
http://www.ccsso.org/Resources/Programs/Education_Information_Management_Advisory_Consortium_(EIMAC).html
EIMAC represents and advises SEA chiefs and staff on national data issues, collaborates in the planning of national data initiatives, reviews and provides feedback on national data issues, provides networking and professional development opportunities for SEA directors and data managers, and provides resources and leadership to states in building student-level data systems.

Forum Guide to Building a Culture of Quality Data, National Forum on Education Statistics, Institute of Education Sciences National Center for Education Statistics
http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005801
This document offers recommendations to staff in schools and school districts about best practices for data entry—getting things right at the source.

Forum Guide for Education Indicators, National Forum on Education Statistics, Institute of Education Sciences National Center for Education Statistics
http://nces.ed.gov/pubs2005/2005802.pdf
This guide will help schools and districts better understand how to appropriately develop, apply, and interpret education indicators. It describes the role of indicators as tools for measuring educational status and progress; recognizing standard definitions and calculations for education indicators; and identifying common misuse of education indicators.

International Working Group on Educational Data Mining
http://www.educationaldatamining.org/index.html
This group supports collaboration and scientific development in this new discipline through the organization of workshops and mailing lists as well as the development of community resources to support the sharing of data and techniques.

National Center for Educational Achievement (NCEA), Just for the Kids
http://www.nc4ea.org/index.cfm/e/initiatives.just_for_the_kids
NCEA's Just for the Kids (JFTK) initiative provides the public with important information about school success, including College and Career Readiness (CCR) School Performance Reports, interactive lists of Higher Performing Schools, Higher Performing School profile reports, and Self Reflections spotlighting successful practices shared by educators from Higher Performing Schools.

National Education Data Model (NEDM), U.S. Department of Education
http://nces.ed.gov/forum/datamodel/
NEDM is the single, comprehensive model of education data and is prerequisite to establishing automated and comparable systems. The Education Data Model can be used by educators, vendors, and researchers to understand the information required for teaching, learning, and administrative systems. It answers questions such as (a) what data do schools need to collect and manage in order to meet the educational needs of their students? and (b) what information is needed to effectively manage education organizations such that teaching and learning are successful?

National Forum on Education Statistics, Institute of Education Sciences NCES
http://nces.ed.gov/forum/index.asp
The forum is sponsored by the National Center for Education Statistics of ED and is committed to improving the quality, comparability, and usefulness of elementary and secondary education data while remaining sensitive to data burden concerns.

Office of Planning, Evaluation and Policy Development, U.S. Department of Education

http://www2.ed.gov/about/offices/list/opepd/ppss/reports.html

This ED Web site houses program evaluation reports, including three data briefs on the findings of the national study on education data systems and decision making. *Implementing Data-Informed Decision Making in Schools: Teacher Access, Supports and Use* (2009) describes the student data systems available to school staff members, how school staff members are using the systems and other forms of student data, teachers' understanding of data displays and data interpretation issues, and challenges. *Teachers' Use of Student Data Systems to Improve Instruction: 2005 to 2007* (2008) is the second in a two-part series examining teachers' access to and use of data from student data systems. *Teachers' Use of Student Data Systems to Improve Instruction* (2007) provides the first national estimates of the prevalence of K–12 teachers' access to and use of student data systems.

Progress Software

http://web.progress.com/en/Product-Capabilities/corba.html

This company provides support for implementing Common Object Request Broker Architecture (CORBA) that enables a state's software components to work together, regardless of where they reside, what hardware they run on, or what language they are coded in.

Schools Interoperability Framework (SIF) Association

http://www.sifinfo.org/us/index.asp

The SIF Association helps schools and districts with seamless integration of a broad spectrum of data, and data movement between applications—efficiently, accurately, and automatically—for interoperability between disparate applications.

Surveys of Enacted Curriculum, CCSSO

http://www.ccsso.org/Resources/Programs/Surveys_of_Enacted_Curriculum_(SEC).html

The Surveys of Enacted Curriculum are a practical, reliable set of online data collection tools used with teachers to collect and report consistent data on current instructional practices and content being taught in classrooms. Data is analyzed to determine the degree of alignment between current instruction and state standards and assessments.

State Highlights and Events

Alabama

Establishing Data Systems and Using Data for Improvement

By Judy Pugh, Education Specialist, Assessment and Accountability; Miriam Byers, Coordinator of Student Assessment, Assessment and Accountability; and Catherliene C. Williamson, PhD, School Improvement Coordinator, Alabama State Department of Education

Mary Lou Meadows, EdD, SECC State Liaison

For years, Alabama has sought to improve education by setting high standards for what students are expected to know and be able to do. In addition, we have held educators and students accountable for achieving such standards. At the heart of this endeavor is ensuring that all students are afforded the opportunity to achieve to the standards set by Alabama for graduating students college and/or career ready.

Data perform an essential role in informing school systems and teachers of what students need access to and need to learn. They provide quantifiable information, taking emotion out of the decision-making process. School system leaders in Alabama are discovering the power of data for promoting school improvement. Alabama's educational leaders believe that better information about student performance yields better instruction if data are used intelligently. An avenue through which Alabama fosters access to meaningful "real-time" data is the data warehouse.

The data warehouse is a unit record data system that uses unique identifiers to match individual students in grades 3 through 8 and 11 with their test scores and their school/grade/teacher assignment. The system provides data at the group level as well as the individual student level, enabling superintendents and central office personnel to develop systemwide curricular and instructional goals. The data warehouse has the ability to sort data by demographics at the system, school, and class level. This capability helps provide reporting and analysis services, which turn data into useful information.

Alabama strives to provide all those who have a stake in the educational process with insights and tools for cultivating a statewide culture of data-driven inquiry. The state continuously uses data for student, school, and teacher performance to review and revise school and classroom practices. Alabama has many initiatives and programs that use empirical data for the development of instructional practices.

Two programs designed to help with graduation rate are Preparing Alabama Students for Success (PASS) and Alabama Connecting Classrooms, Educators, & Students Statewide (ACCESS). PASS is a program designed to gather and analyze data to identify Alabama students at risk of dropping out and to help

them graduate from high school. ACCESS is a statewide distance learning initiative that provides high-quality classroom courses and teachers through technology.

Making Middle Grades Work is a program designed to improve student achievement in middle grades. A primary tool for this program is the Middle Grades Assessment, which is referenced to National Assessment of Educational Progress (NAEP) proficiency standards in reading, mathematics, and science. This assessment is administered to eighth graders. The Middle Grades Assessment also includes data from a survey of students, teachers, and school personnel. Schools are expected to use data from their state assessments, end-of-course assessments, and end-of-year assessments.

Alabama Reading Initiative (ARI) uses statewide Dynamic Indicators of Basic Early Literacy Skills (DIBELS) tests and systematic cooperation with district central offices to influence the teaching of reading in all Alabama schools. Through intensive teacher development efforts, educators across the state learn how to use student assessment data to identify areas in which students can improve and how to adjust instruction according to student needs.

Alabama Mathematics and Science Technology Initiative (AMSTI) uses 4 years of longitudinal data from state indicators in math and science to plan their program with a clear understanding of teacher expertise, needs, and concerns. AMSTI also uses data gathered from teacher and principal surveys, interviews, and classroom observations.

School improvement support is provided to districts and schools identified in multiple years of school improvement. A core practice of the school improvement program is coaching district and school leaders to utilize data-driven practices to guide continuous improvement efforts. The school improvement team has emphasized the tenets of the continuous improvement cycle to facilitate coaching strategies that positively impact student learning. The use of data is embedded throughout the processes in the cycle. The cycle begins with a focus on the multiple sources of data, developing a plan for student learning in response to needs, implementing the plan, checking on the effectiveness of the plan by reflecting on formative assessment and progress monitoring results, and acting on the updated information to adjust the plan as needed.

Through this cycle, central office and school leadership teams are guided to gather and analyze data, look for patterns and trends, and prioritize procedures to respond to challenges that need immediate action. From data and observations, teams set targets, develop indicators of success, and identify strategies that will eliminate problem areas.

Programs and supports such as ARI; AMSTI; school improvement; and ACCESS, along with many others, are making a difference in teaching and learning across the state. Due to these initiatives, we have seen a decrease in the number of schools identified for school improvement.

Georgia

Using Data to Increase Student Achievement

By Kathy Cox, Former State Superintendent of Schools, Georgia Department of Education
Glenda Copeland, MA, SECC State Liaison

Every business leader in the world understands that accurate data is a vital component to success. In today's global economy, data has to inform decisions so businesses can compete and be profitable.

So, why would education be any different?

Our students are no longer just competing for jobs with other students from Georgia or even America for that matter. They are competing against students from countries all over the world, such as Japan, Singapore, and Finland.

At the Georgia Department of Education (GaDOE), our vision is that we will lead the nation in improving student achievement. In order to fulfill that vision, we must be able to provide accurate data to the many people that influence the way our students learn.

GaDOE has been working on a data system for several years now to give students a designated identification number that tracks them through their educational career. We've made good progress on our systems, but we still have not perfected the way we gather and share data.

Our existing data collection and reporting infrastructure is not as efficient as we would like and does not give us reliable data exchanges with local school systems. But we are on our way, and recently the federal government recognized Georgia's commitment to a robust educational data system. Georgia was one of 27 states awarded a longitudinal data system grant and one of only three states to receive the maximum amount—$8.9 million.

The statewide LDS grants were created to enhance the ability of states to efficiently and accurately manage, analyze, and use educational data, including individual student records. The data systems developed with funds from these grants should help the state, local districts, schools, and teachers make data-driven decisions to improve student learning as well as facilitate research to increase student achievement and close achievement gaps.

Georgia will use the grant money over the next 4 years to make several enhancements that will improve our ability to:

- provide educators with information to help them tailor instruction to meet each student's needs;

- furnish administrators with information to effectively and efficiently manage and allocate resources;
- enable policymakers to evaluate whether initiatives show evidence of increasing student achievement; and
- empower the public to hold Georgia's education system accountable by providing transparency through data reporting.

In my opinion, the most important benefit of an accurate data system would be to provide teachers the data they need to evaluate student performance. The same way businesses use data to track trends, teachers need data to follow learning trends in their students.

For educators to accomplish this, the data they get must be current. With our new system, we will no longer exchange data just a few times a year: It will happen daily! This will greatly enhance our ability as a "business" to use time as effectively as possible. No longer will students be without a schedule because the school is waiting for transcripts to be sent from another school system. And, no longer will a student's current classroom teacher be the last one to know that a student had difficulty in the same subject last year.

Many of our biggest educational challenges can't be attributed to a single event. Rather, a series of events over time leads students to drop out or graduate unprepared for the 21st century economy. A first-class data system with a record of students' educational experiences is required to better understand their needs and identify and promote best practices that maximize the achievement of each student.

As businesses have effectively used data to boost profits, it's now time for educators to use data to boost student achievement.

Kathy Cox, a parent and a veteran classroom teacher, was Georgia's superintendent of schools until June 30, 2010.

Louisiana

Using Data to Improve Instruction

Adapted from the state's application for Phase 1 of the Race to the Top competition, Our Children Can't Wait: Louisiana's Blueprint for Education Reform
By Darlene Morgan Brown, PhD, SECC State Liaison

Louisiana shares the belief of Arne Duncan, Secretary of the U.S. Department of Education, when he remarked at the Fourth Annual Institute for Educational Sciences Research Conference in June 2009, "I am a deep believer in the power of data to drive our decisions. Data gives us the roadmap to reform. It tells us where we are, where we need to go, and who is most at risk."

Louisiana uses a robust longitudinal data system (LDS). Louisiana's LDS currently informs school, district, and state performance as it relates to student achievement as well as college- and career-readiness. The LDS also will provide a critical information feed into an Instructional Improvement System (IIS) and a Human Capital Information System (HCIS).

One of the most recent uses of LDS data has come through the state's Value-Added Teacher Preparation Program Assessment Model (TPPAM). TPPAM assesses the average effect of new teachers from teacher preparation programs on students' educational attainment taking student, class, and school factors into account. Louisiana's Value-Added Assessment Initiative for Schools and Teachers will compare students' performance on the current year's summative assessment (LEAP or iLEAP) with scores for prior years, incorporating critical factors such as student disabilities. The results for all students, teachers, and schools in tested grades will be combined to identify classes, schools, and educational programs where student achievement is unusually strong or weak. This initiative is being led by Dr. George Noell, a nationally recognized leader in value-added assessment. These results will give educators objective data that can guide decisions regarding instruction, professional development, school improvement initiatives, and personnel assignments.

The Curriculum Verification and Results Reporting Portal (CVRRP) lies at the heart of Louisiana's Value-Added Assessment Initiative for Schools and Teachers. CVRRP is a web-based portal that allows teachers and principals to verify that teacher-student links are accurate prior to the data being used in analyses examining achievement outcomes. Louisiana began piloting CVRRP in 16 schools from 11 different local education agencies in Fall 2009. A second pilot, testing CVRRP in 20 LEAs, was slated to begin Spring 2010. Statewide access to value-added assessment data on teachers is expected to be available for all LEAs in 2012.

Integrating an IIS that will give teachers, leaders, and administrators rapid access to student achievement and teacher effectiveness data will vastly increase the use of data to drive instructional improvement and will unequivocally show the effect teachers have on student learning. Implementation of the CVRRP will allow teachers the ability to access their value-added index and a measure of their own effectiveness.

Mississippi

Not All Data Are Created Equal

By Kris Kaase, PhD, Former Associate State Superintendent, Data Management and Reporting, Mississippi Department of Education
Debra Meibaum, MAT, SECC State Liaison

People working in school districts and state education agencies seem overwhelmed with the amount of data available these days. Sifting through that data to find the truly meaningful information is a real challenge. Staff at the Mississippi Department of

Education (MDE) are trying to do just that as part of their work on the statewide system of support, which has been ably supported by the Southeast Comprehensive Center. A group led by Ken Thompson, MDE director of research and statistics, has identified several potentially useful indicators of schools and school districts that may need intervention. The group brainstormed possible indicators for student achievement, financial performance, school climate, health and wellness, and staffing quality. In reviewing the data, some indicators were found to potentially be very meaningful, while others yielded little meaningful information or perhaps needed improvement in data quality before being used. The next step is to examine the correlation of these indicators with school and district outcomes to see if they are reliable indicators of high-performing and struggling schools and districts.

MDE is also working towards implementing the indicators required as a part of the State Fiscal Stabilization Fund Application. Providing teachers with more student growth and performance data will be particularly interesting. Mississippi first implemented a growth model for state accountability in 2003 and implemented a slightly revised growth model for state accountability in 2009.

Over the next year, MDE will be working to provide teachers with reports on the growth of the students they taught in the previous year as well as how much growth a teacher's current group of students experienced in the previous year. The state's growth model will also be the basis for providing teachers information about their impact on student performance. Since these data are more complex than typical student assessment reports, MDE plans to develop an interpretive guide to help teachers and administrators make the best use of this information. MDE also plans to require school administrators to sign a memorandum of understanding outlining appropriate and inappropriate uses of these data.

The staff at MDE, like all educators, are becoming more data-driven. The challenge is knowing what data are important for decision making and will lead to real continuous improvement.

South Carolina

Data Systems to Support Instruction and Learning

By Gary West, Director, Data Management and Analysis, South Carolina Department of Education
Sandra Lindsay, EdD, SECC State Liaison

Introduction

South Carolina's application for Race to the Top (RT3) funds (like a good formative test) provided the opportunity for the state to identify needs and to plan activities to meet those needs. The application process was a great learning opportunity in several ways: (a) high expectations had been set for us; (b) we were involved in identifying our needs; (c) we were involved in planning to meet our needs; (d) we collaborated with others who could help us meet our needs; and (e) we waited for our paper to be graded.

And we hoped our grade would be a real measure of our performance. (Does anyone remember when we hoped we'd be graded on effort? Those days are gone—forever.)

Race to the Top

A key component of the RT3 grant is data systems to support instruction and learning. One of the major functions of those data systems is to provide information to educators about student performance, teacher impact on that performance, and principal impact on the teacher impact. At the same time, the data system should be able to inform instructional decisions as teachers and principals plan their impact on student performance.

As part of its RT3 application, South Carolina developed a plan to incorporate data systems into the implementation of the other three components of the application (equitable distribution of teachers, rigorous standards and assessments, and turning around struggling schools). Data must inform decisions and action in those areas; but, more than that, the data must enable educators, parents, students, and other education stakeholders in their efforts to have an impact on student performance. All those stakeholders must be able to use data (not just have it) to create learning opportunities that systematically create learning.

South Carolina has developed a high-impact plan that will lead to reformation of education and learning in our public schools. The plan builds on foundations that already exist, adding structure and purpose to educational goals and strategies for improved student performance. And the use of data—not just the collection of data—is a foundational element of those goals.

Foundations

In the mid-'80s, South Carolina was one of the first states to adopt and implement a statewide student information system (SIS). At the beginning of the 21st century, South Carolina replaced the old SIS and expanded its efforts to collect and use data at the school, district, and state levels. Now, at the end of the first decade of the 21st century, South Carolina is moving to its third statewide SIS. The SIS is used, at the school and district levels, for keeping student records, attendance, grades, scheduling, and for other purposes. The SIS is also used to report funding and accountability data to the state level.

In 2006, South Carolina began building the foundation for a statewide longitudinal data system (SLDS) that would be a repository of data from schools, districts, assessments, programs, and other sources. The purpose of the SLDS was to provide data to educators, researchers, and policymakers in an effort to inform decisions and actions in the K–12 environment. That foundation has been built, and several years' worth of data is there.

So, in South Carolina, we have data to meet our operational and reporting requirements. So, what about data to guide instruction and create learning? If data can't improve student performance, what good are those data? After all, student performance is what education is all about, right?

There are still some key components missing from the state's data systems at this time. For example, there are only a few folks who can get to the data because the "front end"—the screens through which someone can log into the system—is not there. That front end is being built with four groups of potential users in mind: (a) the general public, (b) parents and students, (c) educators, and (d) researchers and policymakers—each of which would need a different view of the data.

But even more important than the front end, there is the need to provide the data in ways that will do more than tell us what we've already done. It is extremely important that the data tell us—all of us—what we should be doing next in improving student performance. And that's what's interesting—even exciting—about what South Carolina is planning for its data systems to support instruction and learning.

An Integrated Data System to Support Instruction and Learning

Data that are not used are worthless, regardless of the amount of data you have. South Carolina's plan to reform education is based on a foundation of accessible and useable data to guide instruction and learning.

Figure 1 illustrates the importance of the data systems that support the programmatic reformation. The programmatic reforms include the equitable distribution of teachers and leaders (the green area) to schools where student needs are the greatest. Rigorous standards and assessments (the blue area) will ensure that all students learn for success in higher education and in the workforce. Comprehensive efforts to turn around struggling schools (the yellow area) will create the learning environments that ensure student success. Those programmatic areas are interdependent; neither area is a solution to educational reform. Reform requires successful implementation of all programmatic strategies.

Figure 1 also indicates that there are data needs (the red area) that underlie all the programmatic areas. Note that none of the data

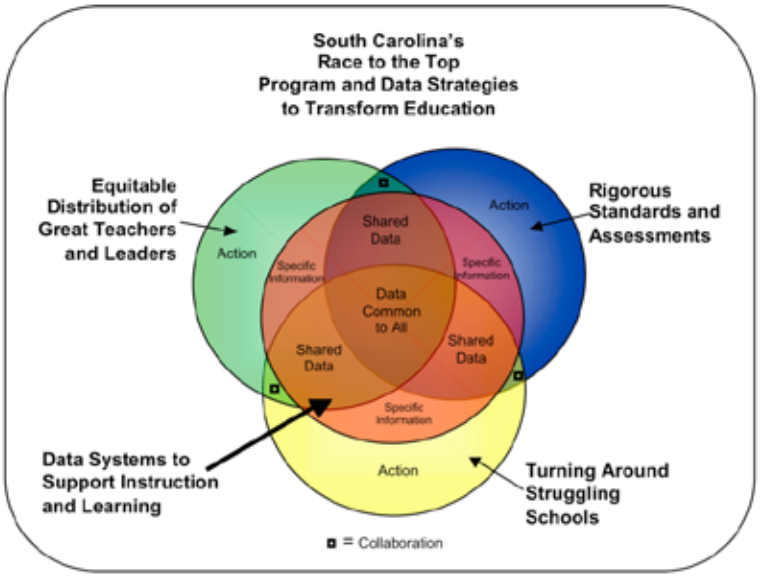


Figure 1: Race to the Top: How Data Can Inform Reformation and Transformation

sticks out from under the programmatic areas—the data do not exist for their own sake. The data are important only in that the programmatic areas are informed by those data.

Using Data for Reformation and Transformation

Collecting and keeping data serve no purpose unless the data system enables stakeholders to access, analyze, and apply data. To turn data into information and to encourage stakeholders to use the information, educational data systems must provide a broad spectrum of tools and resources that enable educators and other stakeholders to make meaning of all available data.

The strategy for providing those tools and resources has been organized around the "Seven A's" described below. The first three A's are infrastructure issues that are managed by technology and network support staff. The last four A's must be managed—and managed well—by the end-user stakeholders (teachers, principals and instructional leaders, and others). The Seven A's should not be considered linear; rather, the process always creates new data to be used for planning whatever is to happen next, and the process starts again:

- *Acquisition:* For South Carolina's reform efforts to be successful, high-quality data must be available to all stakeholders. Successful acquisition of high-quality data depends on those who produce the data and those who enter data into the system. Training and support for educators and data managers are critical to this process.
- *Awareness:* Educational and partner stakeholders in higher education, workforce agencies, and health and human service agencies must be aware that data exist in order to access and use those data to make critical decisions and take important

actions. "Marketing" of the available data and its importance to successful instruction and learning is essential in promoting the use of those data.

- *Access:* The comprehensive database system offers four separate interfaces, with the level of access determined by stakeholder role. Educators will have access to student-level data by classroom and building. Parents and students will have access to the individual student's data. Policymakers and researchers will have access to "de-identified" data. The general public will have access to summative data, with no access to individual data records. Training and support for each group will be based on the appropriate level of access.
- *Analysis:* Stakeholders will need training and support to ensure proper understanding, analysis, and use of data to which they have access. Training will include strategies to implement root cause analysis and research for interventions to address the root causes. Stakeholders will need skills in the use of tools (spreadsheets, pivot tables, charts, and others) in order to fully analyze the data to identify areas of need and courses of action.
- *Application:* Users will need ongoing training and support to ensure they can effectively apply resources and take appropriate action to solve the problems and address the needs identified through those analyses. The application of the data requires deep understanding of the data as well as an understanding of the context in which the data have meaning. But more than understanding, application requires specific action for specific purposes based on the data and analyses. This is where educators make decisions that have impact on student performance.
- *Assessment:* Stakeholders will need training and support to use assessments and new data effectively to determine outcomes and report results of their application efforts. Assessment will generate new data that must be reviewed to determine the impact of their efforts on student performance.
- *Advancement:* Stakeholders will need a constantly higher level of training and support to refine assessment and application processes, identify subsequent sets of needs and problems, and identify appropriate next steps. These processes will lead to new data being added to the system to improve the effectiveness of their efforts. These are the next steps that move education forward, generating more data and starting the process of acquisition, awareness, and the remaining A's all over again.

Core Priorities for Building Integrated Data Systems

At the heart of the integrated data systems (Figure 2), is a curriculum management system that will bring together data from disparate sources in an intuitive framework that will provide student-by-student information to guide instruction and to create learning. To create that integration, the state must create some foundations and linkages that can automate access to and analysis of the data. Ten foundational priorities have been identified as prerequisites to building the integrated data systems:

- Establish data governance structures to include P–12, higher education, workforce agencies, health and human services agencies, and child care agencies in South Carolina; data from these environments are needed to determine the educational needs of each student as well as the resources available to support student performance.
- Implement data quality controls within the statewide student information system so that those data are complete, correct, and meaningful; complete, correct, and comprehensive data are needed to support educational decisions that promote improved student performance.
- Integrate educator data into the comprehensive data systems to facilitate and support educator effectiveness and to inform teachers of their impact on student performance.
- Expand the existing SLDS educational data warehouse to include new data sources and new interfaces; the data systems must be more than a repository; those systems must provide access and tools for analysis and use of the data.
- Facilitate and create P–20 data exchanges among educational agencies and institutions within the state and among other states so that data may inform policy and practice, as well as guide instruction and learning to ensure success in the transition from secondary to post-secondary education.
- Create and provide accessible training for all agency partners and stakeholder groups; analysis and application of the data in real educational environments is contingent on the ability of stakeholders to make sense of the data.
- Implement a unique educator ID numbering system to uniquely identify teachers, administrators, counselors, media specialists, and other educators who work with students.
- Implement a unique program identification numbering system so that educational programs throughout the state can be evaluated for effectiveness; program effectiveness can be determined for student subgroups and can guide districts and schools in their decisions about adopting and using specific educational programs.
- Integrate assessment data from sources other than statewide testing into the data warehouse to facilitate teacher planning at the learner level and to foster differentiated instruction.
- Implement a statewide curriculum management system to manage South Carolina's S3 curriculum and common core curriculum, integrate learning standards into curriculum and planning, analyze assessment results related to learner performance, and facilitate educator planning to improve learner performance.

The functional priorities listed above include the foundational components that are required to build comprehensive and integrated data systems to support instruction and learning.

Figure 2 illustrates the relationships between and among the identified priorities and the creation of the integrated data system. At the top of Figure 2, data governance structures will provide the umbrella policies, regulations, and practices that protect the data and the identities of the records stored in those data. At the bottom of Figure 2, training and technical assistance form the foundation on which the four user access interfaces is built. The interfaces define the levels at which end-users can access the data. The important data linkages are managed through the unique ID systems for students, educators, programs,

and agencies represented in the integrated data system. The arrows indicate the linkages and relationships among the data and the users.

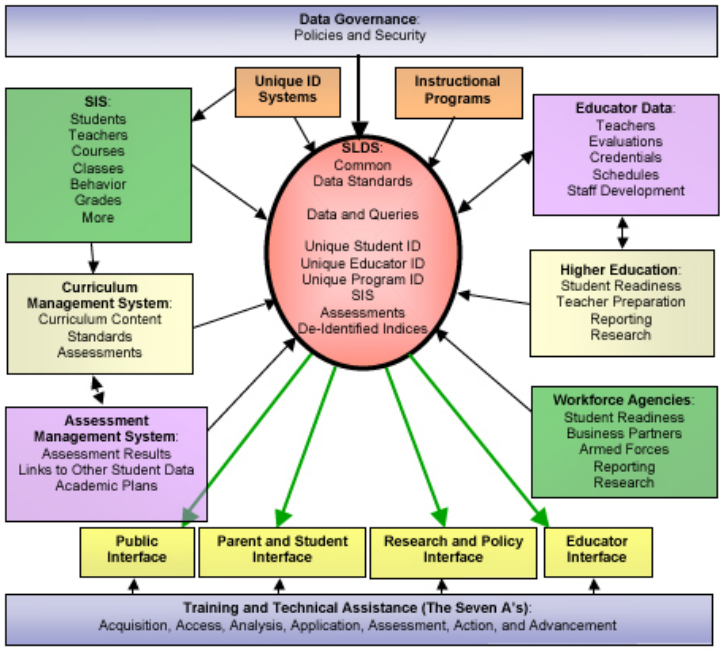


Figure 2: Statewide Longitudinal Data System (SLDS) for Education

The Curriculum Management System: Giving Teachers the Time to Teach

The real reason to have a statewide data system for education is to support instruction and learning (see Figure 1). The data cannot be purposeful if those data cannot inform instruction and create learning in the classroom. If the teacher must manually go looking for the data, access the data, and analyze the data, there is little chance that those data will have an impact on what happens in the classroom.

However, if the data systems can bring the data together, provide analysis of the data with regard to each student's needs, recommend resources and activities, and put those data into the context of curriculum and standards, then teachers can have direct impact on student performance—because they will have the time to teach.

The curriculum management system (CMS) is the key component of a comprehensive data system to support instruction and learning—and to improve student performance.

The CMS Concept

There are some commercial and open-source CMS applications available to educators. Those are, basically, empty database systems into which curriculum standards and components are loaded. Several of those systems also collect and catalog instructional resources that are indexed or linked to curriculum standards. After those systems are populated, student performance results can be entered into the system. The system will then link those results to the standards and will report to the teacher that each student has specific continuing academic needs and that specific resources are available to address those needs. Some systems allow the teacher to rate the suggested resources based on effectiveness of those resources in meeting the student's needs.

The CMS model proposed as part of South Carolina's comprehensive data system goes beyond the basic CMS functionality. As shown in Figure 3, the comprehensive CMS system will include data from the student information systems that will include the basic identifiers and demographics, instructional programs and resources, learning styles, assessment results, and more. The system will include tools for teacher planning and analysis, as described in the next section.

The system will match student performance to program effectiveness and teacher effectiveness. Program effectiveness can be analyzed based on student performance after participation in those programs. Program effectiveness can be determined by student population subgroups, as well. For example, an instructional program might be very effective with black male students but may not be effective at all with other populations. Such information can be extremely important to a school that is targeting an achievement gap between subgroups of students.

The system can also determine the effectiveness of teachers when working with specific programs and specific groups or subgroups of students. This type of information can be helpful in the equitable distribution of teachers (and principals) to or within schools where certain groups of students need the most effective educators.

So, the intent of the CMS component is to provide data that will directly inform the state's efforts to distribute effective teachers and leaders, to manage curriculum and assessments, to turn around struggling schools, and to have an impact on student performance. The proposed CMS model will incorporate more data and will provide tools for using those data in the process.

The CMS Model

Figure 3 illustrates the relationships between and among the various components of the comprehensive educational data system. The color scheme relates to the components in Figure 1. That is, the green boxes and green text are related to teachers and education leaders, the blue boxes and text relate to curriculum and assessments, the yellow background relates to the quality and effectiveness of schools, and the red boxes and text relate to the

data systems. In those instances in which the box color is different from the text color, there is a combination of factors involved. For example, a red box with blue text indicates an integration of data and curriculum or assessment factors.

The CMS component is at the center of Figure 3 because it is the "integrator" of the data that are part of the complete data system. At and above the horizontal center of Figure 3, you will find components that provide data, information, and resources to the CMS component. Below the horizontal center of Figure 3, you will find the resources that come from the CMS component to inform the appropriate stakeholders. Those resources generate additional data that are moved (see the dashed arrows) into the CMS component and that, then, inform new decisions and actions. The arrows indicate the flow of data, information, and resources.

At the top of Figure 3, you will find the student information system (SIS), which provides student information to the CMS. That information includes demographics, unique IDs for the student, class schedules, unique IDs for teachers in the content area classes, program IDs if the student is participating in remediation or enrichment activities, and more. Curriculum standards and content are part of the CMS resources. Additionally, instructional materials and resources are part of the system and are indexed to the curriculum standards.

The assessment management system (AMS) provides test results from state testing programs, formative assessments, and other assessments relating to student performance. Assessment results are updated whenever new administrations of the tests take place.

Teachers and other educators access the CMS component to add new information and to get information from the system (see the green arrows). As indicated in Figure 3, teachers are able to generate long-term instructional planning resources, access or create short-term lesson planning resources, develop learning activities for individual or groups of students, and administer learning assessments related directly to the learning activities and the appropriate learning standards.

The results of the assessments are used to update the AMS and to provide feedback about student performance. Student performance is then related to program effectiveness and teacher effectiveness, which update the CMS component. Updates to the CMS component then provide additional information and resources for each educator in the system.

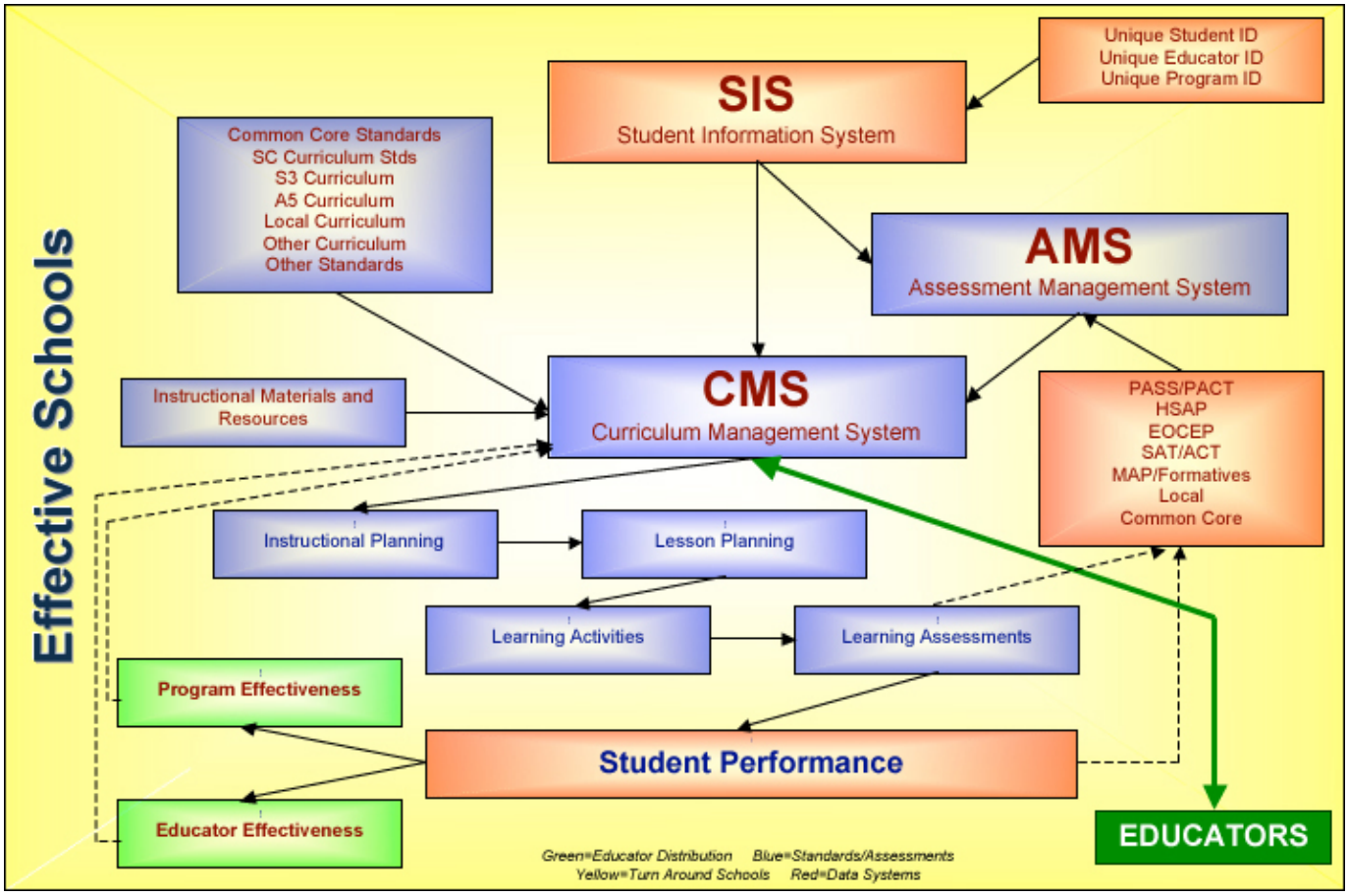
If the CMS component is properly populated with data, information, and resources, the system can provide the student-by-student information and resources or can provide information and resources for groups of students with the same needs. For example, the system might work like this:

- The teacher logs into the system and requests information about a specific student.
- The system produces the basic information, including status with regard to academic standards.
- The system also provides basic learning factors, such as learning style, disabilities, etc.
- The system uses those factors and produces resources that might say something like this: "Other students like this student, with the same academic needs and learning factors have used the following materials and resources and have improved their performance results on PASS by x scale score points." (Some of you will recognize this as the Netflix model. Netflix suggests movies you might like based on your choice of previous movies and your ratings of those previous movies.) This statement could be repeated for each type of assessment (formative or summative) by which the student's performance will or can be measured.
- The system would also identify other students who may have the same academic needs and learning factors so that instruction planning and resources could be used for the group.
- An additional resource could also be provided. The system can report something like this: "The following teachers have worked with students like this student and have had success, as indicated by improved student performance on PASS." This type of information could be repeated for each type of assessment (formative or summative) by which the student's performance will or can be measured.

With this type of information generated by the data system, teachers can focus on the needs of each student or groups of students. In addition, the system will propose resources that have been shown to work with those types of students, meaning that the teacher can get to work faster (as opposed to needing time to plan those resources). Students will learn better because the activities and resources are focused on their specific needs.

A robust and comprehensive CMS will improve student performance through improving the focus of the educational opportunities available to those students—and to the teachers of those students.

Figure 3: An Integrated Curriculum Management System to Give Teachers the Time to Teach



Conclusion

The real measure of success for any school, any principal, and any teacher is nothing more and nothing less than student performance. Educational data systems must provide more than summaries of what students have already done (such as measured by high-stakes tests). Educational data must inform teachers and other educators about what is needed next for every student.

South Carolina's plans for a comprehensive data system to support instruction and learning are based on that concept—and its curriculum management system is a key component of that system. The CMS provides data and tools to promote the use of those data in planning for—and creation of—learning.

And successful learning will be the measure of the system's success—as well as the measure of each educator's success. If we succeed, students succeed. That's why we do this, after all.

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The Southeast Comprehensive Center (SECC) is one of 16 regional centers established by the U.S. Department of Education. The primary goal of the regional centers is to build the capacity of the state education agencies and statewide systems of support to implement NCLB. Links to the other regional centers, the content centers, and the U.S. Department of Education may be found on the SECC Web site (secc.sedl.org).

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