

Data and Reporting

Prepared for the CCHSI Committee on Data and Reporting by Dixie Griffin Good • 10/25/04

This brief is intended to inform the efforts of members of the Colorado Commission for High School Improvement as they examine policies related to education data and reporting.¹ It begins with a look at education data from a broad systems perspective. The second section looks at emerging principles for education data collection and how they relate to data needs for improving high schools. The third section provides detail about Colorado's current data collection and reporting capacity. The final section draws conclusions and makes recommendations for the Commission's consideration.

Section I: Context for Education Data

Education data plays an increasingly important role in decision-making at every level of education delivery, funding and oversight. Standards-based education reform set in motion statewide efforts to ensure that academic standards were being implemented and upheld. Those early testing and accountability systems are giving way to a new generation of more sophisticated models, made possible by more advanced information technologies.

Reporting requirements of the No Child Left Behind Act of 2001 caused states to re-tool their data systems, especially in order to disaggregate data needed to zero in on achievement gaps. NCLB, however, is only one of many forces affecting education data collection and reporting. Advances in information technology and a budding culture of data use in the field of education are driving change as well. The growing number of uses — and users — for education data is leading states to re-examine and, ultimately, to re-invest in the systems that collect, store and report on student and school performance.

The range of end-users for education data crosses every sector of society. The state system must not only meet the data needs of educators and policymakers, but also serve students, parents, researchers, community members, and leaders from business, industry and nonprofit organizations. (See Appendix for more detail about the Users and Uses of Education Data.)

A functional data system is more than a black box collecting all conceivable data points; rather, it consists of quality data inputs and useful, accessible outputs. Smart data collection efforts align closely with accountability measures, avoid redundancy, and go beyond collecting scores on standardized tests. Once the appropriate data is in hand, the key to successful data management lies in the ability to transform *data* into *information*. This requires timely reporting that can inform decisions.

Accessibility issues add to the complexity. States are challenged to provide meaningful data to sophisticated users, while maintaining a high degree of transparency for non-educators. Beyond merely making data available, states shoulder responsibility, with varying degrees of success, for providing tools that enable users to actually make sense of the data (see sidebar).

Historically, education databases were created to handle discrete kinds of information. Different departments — finance, personnel, enrollment, transportation, curriculum, assessment — each had their own way of categorizing, collecting, storing and reporting information. Because these stores of information grew in isolation from one another, residing in incompatible or proprietary applications, great effort was required to share and compare data. Today, consumers of education data want to know the *relationships* between data sets, with the goal of getting better at teaching and learning. Industry-wide efforts², federal guidelines³ and a cross-sector, multi-state initiative⁴ are establishing protocols for data collection that promote sound data use and allow data to flow more easily across departments, districts, and states.

Making Sense of Education Data

Sound investments in data systems should yield insight into policy matters, answers to key accountability questions, and evidence to support instructional decisions aimed at improving teaching and learning.

In Oregon, for example, the Department of Education web site links school finance data to a number of indicators of interest to education stakeholders. (See <http://www.ode.state.or.us/sfda/gettingstarted.aspx>) Here, users can get reports on school-level data suitable for comparisons among schools and districts. Statewide data from 1999 forward are available on spending, staffing, school processes, student performance, and demographics.

Users will also find information on data analysis. Tutorials, a help desk, online help with reports, and reference documents support users in making sense of the data.

Clearly, state data systems must have the capacity to respond to changes in the education environment. The following table⁵ shows the changes that need to take place in order to bring more flexibility to data systems.

Table 1: The Transition to More Flexible Data Systems

FROM...	TO...
Data organized by testing events	Data organized by individual student record
Static, aggregated records	Atomistic records, relational in time and hierarchy
Data in discrete sets or “silos”	Records fully relational by field and data set
Data and reports concentrated in hands of few	Access to data and reporting capability at SEA, district, school, classroom levels
Expertise required to use	User-friendly access routines; continuous user training
Numerical, canned, and columnar reports	Graphical, interactive displays

As might be expected, making the transition to a more flexible data system is time-consuming and not inexpensive. The speed and strategies used to make this transition differ across the states, depending on such factors as existing human and technical capacity, and the policy environment.

Section II: Emerging Principles for Education Data and Their Relation to High School Improvement

In recent years, technology advancements have changed how people handle information. Moreover, technology has actually changed how we think about and solve problems. Our capacity for handling complexity has increased dramatically due to the availability of tools for processing information. Rather than thinking about the education enterprise in more linear terms, we are now looking at the interactions, correlations and relationships of a great many factors, and how these factors affect student outcomes.

New ways of storing and retrieving data make it possible to effect change in complex organizations, such as schools and education agencies. As a result, new principles for effective education data collection and use are coming into focus. To wit, the Colorado Consortium for Data-Driven Decision-making (C2D3) consists of 50 districts interested in furthering teacher professional development for using data to inform instructional decisions. A state task force⁶ that led to the C2D3 initiative envisioned a culture of education data use as follows:

Colorado educators and other stakeholders embrace the use of performance information to improve teaching and learning. Essential information is portable and easily accessible to multiple users for multiple purposes, forming a body of evidence for individual-, school- and system-level decision making.

The following data principles appear as recurring themes in the literature on accountability, assessments, reform, and data systems:

- Longitudinal
- Student-Centered
- Disaggregated by Subgroups
- Accessible
- Seamless
- Relational
- Actionable
- Performance Based
- Timely
- Improvement Oriented

Education data should be organized by unique student identifiers so that individual student progress can be tracked across time; multi-dimensional and able to include examples of student work; able to be aggregated and disaggregated for various purposes; examined for the effectiveness of teachers, programs, interventions, strategies; and able to follow the student through a life time of learning.

Longitudinal data collection, made possible by the use of student identifiers, is particularly useful for answering questions about how well schools or programs prepare students for the next level. Too, longitudinal data makes it possible to determine what strategies really work, and to compare how schools succeed with particular student populations. Only longitudinal data can provide answers to these kinds of questions:⁷

- How well do students do who have been enrolled in this school or program for more than one year?
- How does the success of students enrolled in this school for three years or longer compare with that of students enrolled for three years in the highest-performing comparable schools?
- How do the graduates of this elementary school do in middle school?
- How well do the graduates of this high school do in college? How many of them go to college?
- How well do students perform at the end of their enrollment in this school compare with how they were performing when they arrived?
- How does this middle school perform with students who entered the school well-prepared in mathematics? How does the same school perform with students who were poorly prepared?
- How many students who were “average” when they entered high school end up taking Advanced Placement courses?

Answering these questions could have a profound effect on high school improvement. Colorado now has the capacity to collect longitudinal data. The next big challenge is making the data accessible in ways that are meaningful to a range of users.

Section III: Current Status of Colorado Education Data

As mandated by the state General Assembly, the Colorado Department of Education (CDE) collects and reports certain educational data. CDE now employs an automated data collection system, whereby district representatives send in data electronically several times each year. The automated data exchange is fairly new (piloted in 2002 or 2003) for several reporting procedures, including end-of-year data collection about pupil counts and information for the Colorado Basic Literacy Act.

Colorado has in place a strong foundation for elementary and middle school data collection. The state assessment system earns high marks for being criterion-referenced, supporting important student learning, and in alignment with state standards.⁸ Like many other states, however, Colorado falls short when it comes to capturing and reporting out key information on high schools. The National Center for Educational Accountability⁹ (NCEA) identified 9 minimal requirements for state student achievement information systems. The Council of Chief State School Officers (CCSSO), with funding from the U.S. Department of Education, asked NCEA to survey states with respect to their status on implementing the 9 data elements. Table 2 (below) shows Colorado’s results.

Table 2: How Colorado Matches with NCEA’s 9 Data Elements

<u>Elements needed for full elementary and middle school reports</u>	<u>Present in Colorado?</u>
1. A statewide student identifier system	YES
2. Fall student-level enrollment and demographic information	YES
3. Spring student-level test information	YES
4. Information on every student in a tested grade who did not take the main state test	YES
<u>Additional elements needed for full high school reports</u>	<u>Present in Colorado?</u>
5. Student-level high school transcript (course completion) information	NO
6. Student-level SAT, ACT, and AP exam results	NO*
7. Student-level graduation and dropout data	NO
8. The ability to match student records between the K-12 and higher education systems	NO
<u>Element needed to verify the accuracy of information submitted by school districts</u>	<u>Present in Colorado?</u>
9. A state data audit system	YES

* Note: The 11th grade ACT assessment is part of the Colorado Student Assessment Program. As required by SB186 (2000), 11th grade ACT results are used in the calculations for the School Accountability Reports (SAR). Results from the reading, English, and math portions of the test are used. Science results are not included in SAR calculations.¹⁰

As mentioned previously, capturing the types of data in items 5 through 8 in Table 2 are critical to informing high school improvement efforts. Now that Colorado is collecting data by unique student identifiers, the state is positioned to pick up data on SAT and AP scores. Other elements, such as the ability to match K-12 student records with records from community colleges, vocational programs and universities will require a higher level of cooperation between institutions.

States often collect measures of student performance other than tested achievement. As shown in Table 3, local report cards in more than half of the states include attendance rates or average daily attendance, dropout rates, graduation rates, and enrollment. More than one-fifth of the states also include student mobility, and promotion or retention rates on the report cards. About one-half of the states report information on Advanced Placement course-taking and test scores and average SAT or ACT scores.

Table 3: Non-cognitive Data Reported at the School and/or District Levels Across the States, 1999-2000

<u>Measure</u>	<u>Number of States Reporting¹</u>	<u>In Colorado?²</u>
Attendance Rate	39	Yes
Dropout Rate	37	Yes
Enrollment	38	Yes
Graduation Rate or Number of Graduates	27	No
Promotion and/or Retention Rate	12	No
Student Mobility/Transfer	11	Yes
AP Course-taking and Test Scores	25*	No
Average SAT or ACT Scores	25*	No

Based on the information presented in this section, a gap analysis reveals that:

- Overall, Colorado needs to build collection and reporting capacity for data essential to improving high schools. Greater accessibility and reporting capacity is especially needed.
- Data on student graduation, dropout rates, and course completions are now being collected, but full reports are not readily accessible.
- SAT, ACT, and AP exam results need to be collected for individual students and disaggregated by subgroups
- Colorado has the framework in place for longitudinal data, but full access and flexible use of this data is not yet available

Improvements to the state's education data system that focus on these areas would bring Colorado up to speed with NCEA's minimal requirements for data reporting. More importantly, closing these data gaps would help strengthen policy and decisions relating to improving high school teaching and learning.

Section IV: Conclusions and Recommendations

A robust education data system is a must for making progress on education reform. The business of developing, maintaining and operating an effective state education data system is an incredibly complex endeavor, and well worth the investment. But it will not happen without a sustained, proactive effort.

A more perfect education data system would:

1. Serve multiple purposes and audiences;
2. Provide appropriate accessibility to all stakeholders, while safeguarding confidentiality;
3. Employ best practices in data integrity and use statistically sound rules;
4. Use evidence that is accurate, appropriate, timely and based on standards (not norms);
5. Establish protocols that allow data to flow seamlessly across education agencies;
6. Follow the student from early childhood through post-secondary education;
7. Track finance data to allow for cost-benefit analyses of various strategies and programs;
8. Allow meaningful comparisons of data and outcomes;
9. Be flexible enough to respond quickly to changing needs for collection and reporting;
10. Promote improvement in student achievement.

A system that employs the principles outlined above is beyond the purview of any single group of experts, be they information technology professionals, educators, policymakers or administrators. For this reason, *Colorado needs an ongoing board or commission, comprised of members appointed for their expertise and varied perspectives, charged with overseeing the evolution of the state's education data system.* Most states have similar oversight commissions in place for complex and technical issues, such as utilities and transportation. An education data system commission will be able to consider the concerns and opinions of a wide group of stakeholders, weigh options, and recommend actions for legislators.

In addition, representatives from this oversight group should participate in ongoing, multi-state efforts to standardize education data collection and reporting, including establishing protocols for data specifications. Many states are facing the same challenges as Colorado. It would be prudent to work together to avoid reinventing the wheel and to leverage each other's investments and insights.

APPENDIX

The table below shows some of the education data needs of various audiences, and how such data can be used to improve education results.

Users and Uses for Education Data¹¹

Primary Audience	Type of Data	Current or Potential Uses
U.S. Department of Education	Disaggregated achievement results by subgroups Adequate Yearly Progress for each school Teacher qualifications School report cards	NCLB compliance Conduct research and inform improvement efforts
State Policy Makers and Education Agencies	Standardized state test scores Percentages of students achieving proficiency School report cards	Confirming state standards being met Recognize achievement Provide rewards or sanctions Provide technical assistance to districts and schools Program design Inform school choice
District Leaders	Percentages of achieving proficiency, by building, by subgroup School report cards Aggregated longitudinal student achievement data	Help parents and the community focus on student achievement Provide technical assistance to schools Prepare for NCLB AYP consequences Inform school choice Make district-wide curriculum decisions
School Leaders	Percentages of students achieving proficiency, by grade, by program, by teacher, by subgroup School report card Disaggregated longitudinal student achievement records Attendance data Graduation rates Individual student performance records	Help school community focus on student achievement Focus staff use of time Inform school choice Flag students in need of assistance Make school-wide curriculum decisions

Primary Audience	Type of Data	Current or Potential Uses
Classroom Teachers	Percentages of student sub-groups achieving proficiency Individual student subtest scores School report cards Individual longitudinal student achievement records Attendance Student performance in prior and subsequent grades Diagnostic information on students' learning needs	Help students focus on achievement Focus staff use of time Flag students in need of assistance Make classroom curriculum decisions Create additional assessment items
Students and Parents	Grades on assignments and tests Portfolio work Individual longitudinal achievement record Diagnostic information on student's learning needs School report cards	Help students focus on achievement Inform progress against proficiency standards Inform school choice
Community/Business & Industry	Percentages of students and sub-groups achieving proficiency School report cards	Help parents and the community focus on student achievement Provide assistance to needy schools

End Notes

¹ A detailed analysis of calculating graduation rates (Swanson), and recommendations for adjusting Colorado's overlapping accountability systems (Donnell-Kay/CASE) are addressed in separate reports.

² Schools Interoperability Framework, see http://www.sifinfo.org/about_sif/general_overview.asp

³ National Center for Education Statistics "Building an Automated Student Record System." 2000. <http://nces.ed.gov/pubs2000/2000324.pdf> and "Student Data Handbook: Elementary, Secondary, and Early Childhood Education." 2001. <http://nces.ed.gov/pubs2000/2000343.pdf>

⁴ U.S. Open e-Learning Consortium, see http://www.cltl.org/projects/us_open_e_learning/

⁵ Palaich, Good, & van der Ploeg. "State Education Data Systems that Increase Learning and Improve Accountability," Learning Point Associates; Policy Issue 16, June 2004. Online at <http://www.ncrel.org/policy/pubs/issues.htm>

⁶ This vision statement comes from the Task Force on Information-Based Decision Making, convened by the Colorado Department of Education in July 2002. The Colorado IBDM Initiative funded the Colorado Consortium for Data-Driven Decisions. For more information, see <http://www.cltl.org/projects/c2d3/>

⁷ Dougherty, Chrys. "The Education Data Manager's Guide to the Value of Longitudinal Student Data. ECS Policy Issue: September 2002.

⁸ See "Testing Our Children: A Report Card on State Assessment Systems." <http://www.fairtest.org/states/survey.htm>

⁹ NCEA was created in 2001 by the Education Commission of the States, The University of Texas at Austin, and Just for the Kids. The National Alliance of Business became a part of NCEA in 2002. The Center is based in Austin, Texas, and has field offices in Colorado and Washington, D.C.

¹⁰ Source: CDE PowerPoint presentation on ACT Student Biographical Data, June 2004.

¹¹ Palaich, Good, & van der Ploeg. "State Education Data Systems that Increase Learning and Improve Accountability," Learning Point Associates; Policy Issue 16, June 2004. Online at <http://www.ncrel.org/policy/pubs/issues.htm>