Promoting Data in the Classroom
Innovative State Models and Missed Opportunities

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Introduction

Throughout the past decade, states and school districts across the United States have designed new ways to expand and inform teachers' use of data in K-12 classrooms. The shift is, in part, a function of the growing availability of student data. As a result of federal requirements and state initiatives, states now collect more data on students, teachers, and academic environments than ever before. Every state maintains a student-level longitudinal data system and many of them provide important data points to school district officials, school leaders, and teachers to help inform instruction. In short, education stakeholders in school districts across the country have a variety of facts, figures, and statistics at their disposal.

The data requirements states face today are largely a product of the No Child Left Behind (NCLB) Act of 2001. In requiring states to publicly report both aggregated and disaggregated data on student demographics and achievement annually, NCLB forced them to develop more sophisticated methods of tracking such information. Subsequent federal policies furthered that trend. Taking their cues from the Data Quality Campaign, a non-profit organization that launched in 2005 to help build a data-driven educational world, lawmakers passed the America COMPETES Act in 2007. The law spells out a dozen critical elements that states must build into their data systems within a certain period of time. The America COMPETES Act also created a new competitive grant program called Statewide Longitudinal Data Systems (SLDS) Grants to help states establish or expand student data systems.[1]

States have made substantial headway in building new data systems and collecting and culling these new data points. The Data Quality Campaign, which tracks states' yearly progress on the data systems, found in its 2012 annual report that every state had at least the foundation for a data system. However, that report also noted a sobering reality: most states do very little to train teachers and administrators in how to use these data to inform and improve classroom instruction.[2]

A few states, however, are bucking that trend and are working to arm teachers with the tools they need to effectively use information in their classrooms. Through data-oriented professional development programs, they are giving teachers new skills that will allow them to better evaluate students' learning deficits and differentiate instruction based on students' needs. A teacher equipped to analyze and respond to student data might, for example, examine his third-graders' math scores and discover that while most students are grasping the new concepts, others are struggling with basic skills that prevent them from mastering more advanced math concepts. He could then provide those students intensive interventions, allowing them to catch up with the rest of the class.

This paper explores two states pursuing such professional development programs, Oregon and Delaware, that are models for both the successes and challenges other states are likely to face when implementing such programs. Their efforts share many common themes, which are instructive for policymakers who hope to replicate their accomplishments in other states. As federally funded efforts, both the Oregon and Delaware programs also demonstrate that the federal government can play a significant role in providing opportunities for innovation across the nation. This paper also examines how federal grant programs can be better targeted to encourage states and districts to adopt new efforts to encourage classroom data use and to implement them fully. ◆

The Federal Role in Educational Data

The No Child Left Behind Act launched a decade of development in state educational data systems. With its passage in 2001, states and school districts faced a new statutory requirement to produce publicly available "report cards" that included student achievement and graduation rate data both in the aggregate and by racial and socioeconomic subgroup.[3] At the time, many states were ill-equipped to track these data. Although states were not required under the law to create new data systems, the logistical task of reporting so much information *de facto* necessitated the creation of longitudinal data systems.[4]

The No Child Left Behind Act launched a decade of development in state educational data systems.

Initially, states had little support as they hurried to build out their data systems and meet the new reporting demands Congress placed on them. In 2005, however, Congress established the Statewide Longitudinal Data Systems (SLDS) grant program to provide competitive, three- to five-year grants to help states establish or expand their longitudinal databases. Since then, 47 states and the District of Columbia have received at least one grant.

Lawmakers passed the America COMPETES Act in 2007 to further shore up states' efforts.[5] The law identified 12 principles of aligned data systems. Those 12 elements contained both basic data points to provide teachers with valuable information about student learning and several more advanced components. These include unique student identifiers to link data across grades; data validity assessment tools; student test scores and transcript information; and alignment between data from K-12 and postsecondary institutions.[6] Essentially, the America COMPETES Act established a framework for the distribution of federal dollars to create and grow statewide data systems and focus states' efforts on the critical components of a useable data system.

In 2009, Congress began requiring SLDS award recipients to incorporate the 12 elements outlined in the America COMPETES Act.[7] Lawmakers injected an additional $250 million into the SLDS grant program through the American Recovery and Reinvestment Act (ARRA). Funding for the SLDS program, for which regular appropriations have fluctuated between a high of $65 million in fiscal year 2009 and a low of $38 million in 2012, has been contingent on recipients implementing the 12 elements ever since.[8]

The strong push for those key elements has paid off, according to the U.S. Department of Education. The most recent report for the SLDS grant program, which examined all fifty states and the District of Columbia in 2010, shows that over a dozen states now include all 12 of the America COMPETES elements, and only four have fewer than half of the elements.[9]

Teachers' Data Usage in Classrooms: The Next Step

Information available about students' academic progress and educational histories is of little use if educators lack the tools necessary to leverage those data in the classroom. Teachers with a solid working knowledge of academic data can use that information to assess each student's progress and better tailor instruction to their needs. These data can highlight learning deficits, help identify the source of those issues, and aid teachers in correcting them through instruction. Data make up a critical component of teachers' planning in many of the most effective classrooms.[10]

The NCLB data collection and reporting requirements mean that states make significant amounts of student data available to teachers. However, evidence suggests that few teachers have the skills or training to properly harness the power of those data. The Data Quality Campaign's annual *Data for Action 2012* report found that only four states had comprehensive plans to assist teachers in using longitudinal educational data, and ten states and the District of Columbia still fail to train teachers and principals to use data reports.[11] Only 16 states required teachers to demonstrate data literacy

skills as a condition of certification and as a requirement for approval of teacher preparation programs.[12]

Federal efforts to guide state data systems have also been lacking. The SLDS program requires that stakeholders have access to the data, but only suggests that recipients of SLDS funds "should" offer professional development to assist data users in understanding and using the data.[13]

In the words of one school district official, "We see more data drowning than data scarcity, and too much data doesn't do much good either."[14] Teachers must both understand the demographic and achievement data available about their students and be able to analyze and apply those data to instructional practice.

Other education agencies also fall short of this imperative, such as teacher preparation programs. A National Council on Teacher Quality study of teacher preparation programs noted that most teacher training programs do not include training in data literacy. Only 2 percent of 180 teacher preparation programs surveyed sufficiently explored the analytical skills needed to understand student data from assessments, and none of the programs gave teacher candidates the training necessary to apply data in their classrooms.[15]

"We see more data drowning than data scarcity."

Another obstacle to using data to inform instruction is the actual information available in state longitudinal data systems. Many of the data points currently available to teachers are not the rich, informative metrics necessary to help educators design targeted student educational plans. Instead, most of the data available to teachers come from end-of-year summative exams. By the time accountability assessments have been administered and teachers receive the scores, the students have usually moved on to the next grade.

The most powerful data for teachers' instructional improvements actually come from formative exams, those administered throughout the instructional process and

What Assessments Lead to Good Data?

There are three main types of assessments. The most common of these assessments, summative assessments, are administered too late in the school year for a teacher to use the resulting data to correct his course of action. Other assessments offer more timely information to teachers, allowing them to adjust instruction to better support struggling students.[17]

- **Summative Assessments**: Summative assessments include end-of-year exams or state standardized tests used for federal accountability efforts. They are the most common data available to teachers. Typically, they are administered at the end of the year, making them difficult to use for the purposes of improving classroom instruction.

- **Formative Assessments**: Formative assessments evaluate students' skills mid-academic unit. These assessments may provide more valuable information to teachers because they assess students' learning as it happens, allowing teachers to change their instructional strategies accordingly. However, many states do not provide standardized formative assessments, and many teachers are ill-equipped to design their own valid, useful formative assessments.

- **Interim or Benchmark Assessments**: Interim assessments are typically administered at the end of an academic unit or at other pre-determined times. They identify whether student have mastered particular skills at the end of the instructional period. As a result, teachers are unable to use the resulting data to adjust their instruction before the end of the unit, but still have time in the school year to provide interventions to those students who require additional help.

used to mold future instructional steps.[16] These exams allow teachers to correct their instruction mid-process and offer opportunities to diagnose and address student needs before the school year ends.

Because NCLB penalizes schools and districts based on their summative exam scores, it is hardly surprising that most states and schools use those data as the primary measure of student performance.[18] However, this singular focus on summative scores both restricts teachers' abilities and willingness to use data in the classroom and hinders students' potential for academic success.

Federal Efforts to Improve the Use of Data in Classrooms: An Overview

Congress and the U.S. Department of Education have launched major efforts over the past decade to expand the availability of student educational data. Each of those campaigns has received significant federal funding, and the conditions attached to the funding have transformed the data system infrastructure in use today. However, few of the efforts have placed much emphasis on teachers' understanding of the importance of data, or on professional development for using these data in the classroom. Each of those efforts is described below.

- The Statewide Longitudinal Data Systems (SLDS) competitive grant program is most directly linked to the establishment and expansion of state educational databases. Funding flows through the U.S. Department of Education's Institute of Education Sciences (IES), which promotes research-driven and evidence-based practices. The program has provided three- to five-year grants since 2005 to assist states in building and growing longitudinal data systems. Nearly every state has received at least one grant; only Alabama, New Mexico, and Wyoming have yet to receive funds through the program.[19]

Funding for the program has fluctuated in recent years. In fiscal year 2012, the Department of Education had more than $38 million to distribute to states. Through the 2009 American Recovery and Reinvestment Act, Congress funneled an additional $250 million into the program.[20]

Since the original grant competition in 2005, the Department of Education has spent more than $500 million creating education data infrastructures in nearly every state. Those federal dollars have laid significant groundwork for state data systems. Still, an analysis from the Data Quality Campaign said that "the hardest work remains"— making those data available and useful for teachers and administrators.[21]

- The Obama Administration launched the Race to the Top competitive grant program in its first term through ARRA. Congress originally endowed the Race to the Top (RttT) fund with $4.35 billion—$4 billion for grants to states to make systemic reforms, and $350 million to fund cooperative, cross-state development of high-quality assessments.[22] In its first round, only Delaware and Tennessee won grants to implement comprehensive school reform plans.

Race to the Top applicants were required to write plans that included efforts towards improving the quality and use of education data, one of the four reform pillars spelled out in the legislation. Moreover, the application required states to document the sophistication of their statewide data systems, including the number of America COMPETES Act data elements they had.[23]

Though RttT was designed as a one-time investment in school reform, Congress has continued

Figure 1: Statewide Longitudinal Data Systems: Budget History

Fiscal Year	2005	2006	2007	2008	2009	2010	2011	2012
Funding ($ millions)	24.8	24.6	49.2	48.3	335.0*	58.3	42.2	38.1

Sources: New America Foundation, U.S. Department of Education

*Includes American Recovery and Reinvestment Act funding

Figure 2: Race to the Top Awards: 2010-Present

Competition	Number of Winners	Year of Award	Total Amount Awarded ($ millions)
Race to the Top Phase One	2	2010	600
Race to the Top Phase Two	10	2010	3,325
Race to the Top Phase Three	7	2011	200
Race to the Top—Early Learning Challenge Phase One	9	2011	445
Race to the Top—Early Learning Challenge Phase Two	5	2012	133
Race to the Top—District	16	2012	373

Sources: New America Foundation, U.S. Department of Education

to provide funding for it each year since. After the first-round winners were announced in 2010, the Department of Education conducted a second round of grants using the remaining ARRA funds in late 2010. In 2011 the Department distributed a third round of grants using funds provided for the program through fiscal year 2011 regular appropriations.[24] In total, 21 states and the District of Columbia had received funds for the Race to the Top K-12 program by the end of the third round of grants, and 46 states and the District of Columbia had applied for at least one round of the competition.[25] Since then, the Department of Education has expanded the program's mission to include both an Early Learning Competition and a District competition, also with a focus on data.

• Finally, the Improving Teacher Quality (ITQ) State Grants program provides funding to every state and the District of Columbia for teacher quality activities under Title II, Part A of the No Child Left Behind Act. Unlike the Statewide Longitudinal Data Systems and Race to the Top grant programs, both of which are awarded on a competitive basis, ITQ grants are formula-funded. That means every state—and about 95 percent of all local educational agencies—receives some funds through the program.[26]

Funds are designed for recruiting high-quality teachers, shrinking student-to-teacher ratios in the classroom, providing professional development, and improving teacher and principal preparation programs.[27] Research from the U.S. Department of Education suggests that over the past decade, states have increasingly devoted a large share of the Title II funds to professional development—up to 44 percent of funds in 2012 from 27 percent in 2003.[28]

It is unclear how much of the Title II-funded professional development work is focused on enhancing teachers' understanding of data use in the classroom. However, the program's statutory language explicitly allows recipients to do so.[29]

While there are many federal programs available to assist in the development and use of student data collection systems, states rarely use them expressly to provide the access and training necessary to ensure that teachers use these data to improve instruction. ◆

Models of State Innovation: Oregon and Delaware

Oregon and Delaware are both working hard to ensure that teachers have the skills necessary to put education data to work in their classrooms. Both operate comprehensive training programs that provide valuable models for this type of work. The Oregon DATA Project is a statewide program that relies on Statewide Longitudinal Data Systems grants, as well as additional grants from the U.S. Department of Education's Institute of Education Sciences (IES), to provide training for teachers to support best practices in the use of data. The Delaware Race to the Top Data Coach Program is funded with federal RttT dollars.

Both projects provide insight into the federal role in a new field of professional development: helping teachers improve their instruction with the use of student data. Though both states have struggled to create effective, valuable programs, their experiences provide lessons to states that seek to follow in their footsteps. ◗

Oregon DATA Project

The Oregon DATA Project (ODP) provides teachers with voluntary, job-embedded professional development opportunities to learn to use data to improve instruction. Teachers engage with their colleagues in finding innovative ways to use data to assess student skills and craft responsive lesson plans. Teachers are grouped in teams, known as Professional Learning Communities (PLCs), which are run by trained staff who guide teachers through the ODP-created curriculum.

Origins of the Oregon DATA Project

The Oregon DATA Project was conceived by former teacher and elementary school principal Mickey Garrison in the 2006-07 school year with input from stakeholders in the field. She designed the program's first grant application to help build out a data infrastructure that underpins the state's ongoing data collection efforts and assists teachers and school administrators in the use of those data.

At the time, the state already had a handful of data projects in place. The Pre-Kindergarten through Grade 16 Integrated Data System (KIDS) system centralizes students' transcripts and records. The Integrated Data Transfer System (IDTS) links K-12 data with the state's community colleges and public universities. The Longitudinal Growth Model provides data on student progress to schools and school districts.[31]

However, even with all of those data available, Oregon teachers lacked the expertise to effectively use the information, and in some cases didn't even have access to the statistics they needed. As Garrison stated, many of Oregon's school districts assumed an "if you build it, they will come" approach, but quickly found that no one did come.[32]

As a former educator, Garrison had discovered the power of data. In her school, she created data teams to examine and analyze student information and build new reform strategies based on their discoveries. Throughout that process, her school made substantial strides and narrowed the achievement gap between low- and higher-income students.[33]

In 2007, the Oregon Department of Education tapped Garrison to write a grant proposal for the U.S. Department of Education's Statewide Longitudinal Data Systems competition. That proposal ultimately launched the Oregon DATA Project with a $4.7 million grant to advance

Oregon's work. This work included developing a state-wide professional development program to encourage the analysis and use of data from the Oregon Assessment of Knowledge and Skills,interim district-level measures of student achievement, and formative assessments. It also provided access to teachers and administrators to track student progress and create reports. ODP launched in the 2007-08 school year.

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Building the Oregon DATA Project

The ODP began as an almost exclusively volunteer project; Garrison and her single staff member had no other paid support. Garrison, working with other ODP leaders and independent analysts, recognized that the data project would have to be a grassroots effort and went to the field first. She created the curriculum for the PLCs cooperatively and remotely with a team of volunteers. Contributors would join online meeting sessions to construct a program to help participants build the skills they needed to analyze student data to improve instruction.

Together, teachers and leaders assisted Garrison in designing a collection of lesson plans and presentations that trainers could use during PLC meetings to advance teachers' knowledge of and skills in using student data in the classroom. Such cooperative creation of a curriculum is rare, and the efforts built a movement around the Oregon DATA Project.[34] Due to the significant geographic dis-

tances between school districts, such a statewide effort was unheard of in Oregon at the time.

Recruiting School District Leaders and Investing in Trainers

After the first planning year, the Oregon DATA Project invited districts to participate in the professional development program voluntarily. At the outset, elementary schools joined more quickly than middle or high schools. Teacher participation at the school-level was also voluntary. Sometimes, only a small group of teachers at a school would agree to participate, but the program expanded as word of mouth spread and interest snowballed. The ODP is now beginning to expand through middle schools and into high schools.[35]

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As a condition of joining the ODP, districts were required first to identify time during the regular workday for teachers to meet in their PLCs. This guaranteed that teachers would have the time necessary to incorporate data analysis into their workdays. Some administrators took the challenge very seriously; in La Grande School District, for instance, Superintendent Larry Glaze appealed to the school board and won late start times every Monday so that staff could meet in small groups with their data coaches before classes began.[36] Districts worked with ODP staff to develop implementation plans at both the

Professional Learning Communities

Both the Oregon and Delaware data projects rely on Professional Learning Communities (PLCs) to implement their training programs. Schools that participate in the data efforts in both states set aside blocks of time during regular work hours for teachers and administrators to meet with trained data coaches to learn data analysis skills, share instructional strategies, and design lesson plans based on the results of data analyses. Teachers consider this time "sacred", because it provides the additional planning time to implement new efforts to bring data into the classroom, says the Delaware project's leader Donna Mitchell.[30]

school and PLC levels, with PLC plans tailored to teachers' skill levels and needs.

Garrison worked with school districts to identify trainers for the Professional Learning Communities from among teachers, administrators, and other stakeholders. Each district took its own approach to selecting trainers. In several districts, every school administrator went through the process to become a certified ODP trainer. That training, Garrison said, gave those administrators the foundation necessary to support their teachers in their use of data.

The ODP team designed the trainer curriculum so it could be exported to remote or online training sessions. As of 2013, the state has certified 600 trainers. According to ODP staff, however, there were not enough volunteers with sufficient data experience around the state to conduct the trainer certification courses. As a result, ODP staff led the majority of the trainings.[37] More than 10,000 people across the state have received some form of training to lead PLCs, and the ODP training sessions are always full.

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According to Garrison, the trainer certification process comprised one of the most important parts of the ODP. She found that trainers must already be comfortable with student data before coming into the certification classes so that they could dive into deeper issues with data; as a result, the instructors are better able to provide consistent, reliable assistance for teachers.[38]

The trainer certification has transformed since the initial sessions. It began as a formal presentation in a classroom-style meeting, similar to other professional development programs, and developed into a workshop that combines traditional classroom instruction with small-group exercises that lead a team through a data analysis. ODP staff members present the essential components of the Oregon DATA Project to potential trainers first. Later, they combine that instruction with hands-on exercises in smaller groups

that allow workshop participants to better understand and master advanced subjects.

As the final task of the training session, participants are given a dataset and asked to analyze it and produce a plan for improving classroom instruction based on their findings. ODP executive team members observe and score their performance. Not all participants in the training sessions earn a state certification. ODP staff counsel potential trainers who do not initially meet the ODP standards until their data analysis skills improve.

Today, the Oregon DATA Project has expanded into more school districts. ODP staff does not conduct the same regular trainings. Though staff members conduct a handful of statewide trainings each year, the sessions are now run regionally by trained district staff. Certified teachers and administrators from districts around the state provide hours of training and follow-up coaching and support each year to new participants, and Garrison conducts regular check-ins via webinar to assist districts as they bump up against new hurdles.[39]

The Project's Success in Schools

In schools that fully adopted the Oregon DATA Project, data use has become a way of life. According to ODP director Garrison, the most important aspect of success is the teacher's willingness to use data to inform instruction, interest in working collaboratively, and commitment to learning to do so. Rather than feeling isolated in their classrooms, teachers work with each other to incorporate data into their lessons to bolster their students' academic success.

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Additionally, Garrison found that it was vital for participants to feel comfortable using data, even if it exposed their weaknesses. Otherwise, they would be reluctant to dive deeply into potential problems in their classrooms. ODP also found that teachers needed to feel secure enough with their data teams to take professional cues from other teachers who demonstrated better results and apply those ideas in their own classrooms.[40]

Initially, PLC work focused on examining school district-

and school-level summative data—the student subgroup testing data available for all schools as a result of NCLB reporting mandates—and understanding how to use those metrics in developing curricula and evaluating academic programs.[41] Because summative data can only provide after-the-fact analysis, it is far less useful to classroom teachers than the interim or formative assessments that occur mid-instruction. The Oregon DATA Project is now piloting training around formative assessments.

Striving for Success in the Oregon DATA Project

The Oregon DATA Project was designed to be responsive to feedback from participants. The Institute for Education Sciences (IES) ensured, as its funder, that the ODP team regularly took a step back to evaluate its efforts. IES staff visited Oregon and required monthly check-ins. The ODP team also arranged for a third-party evaluation of the program.[42]

The evaluation found that the data project has resulted in statistically significant improvements in student test scores at participating schools.

Next Level Evaluation, Inc., an independent contractor, conducted an evaluation of the Oregon DATA Project for the 2009-10 and 2010-11 school years, which was completed in Spring 2011.[43] The evaluation found that the data project has resulted in statistically significant improvements in student test scores at participating schools (Figure 3).

While students from ODP schools performed below their peers at non-ODP schools in reading in the 2008 school year, they out-performed them just four years later. In mathematics, students at ODP schools have closed the gap in scores compared to students at non-ODP schools in the same four-year period.

The independent evaluation also found that the ODP has had significant effects with regard to promoting data- and evidence-based instructional decision-making. A prior analysis of schools with data systems found that fewer than half of teachers in those schools felt they had the

skills necessary to use data for advanced decision-making purposes. The Oregon DATA Project analysis found approximately a 10 percent increase in the proportion of teachers who believed they had those skills just in the one-year period from 2010 to 2011.[44]

As a condition of ODP participation, districts are frequently evaluated in on-site visits from ODP staff. Garrison meets with districts as often as they need, face-to-face or via online virtual meetings to check in, review progress, and identify strengths and weaknesses.[46] She does the same with regional staff every six weeks. This allows staff to address regional needs, and to allocate resources where they are most needed.

Through these check-ins, Garrison has identified a number of positive outcomes from ODP participation. She believes that the program has unified school districts across a geographically expansive state where there is typically limited cross-regional interaction.[47] It has created networks of teachers who communicate across the state where previously none existed. The new training mechanisms have advanced professional development for Oregon's teachers and administrators in valuable and meaningful ways, reinvigorating schools and instilling a culture of data use.[48]

The ODP team found that success was contingent on addressing teachers' concerns about using data to assess instruction.

The Oregon DATA Project's successes were not achieved without challenges. The ODP team found that success was contingent on addressing teachers' concerns about using data to assess instruction. ODP had to respond to participants' needs and questions before teachers were willing to learn to use data and apply that knowledge in the classroom. This meant ensuring that teachers had adequate time during the regular school day to examine data and plan related instructional changes. Job-embedded training has proven critical in eliciting teacher buy-in and resolving educators' concerns.

However, some challenges are more fundamental. The Oregon DATA Project primarily uses summative data gleaned from statewide accountability tests, as well as
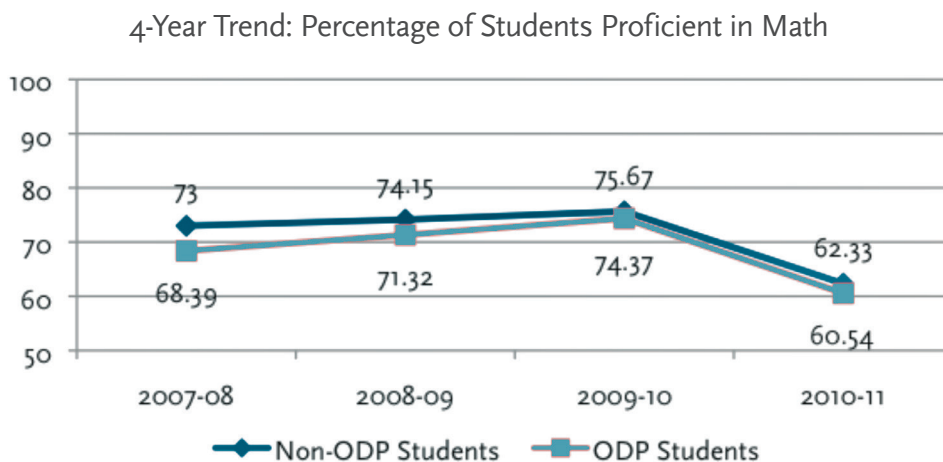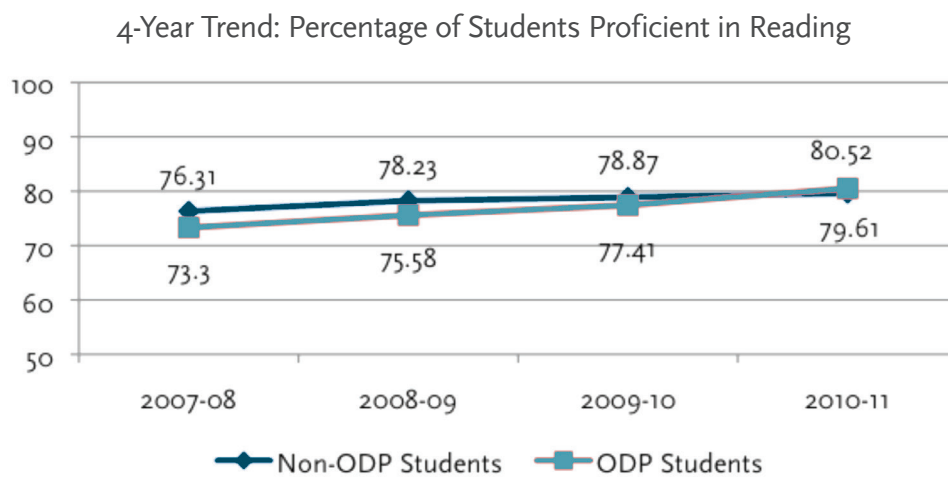
interim and formative data where available. Though teachers recognize the importance of formative data, the state has neither the time nor the capacity to develop standardized formative assessments. The ODP team has provided some training on such assessment data, but not enough to fill this need.

The Future of the Oregon DATA Project

The Oregon DATA Project's original federal funding through the IES SLDS grant ran out in August 2011. The state reapplied for federal money through the SLDS grant competition and received another three-year, $10.5 million grant from IES to continue its work through June 2013; approximately $1.0 million of that goes to the ODP.[50] After that, the future of the program's funding is uncertain. As Garrison said, Oregon is "among the walking wounded" of the economic recession. Without federal assistance, the state will likely be unable to continue a project of this magnitude. ODP staff members are exploring grant opportunities, state dollars, and foundation contributions to continue the program. ✦

Figure 3: Four-Year Trends in Student Proficiency, Oregon DATA Project

4-Year Trend: Percentage of Students Proficient in Reading

4-Year Trend: Percentage of Students Proficient in Math

Sources: New America Foundation, Oregon DATA Project
Note: Oregon raised the cut scores for the 2010-11 math exam, explaining the decline in scores for that year.[45]

Delaware Data Coach Program

The Delaware Data Coach Program was one component of the state's winning RttT grant application in 2010. It places trained professionals in schools that teach educators and school leaders to analyze student data to improve their instructional efforts and outcomes. Through this professional development, which is required of core subject teachers in grades 2 through 12, educators have a forum to collaborate and practice analyzing student data. Teachers meet in Professional Learning Communities, like those implemented in the Oregon DATA Project.

Origins of the Delaware Data Coach Program

One of only two winners from the original, stimulus-funded Race to the Top competition, the Delaware Department of Education dedicated $8.2 million over two years of its $19 million grant to the Data Coach Program.[51] The U.S. Department of Education's substantial award to Delaware is a testament to its interests in this emerging field.

Before receiving the grant, Delaware had already built a strong foundation in academic data systems. The Delaware Student Information System (DELSIS) assigns every K-12 student a unique identifier so that each can be tracked longitudinally; the Statewide Pupil Accounting System (eSchoolPLUS) tracks data for all public school students; and the Delaware Educator Data System (DEEDS) captures teacher data, from participation in educator preparation programs to certification and professional development.[52]

> In spite of all the data systems in place, Delaware education official Donna Mitchell had to acknowledge that the state was "data rich and information poor."

In spite of all the systems in place, though, state education official Donna Mitchell had to acknowledge that the state was "data rich and information poor."[53] To improve the accessibility and usability of these data, the state's Race to the Top application included creating the Delaware Comprehensive Assessment System, a computer-based system to provide more valuable student assessment scores to teachers. This

Timeline: Delaware Data Coach Program

JULY 2009	Race to the Top grant competition announced. Delaware begins application process.
JANUARY 2010	Delaware submits RttT application.
MARCH 2010	Department of Education announces Delaware and Tennessee are RttT Round One winners.
FEBRUARY 2011	Delaware launches data coach pilot program in 20 schools around the state.
FALL 2011 - SPRING 2013	Delaware expands Data Coach Program to all schools in the state with data coaches' participation in Professional Learning Community meetings.
AUGUST 2012	State releases survey results from 2011-12 participants.

setup would support teachers in using those and other data in the classroom to improve instruction.[54]

With fewer than 130,000 students in public education across the state, Delaware is one of the smallest states in the country.[55] That gives the project's leader in the state Department of Education, as well as data coaches across the state, greater ability to meet regularly with education stakeholders than in other states. As a result, the Delaware Data Coach Program was better able to respond to teachers' needs and to correct implementation mid-course.[56]

Building the Delaware Data Coach Program

In talking to teachers and school leaders, Delaware Department of Education officials found that many teachers lacked the skills necessary to use available student data to change individual student results. Much like Oregon, Delaware sought to address this skills vacuum through a professional development program—the Data Coach Program. Every local educational agency in Delaware is required to participate in the Data Coach Program as a condition of the state's RttT award.[57] Moreover, every core subject teacher for grades 2 through 12 is required to participate. For teachers in the untested grades—kindergarten and first—participation is voluntary.[58]

Much like Oregon, Delaware sought to address this skills vacuum through a professional development program—the Data Coach Program.

Delaware also organized teacher participants in Professional Learning Communities. Rather than training school-based personnel to lead data-use professional development, the Delaware Department of Education officials contracted with an outside organization to provide coaches to do this work.

Data Coach Recruitment and Project Design: A Partnership with Wireless Generation

Rigorous selection of data coaches is one of the Delaware program's key components. Beginning in January 2011, the Delaware Department of Education contracted with New York-based Wireless Generation to provide data coaching services to schools. Wireless Generation administers the Data Coach Program, but state officials oversee the imple-

mentation. In total, the project's leadership comprises five members, including a Wireless Generation official and a lead data coach who was hired specifically for the program.[59]

Prospective coaches completed rigorous interviews with the Delaware Department of Education and Wireless Generation. Each candidate was given the same data set and 48 hours to prepare an analysis and recommendations to the project's leadership in a simulated school presentation. Applicants also had to lead a mock Professional Learning Community meeting for teachers and school administrators to demonstrate their coaching skills.[60] Each of the coaches has an average of 14 years of education experience, including several years of classroom teaching.[61] Once they were hired, the coaches went through a ten-day training program known as the "Coaches' Institute." They were introduced to the components of the Delaware project and familiarized with the terminology and culture of the project.[62] After the Coaches' Institute, they were sent out to their assigned school districts.

The coaches participate in continued professional development each month, and meet with other coaches at least twice a month.[63] A monthly session brings together all 29 state data coaches, as well as the Delaware Department of Education and Wireless Generation staff assigned to the project. During these meetings, they reflect on their efforts and participate in continuous professional development.[64]

Data coaches lead PLCs to provide teachers the skills necessary to harness academic data to improve instruction. Coaches also work individually or in small groups with teachers who require additional instruction and observe teachers in the classroom to provide instructional input.

Teacher Meetings and Professional Learning Communities

As with the Oregon Data Project, teachers in the Delaware Data Coach Program stressed that they needed time during the workday to collaborate with their colleagues on data analysis.[65] Thus, the Delaware Data Coach Program is rooted in Professional Learning Communities, or PLCs, small teams that provide teachers ample time to collaborate with data. They meet for at least 90 minutes every week, and coaches are required to attend sessions at least every other week.

Teachers and school administrators are required to attend every meeting of their PLCs. Administrators often act as

Early Educators and Data-Driven Instruction

One challenge that both states face is how to address early grade teachers whose students do not take the standardized tests mandated through No Child Left Behind.[66] NCLB-required state standardized tests apply only to third through twelfth grade, and assessments for younger children are often subjective and cannot provide a basis for data analysis.

In Delaware, kindergarten and first grade teachers were invited, but not required, to participate in the program. However, every kindergarten and first grade teacher agreed to participate. To accommodate those teachers, the state is developing off-grade assessments, as well as assessments for non-tested subjects, and uses a within-year growth measure for early grade teachers. The metrics include student growth objectives to measure children's academic and socio-emotional development, as well as internally or externally vetted assessments.[67]

The Oregon DATA Project is also beginning to develop standardized metrics for younger children, including a kindergarten assessment measure piloted by early learning officials. Currently, the state uses interim measures of early learning that allow teachers to constantly assess progress. Evaluations vary by district, but some use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) assessment, which covers kindergarten through sixth grade students, or the easyCBM assessments for kindergarten through eighth grade students for literacy and math.[68]

Neither state was prepared to incorporate early grade teachers into its respective data projects. However, both are striving to improve their efforts for teachers in the early grades by reaching into the relatively new and ever-growing field of early learning assessments and working to develop and adopt measures of learning in young children.

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facilitators alongside the data coaches. Additionally, the state's teacher evaluation system aligns with the implementation of the Data Coach Program, requiring teachers to participate in the PLCs and maintain student data on formative assessments, attendance, and other classroom factors.[69, 70] The teacher evaluation system takes into account whether teachers use data to tailor their instruction to students based on the outcomes of those assessments.[71] Teachers who absorb the data skills taught during the PLCs and apply them in their classrooms receive higher scores on their evaluations.

During PLCs every other week, the coaches model and then facilitate teachers' efforts to analyze data on student progress and apply those results in the classroom; in the intervening weeks, the teachers lead their own conversations.[72] The PLCs provide teachers the opportunity to learn through application, as they analyze their own student data. Each district has leeway to focus on the issues most central to their needs. While some focus on math for virtually all of their coaching sessions, other schools place more emphasis on reading. The coaches also conduct classroom observations to assist teachers in applying the lessons learned in the PLCs to their classes.[73]

Developing the Data Coaching Framework

Wireless Generation created a framework for data coaches to use while training teachers to use data to improve instruction and student outcomes. Through the framework, called "Taking Action with Data," coaches demonstrate four essential components of data use, imparted over six separate, 10-to-14-week phases, which become progressively more advanced.[74] Designed to be a process of discovery, practice, and application of each particular topic, each phase of the curriculum ranges from understanding the data and using the metrics to modify classroom instruction, to detailed lesson planning to promote student subgroups' academic success, to embracing a culture of data across the school.[75]

The coaches are responsible for building teachers' familiarity with several uses of data. Those four components include:

- Data Inference: Pulling useful information from multiple data sources to answer analytical questions about students

- Differentiated Instruction: Allowing teachers to understand when to utilize whole-class versus small-group or individual instruction

- Cycles of Inquiry: Analyzing data to identify students who need additional help, develop new teaching strategies, assess student growth, analyze the results, and repeat for the next curriculum topic

- Collaborative Data Conversations: Providing low-stakes opportunities for discussions and collaborations with colleagues[76]

Once teachers have internalized these four components, they will be well equipped to use student data to improve their instruction. Eventually, the PLCs are expected to be self-sustaining, eliminating the need for coaches. According to Donna Mitchell, the project's director, "The challenge was determining how to build capacity at the local level so that when the money is gone, [the data coaches] will have coached themselves out of a job."[77]

Setting the Data Coach Program in Motion

The Delaware Data Coach Program was ambitious, particularly in light of the other reforms associated with the state's Race to the Top proposal. The state planned for the data project to last for the full four years of the RttT grant, with the data coaches installed in schools for the middle two years.

Piloting the Data Coach Program in Schools

The data coach program started as a three-month pilot in February 2011. Project staff selected the first five of the eventual 29 coaches hired from an applicant pool of more than 1,300 people to pilot the program.[78] The five coaches were deployed to 20 schools around the state.[79]

The state expected that most schools would progress through the first three of the six phases outlined in the framework in the first year of implementation, and the second three phases the next year. However, the pilot showed that most schools were more advanced than expected, already at phase two or phase three at the start of the Data Coach Program.[80] Project staff accelerated the implementation of the framework to meet teachers at their levels, rather than hold them back, when it was fully taken to scale.

Scaling up the Data Coach Program

The full Data Coach Program launched in all Delaware schools in the fall of 2011 and will continue through the end of the 2012-13 school year.[81] By the start of the 2012-13 school year, the Data Coach Program had 29 coaches in all 41 school districts in the state. Delaware's 200 schools contain roughly 1,500 Professional Learning Communities, which engage approximately 7,500 educators in the use of data in classrooms.[82]

The pilot showed that most schools were more advanced than expected, already at phase two or phase three at the start of the Data Coach Program.

Each school district selected one of two models for data coaches. Initially, 40 percent of districts adopted the Direct Facilitation model, in which Wireless Generation's data coaches work directly with schools' PLCs through weekly or bi-weekly meetings.[83] The remaining 60 percent of districts selected the Coach-the-Coach model, in which a teacher or administrator in each PLC adopts the responsibilities of a data coach and leads the PLC. Since that time, the data coaches have worked to "coach themselves out of a job," and very few local educational agencies remain under the Direct Facilitation model.

The Coach-the-Coach model was designed for schools that already had PLCs as part of their professional development strategies. At these schools, teachers or administrators designated to take on data coach responsibilities were originally required to attend the Wireless Generation data coach training program for four hours each month.[84] However, the coach-candidates struggled to find the required hours. As a result, the program's leaders adapted the Coach-the-Coach method to better account for the amount of time teachers had available. Teacher coaches rarely fulfill their four hours of training in one or two sittings; instead, professional development is spaced over the course of the month.[85]

Is the Delaware Data Coach Program Working?

Though the Delaware Data Coach Program is still in progress, the state has been diligent in tracking its successes. The data coaches are required to provide monthly progress reports to the state's project leaders.[86]

To accurately measure the work of the Professional Learning Communities, data coaches rate each PLC monthly based on how well the participating teachers understand the data analysis material and use of the relevant strategies in their classrooms. Coaches rate the PLCs green, yellow, or red and report the ratings to the state. That way, state leaders and coaches know at a glance how their PLCs are doing. No PLC stays in the red zone for long without a rapid intervention from the coaches. Coaches also keep more detailed metrics of their PLCs between monthly official ratings, from which they can identify and isolate problems and design detailed action plans to respond.[87] By the 2012-13 school year, most PLCs were rated "green," with few yellow or red ratings—a significant improvement over the program's first year of implementation.[88]

According to project leader Mitchell, the schools that demonstrated some improvement in student assessments on mid-year tests tended to be those that had the cleanest implementation of the Professional Learning Communities. They typically had few logistical or scheduling disputes and enjoyed the support of teachers and administrators within the school.[89]

How Teachers and Other Participants View the Program
Because the Data Coach Program was only one of a package of reforms in the state's RttT grant and every school district in the state participates in the program, it is difficult to determine causal effects of the project itself on student achievement. The Delaware Department of Education is working to produce an independent analysis of the program's impact on student achievement, the results of which have not yet been published.[90]

However, the state did conduct a survey of nearly 5,000 teachers who participated in the project in the 2011-12 school year. The survey yielded generally positive assessments of the data coaches and of the project.[91] Eighty-seven percent of teachers felt that looking at student data provided valuable information in providing differentiated instruction to their students. Sixty-three percent of respondents agreed that the Professional Learning Communities help them build skills around the collection and use of data. Eighty-eight percent of those respondents, and nearly 60 percent of all respondents, reported feeling more confident in making data-based instructional decisions as a result of participating in the PLCs.

Additionally, the survey showed that the most effective PLCs were those school administrators regularly attended. Administrators were most likely to attend the PLCs in elementary schools. Nearly 60 percent of elementary school teachers said administrators frequently or almost always attended the PLCs, whereas only 36 percent of high school administrators did.[92]

Eighty-seven percent of teachers felt that looking at student data provided valuable information in providing differentiated instruction to their students.

Challenges and Lessons Learned in Delaware
The Delaware Data Coach Program faced a number of hurdles in its implementation. Scheduling the PLCs presented a planning challenge for schools. According to Mitchell, as well as feedback on the state's teacher survey, the state initially failed to provide enough support to school leaders in building teachers' workdays around Professional Learning Communities.[93] That strained teachers' capacity to participate in the PLCs on top of their regular responsibilities.

Additionally, the decentralized Coach-the-Coach model, in which outside data coaches worked with designated school personnel who lead their own PLCs, generated its own difficulties. Not every teacher who was selected as a school coach was effective in that role. Some principals who became data coaches also needed more training and support on data use and on coaching methods.[94] Officials also made the Coach-the-Coach model more direct in the second year of implementation. School-based coaches now have on-site interactions with the state data coaches, providing direct access to the outside coaches' expertise and resources. Under the revised model, state data coaches can be more reactive to schools' needs and teacher coaches' capacity and provide more thorough coaching.[95]

Finally, every school needed an effective champion of the project if it hoped to succeed. This typically came from a school principal or other leader. Principal involvement in the project also led to richer teacher evaluations because the principals were included in weekly professional development activities. ◪

Common Themes of the Oregon and Delaware Efforts

The Oregon DATA Project and the Delaware Data Coach Program were born of different approaches, but shared a common philosophy: student data are of little use unless teachers can harness that information in the classroom to tailor instruction to student needs. Other states seeking to implement similar efforts have much to learn from Oregon and Delaware.

> Data are of little use unless teachers have the power to harness that information in their classrooms. Other states seeking to implement similar efforts have much to learn from Oregon and Delaware.

Professional Development Focused on Building and Maintaining Data Skills

Both states found that they could not train teachers to use data effectively in the classroom through a single, day-long professional development session. Teacher preparation programs rarely include instruction on data analysis and methods. Few teachers have existing familiarity with data or the skills necessary to use data to inform instruction. Understanding the power of assessments and the value of student data is a time-consuming process, requiring intensive instruction and practice.

Allowing for Workday Participation

Both the Oregon and Delaware efforts found that data-focused professional development was successful only when embedded into the workday. Teachers felt that they did not have enough time in the day to learn the new data concepts unless the Professional Learning Communities occurred during regular working hours.

Both projects are predicated on guaranteed planning time for participating teachers. Each participating school is required to provide teachers with a set amount of time to regularly participate in the instruction and collaborative portions of the project. Although in some cases this led teachers to resent the lost classroom planning time, it strongly contributed to the success of the projects by enhancing cooperative efforts and building team uses of the data.

High-Quality Coaching for Teachers

Both Oregon and Delaware began with instructors and coaches outside the school building, with the intention of training teachers and developing their long-term skills. Highly trained coaches provided skills-based trainings with the hope that they would eventually "train themselves out of a job." with a strong internal working knowledge of data use and a data-heavy culture in schools, the projects could therefore become self-sustaining. Because the data coaches were so intrinsically important to each of these two projects, the hiring process was intensive in both states. Initial hiring relied on mock coaching sessions and trial activities that gave the project leaders a sense of whether the candidates were capable coaches as well as data analysts.

Administrator Support of Data Efforts

The most successful schools in both Oregon and Delaware benefited from administrators who fully embraced the power of data, integrating it into the school's culture and championing the mission. These schools had greater implementation success, including more teacher buy-in and advanced efforts to use data in the classroom.[96] Administrators in these schools were more willing to respond to teachers' concerns about time constraints and actively encouraged teachers to participate in the data analysis and the Professional Learning Communities during the work week. Strong leadership is essential to urge teachers to expand their knowledge of the data project and improve upon their own work. ◆

Federal Policy Implications

Several federal programs already exist that states and school districts can leverage to improve the use of data in the classroom through job-embedded professional development. However, it is clear that without clear guidance and financial and technical support, states are unlikely to use these programs. Policymakers can reshape these existing federal programs in key ways to encourage states and school districts to take on these new instructional efforts.

Statewide Longitudinal Data Systems: Wide Opportunities but Limited Reach

Now that most states have already incorporated the majority of the 12 essential data components specified in the America COMPETES Act into their data systems, they can use SLDS grants to tackle more involved projects. The Department of Education should more deliberately target Statewide Longitudinal Data Systems grants to create or shore up data-focused professional development programs, either through sub-grants to states that have particularly ambitious plans or as a data priority included in all future rounds of the grant competition. A redesigned SLDS program that focuses on the *use*, rather than simply the existence, of data could become a sub-grant, like the one Oregon received for its Oregon DATA Project. A new grant priority incorporated into the existing SLDS grant could encourage more states to include such work in their applications.

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Race to the Top: An Uncertain Future

The Race to the Top competitive grant program funded the Delaware Data Coach Program. The original competition application centered on four education reform principles: educator improvement and development; heightened curriculum standards; school turnaround efforts for the low-est-performing schools; and the expansion of data systems and their use. As the Delaware project shows, the RttT program already gives states a significant opportunity to implement data projects.

However, the data portion of RttT is only a small section of the overall grant program; the data systems component comprises only 9 percentage points in the RttT application rubric, and using data to improve instruction makes up less than 40 percent of that section. States that receive grants must implement a multipronged, comprehensive reform effort, through which the data elements could be lost in the shuffle. It is not a well-targeted, exclusively data-oriented program, and major data reforms can likely be better accomplished in a program with a more narrow focus.

States that receive RttT grants must implement a multipronged, comprehensive reform effort, through which the data elements could be lost in the shuffle.

Additionally, Race to the Top began as a one-time funding infusion through the American Recovery and Reinvestment Act of 2009. Though Congress has appropriated funding to the project every year since, including nearly $550 million in fiscal year 2013, pre-sequestration, continued financial support is far from certain. President Obama's fiscal year 2014 budget request included funding only for a higher education RttT competition, and it remains to be seen whether Congress will appropriate any funding for the program in 2014. Particularly in a challenging fiscal environment, it is ill-advised for states to rely on the continued existence of a recently developed program.

Teacher Quality State Grants: Opportunities Abound

The Improving Teacher Quality State Grants program holds the most potential as an untapped federal resource

for expanding data-driven instruction. Currently, most of the funds are used for class size reduction or isolated professional development activities.

The program issues funds through a formula, rather than competitively. That means every state and most school districts receive a portion of the funds. The program is an ongoing component of the U.S. Department of Education's annual budget, and the policymaking community operates with the tacit understanding that the program will receive at least the same approximate level of spending it did in the prior year.

To better leverage the nearly $2.5 billion program to promote data-focused professional development, the Department of Education could extend or change the grants' professional development goals. Similarly, federal dollars could be buttressed with state and local dollars to ensure state-level oversight and local-level implementation.

Though the Improving Teacher Quality State Grants program does currently allow schools and districts to use the funds for professional development projects like those in Oregon and Delaware, Congress should, when it reauthorizes NCLB, explicitly promote those activities within the program. Incentives should be built into the existing program, possibly as a set-aside of federal funds, to focus specifically on data-oriented and job-embedded professional development activities. ➡

Conclusion

Federal policy has made great strides in the past decade with respect to the collection and availability of student data. A number of policies, taken together, now ensure that states collect and report data on student achievement on state standardized tests, and virtually every state has a longitudinal data system in place. Yet those policies hold greater promise than simply making more information available on student performance. If policymakers focus on those student data at the classroom level, and arm teachers with the skills necessary to use the data to inform instruction, they can open new doors for teachers and students alike. Many more states could join the ranks of Oregon and Delaware if policymakers ensure that states have sufficient funding—and sufficient incentives—to develop their own models of professional development in data literacy. ➡

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