The authority on professional learning

JSD

theme CONTENT-SPECIFIC

Forward thinking, in the field and in the mind

How can you solve "new math" problems with an "old math" mind?
— Linus van Pelt of "Peanuts"

Charlie Brown and his friends were critical to my early philosophical outlook, not to mention my understanding of mathematics education. I remember wondering how new math was different than old math. Was I doing new math? When would my teachers tell me it was time to ditch the old math? It was only much later when I was working in education that I started to grasp the differences in approaches to mathematics curriculum, by which time the new math was old, and the new, new math was causing its own controversies.

The original new math was part of the Sputnik era of education reform, which also included several new science curriculum initiatives, many funded by the National Science Foundation. More than 50 years later, we're experiencing another era of concern over the U.S.'s ability to thrive and compete internationally, and we're seeing renewed emphasis on strengthening education, particularly in mathematics, science, and related fields.

To answer Linus' question, we can't

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really solve new math problems with an old math mind. But the good news is that we can create new math minds, and new science minds, and new language arts minds, and not just for students but for teachers and school leaders as well. We've seen many schools and districts that are working to create new mindsets for educators with effective strategies and compelling visions grounded in data about what students need and research about what works. The research consistently highlights that effective professional learning is grounded in the subject matter areas for which teachers are responsible.

We have great examples in this issue of *JSD*. Read about a group of principals in Michigan who committed themselves to learn — or rather relearn — algebra as part of their effort to boost their instructional leadership capacity. In spite of their fears, they found themselves prepared to help teachers create rigorous learning opportunities for students (see p. 30). Explore how the Clark County (Nev.) School District established districtwide goals across hundreds of schools, thanks to leadership teams in mathematics (see p. 12). And meet educators in California who strengthened the academic language skills of their students and met critical student achievement targets as a result (see p. 24). You'll find several other examples in this issue, and I would love to hear about more.

At NSDC, we realized that our mindset and our field were in the midst of a significant transformation. Looking forward, we could see significant challenges in professional learning that require urgency and efficiency. We determined that the name National Staff Development Council no longer effectively represented the work we do.

In making the transition to a new name, we knew we needed to articulate with clarity what the organization stands for. Given our commitment to our purpose, this step was simple. Our purpose — every educator engages in effective professional learning every day so every student achieves — drives our plans and our actions. We know that this same purpose drives our members as well.

With the name Learning Forward, we found a match between our identity and our aspirations. As the name implies, we are looking forward. We know the generations of educators to come will be the leaders who achieve our purpose. With learning as our core value and the promise of what lies ahead, we're confident we'll meet our challenges. Our members won't settle for less. ■

essentials

PUTTING DATA TO WORK

"Effectively linking teachers and students: The key to improving teacher quality"
Data Quality Campaign, July 2010

High-quality data are critical in developing definitions and policies to improve teacher effectiveness and student achievement. This policy brief explores the challenges faced by states and districts and presents examples of successful policies and strategies. While data is useful to policy makers, teachers can use the information to assess and strengthen their own instruction — and student outcomes. Above all, the report argues, quality information is necessary for making decisions related to personnel, professional development, programs, curriculum, and more.
http://dataqualitycampaign.org/ resources/details/993

EXEMPLARY SCHOOLS EXAMINED

"How high schools become exemplary: Ways that leadership raises achievement and narrows gaps by improving instruction in 15 public high schools"
The Achievement Gap Initiative, June 2009

How do some schools become models of achievement? A report from the Achievement Gap Initiative's annual conference looks at 15 exemplary public high schools from around the country. An analysis of the presentations about these schools and the subsequent Q-and-A sessions reveals that what the schools share is strong leadership. When the schools' leadership teams focused on improving instruction — organizing teacher learning sessions, expressing clear definitions for achievement, monitoring students and teachers, and working collaboratively with their peers — student outcomes also improved.
www.agi.harvard.edu/events/2009Conference/2009AGIReport.php

MIDDLE SCHOOLS PROJECT
Success at the Core

A pilot project in Washington state, Success at the Core, is showing promise for its positive impact on teaching as well as student achievement. After wrapping up its trial year, an independent evaluation of the online professional development program found that middle schools using the tool kit reported improvements in student engagement as well as in professional culture, leadership capacity, and instructional focus. The free program is available to all Washington state middle school educators. Registration grants access to seven modules designed for leadership teams and 24 instructional strategies for teachers.
www.successatthecore.com

ALIGN POLICY AT ALL LEVELS

"Improving school leadership: The promise of cohesive leadership systems"
The Wallace Foundation, December 2009

Principals play a critical role in improving school instruction and achievement. Coordinating school, district, and state policies related to leadership standards, training, and work conditions — creating what The Wallace Foundation calls a "cohesive leadership system" — are essential for boosting that role. The report, focusing on 10 states and 17 school districts, found that creating policy alignment is a challenge, but in areas with significant progress, principals reported feeling more effective and empowered in their efforts to make academic improvements.
www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAreasofFocus/EducationLeadership/Pages/ Improving-School-Leadership-The-Promise-of-Cohesive-Leadership-Systems.aspx

THE MANY USES OF TECHNOLOGY

"Teachers' use of educational technology in U.S. public schools: 2009"
U.S. Department of Education Institute of Education Sciences, National Center for Education Statistics, May 2010

This report presents national data on public elementary and secondary school teachers' use of technology. The study also explores professional development and teachers' use of technology to research student data. For example, in a 2009 survey featured in the study, 94% of teachers reported that their school or district network had a system for entering or reviewing students' grades, and 90% used such a system to look up the results of student assessments.
http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010040

THE EUROPEAN SCENE

"Creating effective teaching and learning environments: First results from TALIS"
Organisation for Economic Co-operation and Development and the European Commission, November 2009

A 2009 survey of teachers in 23 European countries found that effective feedback, variety, and scheduling flexibility are essential to teachers' involvement in and experience of professional development. Teachers reported that professional development is an established aspect of their work lives, highlighting its potential for improving instructional practices and student achievement. Integrating training into teachers' existing schedules, enhancing feedback and appraisal, and fostering positive work environments are recommended. The data offer the first internationally comparable information on European teachers' working conditions.
www.oecd.org/document/0/0,3343,en_2649_39263231_38052160_1_1_1_1,00.html

QUALITY TEACHING MATTERS

"Phi Delta Kappa/Gallup poll of the public's attitudes toward the public schools"
Phi Delta Kappa/Gallup, August 2010

Better professional development is essential to improving the quality of the nation's teachers, and quality teachers are key to strengthening schools and boosting student achievement. These are some of the findings of an annual national poll conducted by Gallup for the professional association Phi Delta Kappa. Nearly half of the poll's respondents described teacher learning as a critical factor in improving student learning, and improving learning was rated the single most critical issue facing the nation's schools. The responses indicate the importance of providing teachers with high-quality, consistent, data-driven professional development.
www.pdkintl.org/kappan/poll.htm

IN THIS ISSUE OF *JSD*   **THE LEARNING STARTS HERE** ▼

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LEARN MORE ONLINE

Access the online learning guide at
www.learningforward.org/news/jsd/
to support team-based learning using this issue.

Quotable

Content is No. 1

"Professional development with a sustained focus on subject teaching — strongly tied to the curriculum, instruction, and assessment that students would encounter — produces the most consistent effect on subject teaching and student learning. Other professional development emphases, such as using hands-on activities, organizing cooperative small groups, taking steps to increase gender equity, or preparing teachers for leadership roles, certainly respond to widespread interests and concerns. However, none of them shows a consistent relationship to teachers' conceptions of subject teaching or reported practices of subject teaching. Only the professional development focused on subject knowledge for teaching does so."

Source: Little, J.W. (2006, December). *Professional community and professional development in the learning-centered school.* Washington, DC: National Education Association.

For more information, see
www.nea.org/assets/docs/mf_pdreport.pdf

OUT-OF-FIELD TEACHING

"Teachers cannot teach what they don't know." So opens a recent Education Trust report (Ingersoll, 2008). Based on an analysis of data from the U.S. Department of Education, the report highlights out-of-field teaching and its disproportionate effect on high-poverty schools. When teachers do not have a solid grounding in the subjects they teach, particularly in middle and high school, they are just one chapter ahead of their students. While the report analyzes causes and promising practices, Learning Forward knows that the out-of-field teaching issue is just one of many reasons that content-specific professional development is critical.

For more information, see
www.edtrust.org/dc/publication/core-problems

STEM is in

Science, technology, engineering, and mathematics, or STEM, education is more intensely in the spotlight recently, thanks to several high-profile education initiatives and reports. Motivated in part by concerns about the United States' ability to compete in a global marketplace, these initiatives concentrate resources and expertise on questions about creating more effective teaching and learning from kindergarten through college and beyond. Professional learning is always part of the equation.

The Opportunity Equation: A partnership between the Institute for Advanced Study and Carnegie Corporation of New York. **http://opportunityequation.org**

Change the Equation: Led by a network of CEOs, the initiative pairs business and education interests. **www.changetheequation.org**

Preparing the Next Generation of STEM Innovators: The National Science Board's recommendations for developing talent in key fields. **www.nsf.gov/nsb/publications/pub_summ.jsp?ods_key=nsb1033**

Report to the President: Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math for America's Future: From the President's Council of Advisors on Science and Technology. **www.whitehouse.gov/administration/eop/ostp/pcast**

Where	%
Grades 7-12	17.2
Grades 5-8	42
High-poverty schools	27.1
Low-poverty schools	13.9

Out-of-field teachers in core academic classes

Source: Ingersoll, R. (2008, November). *Core problems: Out-of-field teaching persists in key academic courses and high-poverty schools.* Washington, DC: The Education Trust.

A vision *for* tomorrow

Many of the writers in this issue of *JSD* share their professional learning strategies and student successes in specific content areas. In each case, educators set a vision for improvement. What is your school or district's highest need in this arena right now? Focus on just one area for improvement. Consider the following questions to take your first steps in creating a vision.

- How will the teacher start the class for the day?
- How will students in these classrooms be spending their time?
- What materials will they be using?
- What questions will teachers ask of their students?
- What questions will students ask of their teachers?
- What support will the student who struggles the most find in the room?
- What support will the most advanced student find in the room?
- If a principal enters the room 5 minutes before class is over, what will she or he see?
- How will the teacher know this was a successful day?
- How will the students know this was a successful day?
- How will the students describe the day to their parents?
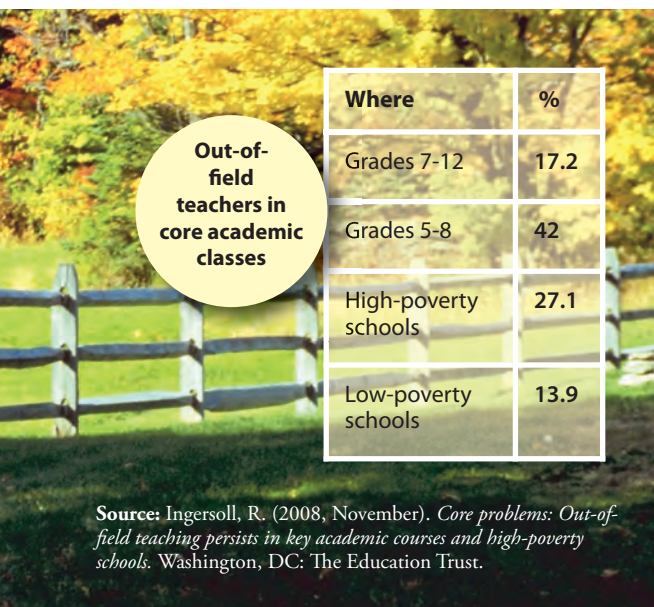
CORNERSTONES OF

An educator's challenge is knowing what to teach and how to teach it

By Tracy Crow

A key finding in the first report from Learning Forward's ongoing research project on the status of professional learning in the U.S. states: "Effective professional development is intensive, ongoing, and connected to practice; **focuses on the teaching and learning of specific academic content;** is connected to other school initiatives; and builds strong working relationships among teachers. However, most teachers in the United States do not have access to professional development that uniformly meets all these criteria" (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009).

As is clear from this finding and dozens of research studies, content knowledge is essential. Joellen Killion, Learning Forward's deputy executive director, illustrates this point beautifully in a story in one of her columns for the *Teachers Teaching Teachers* newsletter. In writing about the Quality Teaching standard, Killion explains the need for skillful teachers to integrate teacher content knowledge, instruction, and assessment. As she gives examples to support her point, she remembers attending a mathematics educators conference, where a general session facilitator asked attendees to comment on a videotaped teaching lesson. Killion at first held back and, when no one else spoke, shared her opinions about all of the things the teacher did right in the lesson: how she engaged the students, how she talked about the concept in concrete ways, and so on. Others in the session chimed in. Killion writes, "Shortly into the participants' comments, a distinguished gentleman (I learned later that it was Hyman Bass, world-renowned mathematics educator and researcher) rose from the dais, approached the microphone, and stated, 'Yes, you are correct. Because she taught so well, it is now unlikely that these students will unlearn the incorrect concept she taught them in this lesson. Just because she can teach well does not mean she can teach the content accurately' " (Killion, 2010, p. 9).

Killion continues, "My experience in being too quick to look at the practice of teaching through a purely pedagogical lens has helped me look more carefully at teaching as a nexus of the content, teaching, learning, and assessment."

As Killion stresses, content is essential, but it isn't the only consideration. Lee Shulman (1986) coined the term "pedagogical content knowledge" to represent the intersection of knowing a subject matter well and knowing also how to teach that subject. Pedagogical content knowledge includes knowing how to make key aspects of a subject comprehensible to students and understanding what topics are easier or harder to learn. Shulman argued that teachers need a wide range of strategies for teaching their content area, strategies they gain through research and practice. Deborah Ball (2000) recognizes the ongoing tension (since the time of Dewey) between subject matter pedagogical knowledge in teacher education and notes also what some see as another competing priority — attending to a diverse student body equitably. Yet, as she states, a deep understanding of a content area serves all students well: "Knowing content is … crucial to being inventive in creating worthwhile opportunities for learning that takes learners' experiences, interests, and needs into account" (p. 242). The challenge, Ball notes, is that teacher learning is fragmented, and teachers are left on their own to integrate subject matter, pedagogy, and myriad other concerns.

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QUALITY TEACHING

Implementing common standards requires a real commitment to learning

By Hayes Mizell

In this era of dissatisfaction with public education, there are many big ideas for reform. Some are intriguing but impractical; others are promising but fail to gain a constituency. And even worthy proposals that education leaders support may not survive the rigors of implementation.

It will be unfortunate if this is the fate of Common Core State Standards. Led by the National Governors Association and the Council of Chief State School Officers, 49 states and territories are participating in the initiative. The goal is to have a common set of standards that states can adopt voluntarily. A state may choose to include standards beyond the common core, as long as the common core represents at least 85% of the state's standards in English language arts and mathematics.

The sponsoring organizations published the standards earlier this year, which "define the knowledge and skills students should have within their K-12 education careers so that they will graduate high school able to succeed in entry-level, credit-bearing academic college courses and in workforce training programs."

This is the next logical step in the standards movement. The Common Core State Standards refine states' previous efforts by reducing the number of standards and increasing their depth and sophistication. Equally important, the new standards can replace the patchwork of current standards, whose quality varies widely among the states. The developers hope the standards will "help ensure students are receiving a high-quality education consistently, from school to school and state to state."

The Common Core State Standards are not self-implementing. States will have to adopt them. School systems will need to develop or adopt curricula that align instruction and student learning with the new standards. Teachers and administrators must understand the new standards and curricula as well as how to use them to shape instruction.

For the Common Core State Standards to have significant impact, implementation cannot be left to chance and will require careful planning and educators' intentional and sustained learning. The role of professional development will be critical. Given the budgetary pressures under which many state education agencies and school systems are operating, they will be tempted to shortchange the professional learning educators need to implement the standards. One can envision, for example, states convening large statewide or regional gatherings of educators, or conducting webinars, for what will basically be information sessions about the new standards.

It is important for frontline practitioners to know about the standards, but sessions consisting mostly of describing and explaining are not enough. Teachers and administrators need to think about the standards and critically consider how to change their instruction so students learn what is necessary to perform at standard.

The new standards will only achieve what their creators intend if states and school systems thoughtfully structure professional development so educators have the time and facilitation to probe the standards' implications for teaching and learning. The most effective strategy will include teachers working in small teams, plotting how to move effectively from studying specific standards to learning and using standards-based curriculum and instruction. This seems logical and tidy, but implementation will be difficult, requiring team members to revisit, reflect on, and refine their practice throughout a school year.

As laudable as the Common Core State Standards are, their development, dissemination, and adoption are only the first steps to raise levels of student performance. Everything depends on the effectiveness of implementation at the classroom level, and that, in turn, depends on the quality, intensity, and frequency of appropriate professional learning.

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> ### Standards at the fore
>
> A critical aspect of the content knowledge teachers need is the recently introduced Common Core State Standards Initiative. Learn more about common core standards at **www.corestandards.org.** Also, see Stephanie Hirsh's column on p. 72 for her perspective on supporting educators in such an effort.

1 DISTRICT, 1 SET *of* MATH GOALS

The top-performing school systems recognise the only way to improve outcomes is to improve instruction … They have understood which interventions are effective in achieving this — coaching classroom practice, moving teacher training to the classroom, developing stronger school leaders, and enabling teachers to learn from each other — and have found ways to deliver these interventions throughout their school system.
— *McKinsey & Company, 2007, p.26*

By Timothy Kanold and Jhone Ebert

I n March 2008, teachers and leaders of the mathematics programs grades 6-12 in the Clark County School District (Las Vegas, Nev.) found themselves under the urgent spotlight of failed expectations. District leaders and teachers had been bold enough to create high-stakes, districtwide common assessment semester exams in five subject areas of mathematics to be used by every middle and high school in the district. These assessments included middle school pre-algebra and honors algebra as well as high school algebra, geometry, and advanced algebra II. In January 2008, 56 middle schools, 48 high schools, and 24,000 students participated in the districtwide semester common assessment. When only 9% of the students tested were able to pass the high school algebra I first-semester common assessment, the results grabbed headlines and the attention of all stakeholders — administrators, board of trustees members, teachers, curriculum leaders, and community members throughout the district.

In response to the overall results, the superintendent established the expert mathematics committee. The committee consisted of stakeholders from throughout the school district, including K-12 mathematics teachers, 6-12 department chairs, K-12 building principals, assistant principals, area superintendents, leaders in the curriculum and professional development program, the testing and evaluation department, along with outside experts from the University of Nevada Las Vegas, the Regional Professional Development Program, and the national mathematics leadership community.

In spring 2008, the district — the 5th-largest in the nation — embarked on a continuous growth and improvement journey in mathematics professional development and learning with clear directive for improvement from the board of trustees, the superintendent, and the deputy superintendent for instruction. This systemic district initiative provided a coherent focus and sustained collaborative effort for improved mathematics achievement by establishing and monitoring nonnegotiable goals for student achievement at both district and school levels. After two years of mathematics-specific professional development, many district schools have exceeded student performance expectations and reached new levels of achievement.

SETTING ACHIEVEMENT GOALS

In *District Leadership That Works,* Marzano and Waters (2009) reveal keen insight into research for effective districtwide leadership for improved student achievement. They suggest that:

1. Nonnegotiable district goals should be established for student achievement and for effective instruction. These goals should be monitored and used as the basis for immediate and corrective action.
2. These nonnegotiable goals for achievement and instruction should be established through a collaborative goal-setting process that involves key stakeholders (p.22).

This is where the serious work of the expert mathematics committee began. The committee examined previous years' trend data in two critical areas of student achievement for five district mathematics college prep core courses: middle school pre-algebra and algebra; high school algebra I, geometry, and advanced algebra II. These areas of district student performance included:

1. Student pass-rate performance data on the first- and second-semester district common assessments.
2. Student semester-grade distribution rates, where we examine particularly the percentage of those who receive grades D and F, which we call the D/F rate.

As recommended by Marzano and Waters, the committee used consensus building to establish both long-term (three-year target goals for district improvement) and short-term target goals (for results by the end of each semester in 2008-09). These nonnegotiable student achievement improvement goals were designed to fit seamlessly into the already established district school improvement plan and quality assurance framework by using the SMART goal protocol from Conzemius and O'Neill (2002).

PROFESSIONAL LEARNING

Once the expert mathematics committee established district targets for improved student achievement, they began a review of research using the *Principles and Indicators for*

Clark County School District SMART goals and results
A SAMPLING

COMMON ASSESSMENT PASS RATE GOAL:
We will increase the high school algebra I common assessment pass rate to **80%** by the 2011-12 school year.

Interim goal	Achieved
9%-35% 2008-09 school year, first semester	**17%**
11%-35% 2008-09 school year, second semester	**12%**
17%-35% 2009-10 school year, first semester	**21%**

GRADE DISTRIBUTION GOAL:
We will decrease the middle school pre-algebra D/F rate to **10%** by the 2011-12 school year.

Interim goal	Achieved
35%-25% 2008-09 school year, first semester	**37%**
41%-31% 2008-09 school year, second semester	**41%**
37%-25% 2009-10 school year, first semester	**33%**

Mathematics Education (PRIME) Leadership Framework from the National Council of Supervisors of Mathematics. The committee studied vital teacher actions directly linked to improved student achievement in mathematics. The mathematics committee recognized the importance of using district leaders and mathematics department chairs to close the knowing-doing gap between "knowledge about how to enhance student achievement and the commitment to actions we must take as a result of that knowledge" (2008, p.56).

Subsequently, the committee established several district professional development initiatives and adult actions for mathematics tied directly to the district SMART goals for each course. This established greater coherence and improved rigor to the student mathematics learning experience from school to school with greater reliability and fidelity to results. The expert mathematics committee's goal was to reduce the variance in implemented teacher practice and student preparation at each school.

A primary committee action was to provide PRIME leadership professional development for 128 middle schools and high school department chairs four times per year. National experts,
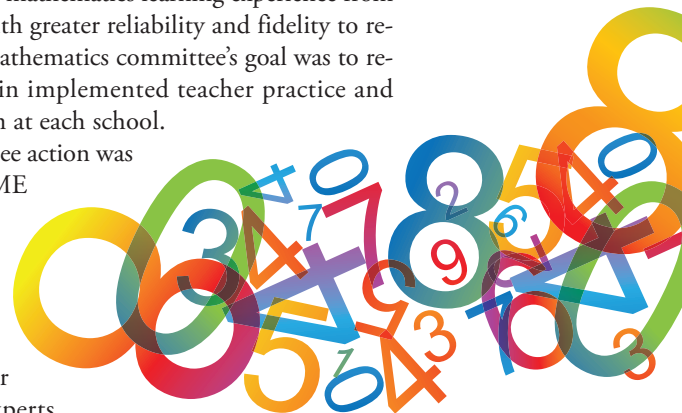
members of the district curriculum and professional development division, and the regional professional development program collaboratively led these meetings.

The professional development of department chairs included:

1. **Creating and implementing school and departmental SMART goal plans.** At the school level, SMART goal plans, designed using site student achievement data, were aligned with district-level SMART goals for each of the five mathematics courses. Mathematics department leaders worked with their respective course-based teacher teams to create SMART goals that advanced the district goals and address gaps in mathematics achievement expectations for all student populations.

2. **Creating and implementing high-performing teacher teams in mathematics.** The expert mathematics committee recognized the power of teacher collaboration in professional learning and used a collaborative teacher team model as a basis for erasing inequities in student learning. Both the district and the committee realized that a hallmark of teacher leadership is the ability to help teachers collaborate with one another and work interdependently to establish best practice teaching in mathematics. Although a work in progress, the committee established the teacher team as the smallest unit of change in the department, rather than the individual isolated classroom teacher.

3. **Creating and implementing mathematics-specific instructional design tasks.** This included high cognitive demand or depth of knowledge task instruction in algebra and geometry. Essential design questions were developed as an expansion of the district's locally developed components of an effective lesson to help each mathematics teacher plan each day. Accepting the PRIME Leadership Framework challenge that "every mathematics lesson must be focused on relevant and meaningful mathematics and support research-informed best practices" (2008, p.5), the mathematics department chairs participated in extensive discussions about implementing effective practices in every classroom. These discussions included strategies to ensure student-engaged learning and rigor in task assignment and selection and the development of relevant and meaningful mathematics lessons every day.

4. **Creating and implementing highly effective classroom assessment practices.** Using the PRIME Leadership Framework as well as identified best assessment practices throughout the district, the department leaders assessed the quality of school unit tests using a test evaluation rubric developed by the expert mathematics committee and experienced by the department chairs as part of the quarterly professional development. The department chair assessment professional development included more consistent and rigorous grading practices for every mathematics course. Some schools also established formative assessment loops for student and adult feedback.

ESTABLISHING HOLISTIC DISTRICT PRACTICE

The expert mathematics committee also played a central role as advisory to the district's curriculum and professional development department and the school board.

The committee established these vital district mathematics behaviors:

1. **Changes in the mathematics course sequencing grades 6-12, which significantly streamlined the total number of course options and provided guidelines for student access to the college preparatory mathematics curriculum.** Mathematics is unique in that it is saddled with the burden of being a vertically connected curriculum. The committee recognized a strong need to ensure the vertical connections in the proper course scope and sequence were consistent across the district.

2. **Changes in student placement procedures from 8th to 9th grade (currently in the second year of a pilot) as well as 5th to 6th grade (under development).** The intent of these changes is to create a coherent, fair, and equitable process throughout the district and to reduce the variance from school to school.

3. **Changes in Response to Instruction (RTI) for struggling students and, most importantly, an intentional and non-negotiable school response to the early preparation of students for local semester common assessments.** Preparation for these high-stakes tests was no longer an option for the district's teachers and all teacher teams.

4. **Changes in ongoing professional development for mathematics teachers.** Over a two-year period, the district focused mathematics professional development on teaching and assessment leadership with an eye on erasing inequities caused by the previously wide variance in teacher practice from school to school. Mathematics teachers participated in course work connected to improvement through the University of Nevada Las Vegas and Saturday lesson studies using Title I ARRA funds. This professional development provided the venue for teachers to not only collaborate but to own their daily work with students. Many of the district's expert mathematics teachers taught one another during these meetings and seminars.

MONITORING CONTINUOUS IMPROVEMENT AND CELEBRATION

Perhaps the most important role the committee has served toward the gradual improvement of student achievement in Clark County School District is its willingness to keep its collective shoulder pushing hard on the wheel of continuous improvement (Kanold, 2006). In January 2009 and again in January 2010, the committee led a review of school-by-school performance on the SMART goal expectations and action plans for the district as well as the SMART goal expectations at each site. Many SMART goal plans contained corresponding adult ac-

tions congruent with expectations of the professional development of the mathematics leader and department chairs.

In reviewing each school's results, the committee asked, which schools surpassed the district student achievement goals for improvement? Which schools surpassed their local site improvement goals for each course? Which schools and which courses demonstrated the most improvement? Which schools did not meet district goal expectations or surpass their local standard? What could the mathematics department or course-level team of teachers do differently to improve? The data review included semester grades — a subjective teacher measure — and the semester common assessment pass rate — an objective standard of rigor measure — for each of the five courses targeted for improvement.

These dual SMART goals allowed the expert mathematics committee to examine school data results that might not be in alignment. Low D/F grade rates with high failure rates on the common assessments would indicate soft levels of rigor for assigning grades. High D/F rates with low common assessment failure rates would indicate that the teacher or teacher team is too rigorous in assigning course grades.

The focused efforts of the committee, the mathematics teachers, the teacher leaders, and the professional development leaders resulted in new levels of student performance in 2010. A review of the first-semester common assessments data in 2010 revealed more than 15,000 students passing the exams than would have passed based on 2008 levels of proficiency. Paying attention to results and acting on those results was rewarded by short-term improvement. See a sampling of district SMART goals and results on p. 13.

The antidote to constant tension caused by a continuous improvement culture is celebration. Each January and February, the district, with help from the mathematics committee, celebrates the achievement of SMART goals at each school. Celebrating in community is an essential part of a viable and healthy school culture. Critical to the celebration was the support and recognition from district leaders. The deputy of instruction, area superintendents, curriculum leaders, and teacher peers were given time to address department chairs and acknowledge the accomplishments for the course-based professional learning community school teams.

Clark County School District
Las Vegas, Nev.

Number of schools: **352**
Enrollment: **309,476**
Staff: **38,523**
Racial/ethnic mix:

White:	**34.6%**
Black:	**14.1%**
Hispanic:	**41.0%**
Asian/Pacific Islander:	**9.6%**
Native American:	**0.7%**
Other:	**0.0%**

Limited English proficient: **30%**
Languages spoken: **134**
Free/reduced lunch: **43.2%**
Special education: **10.4%**
Contact: **Jhone Ebert**, assistant superintendent/chief technology officer
E-mail: **jhone@interact.ccsd.net**

SEEKING SUSTAINABILITY

One of the most difficult aspects of any systemic change is ongoing sustainability. Clark County School District has made a public declaration to stay focused on continuous improvement to ensure student academic success.

The district is ensuring that all aspects of the teaching and learning environment in mathematics are monitored for improvement. Striving to provide transparency in all areas of such a large district is not easy to do, but essential to sustaining a reliable effort around teaching behaviors that impact student learning.

As the expert mathematics committee and the district review the work done to date, they acknowledge the major structural changes that have been made in the past two years, yet they know the changes must be supported by ongoing monitoring of student achievement and faculty actions.

The district plans to strengthen its classroom support more directly. Next steps include deep inspection of the teaching culture and learning at individual schools that need to improve. Classrooms with struggling students need to be provided just-in-time resources to help students meet district expectations. As the McKinsey report indicated, the top-performing school systems "improve instruction by moving teacher training to the classroom" (2007, p.26).

As district mathematics teacher leaders and teacher teams become more confident and capable of working together, they will eventually reach the ultimate goal of sustainability and unlimited possibility.

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LASER FOCUS

ON CONTENT STRENGTHENS TEACHER TEAMS
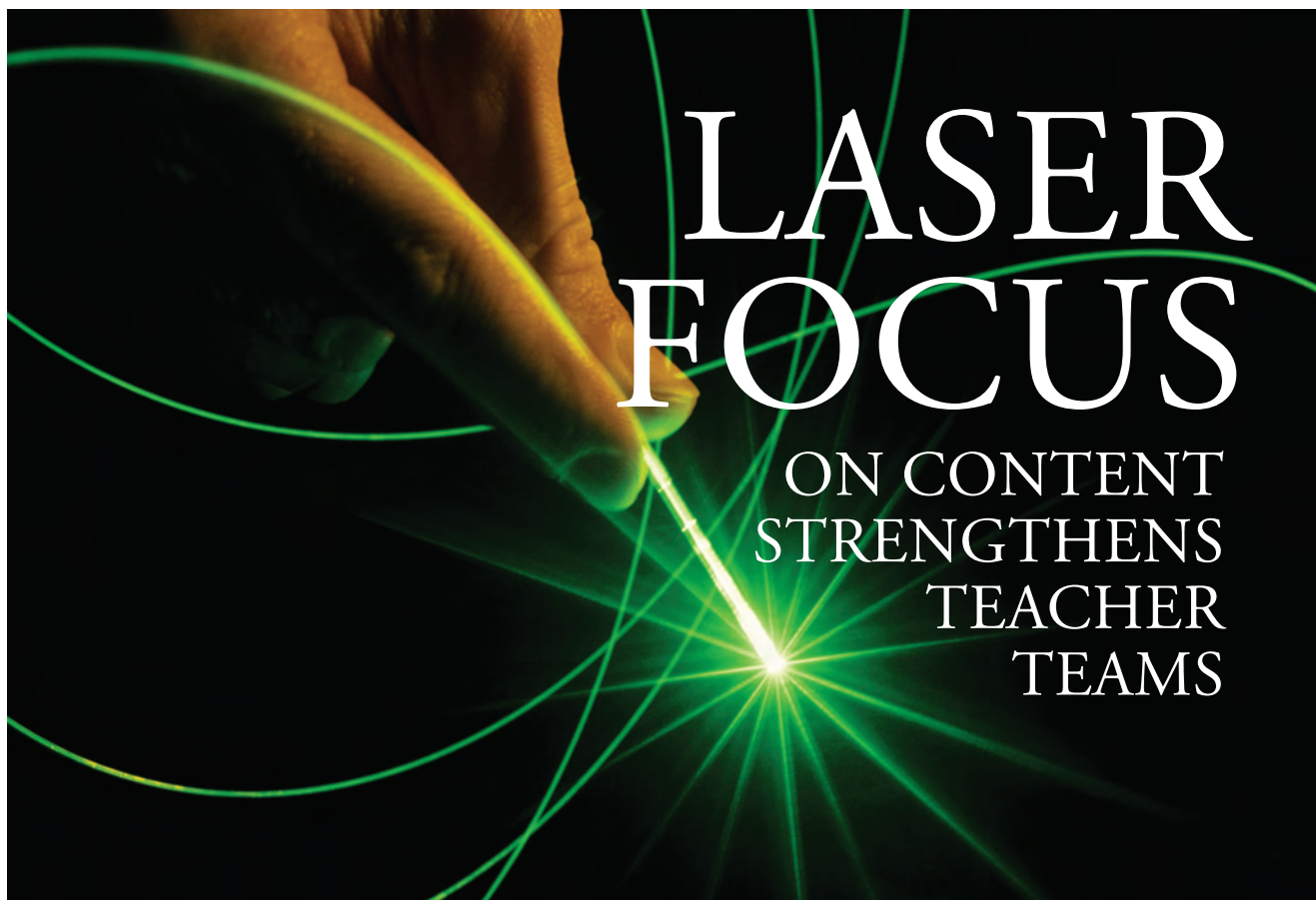
By David Slavit, Tamara Holmlund Nelson, and Anne Kennedy

As Gene Henderson loaded his sixth binder onto the top of his growing stack, his face could no longer be seen. He shouted, "And now I'm in prison!" In a powerful presentation to his school, Henderson was referring to numerous professional development events that had left him with nothing but a binder. He was also joking about his current involvement in PRiSSM, the Partnership for Reform in Secondary Science and Mathematics, a three-year project that targeted mathematics and science teachers in middle and high schools from six districts in southwest Washington. Like many other teachers, Henderson noted that PRiSSM was "the most powerful professional learning experience I have ever had."

Consistent with NSDC (2009) recommendations for professional development, PRiSSM involved collaborative teacher teams in reflecting on and discussing content goals and student learning data to improve practice (Horn & Little, 2010; Kazemi & Franke, 2004). Based on our ongoing work with PRiSSM teachers and administrators, we have identified five important considerations essential to maximizing the potential of teacher collaborations around content-specific learning objectives. The challenges inherent in collaborative, content-specific professional learning are greater than we first recognized, and these new understandings contribute to our ongoing support of professional learning communities.

PRISSM: INQUIRY-BASED AND CONTENT-SPECIFIC

PRiSSM was a three-year project focused on middle and high school mathematics and science teachers. (For detailed information, go to http://research.vancouver.wsu.edu/prissm). The project was designed to develop teachers as leaders of content-based professional learning communities. In Year 1, PRiSSM provided support for 45 teacher

leaders in 22 schools (one mathematics and one science teacher per school) focused on student-centered instruction, research skills, and group facilitation. Cross-content and cross-school learning communities, in groups of four or six, involved high school teachers collaborating with teachers from feeder middle schools. Facilitators attended monthly meetings during the school year and supported each teacher group's creation of a content-specific inquiry focus, research design, and group discussions. The project expanded to 35 communities in Years 2 and 3 when most of the teacher leaders in each school formed single-disciplined (mathematics or science) communities with their building-based content colleagues.

IMPLEMENTING AND SUPPORTING PROFESSIONAL LEARNING COMMUNITIES

Based on the progress and struggles PRiSSM teachers had during and after the project, we have identified five important considerations for enacting and supporting content-specific learning community work. Some of these were incorporated into the original PRiSSM professional development model and proved important for teachers' progress. Others were missing, and we subsequently introduced them to help teachers move forward in their work.

1. Teacher-defined inquiry focus

Teachers reported that what made PRiSSM powerful was the freedom to conduct classroom-based research that addressed students' needs. Each team defined its own questions and methods of inquiry, and project support was devoted to teachers' efforts to develop and investigate these questions. Support included summer institutes focused on collaboration and uses of student learning data, job-embedded learning community time, and ongoing facilitation of monthly community meetings.

Allowing teachers to focus and design their own inquiry increased motivation and spurred greater persistence in investigating problems of practice. The work was personal, real, and grounded in students' mathematical or scientific

learning experiences. Teachers relished the opportunity to address their immediate concerns, and the project leadership team worked hard, with mixed success, at identifying and garnering needed supports. In many cases, this led to improvements in student learning. In one professional learning community, state achievement scores in science increased by almost 20% in one year, buoying the teachers' and administrators' confidence and pride in their work.

2. Principal involvement

Principals were involved in summer institutes, and the facilitators worked with administrators during the school year to ensure that the PRiSSM learning community work was not an add-on. The facilitators attempted to match the communities' work to existing school initiatives and improvement plans. In some cases, this worked well. Teachers' interests matched the school's, or they were able to adapt school initiatives into their own work. In other cases, teachers felt that their work was being compromised and pulled in a direction they found problematic or peripheral to their own interests. For example, one group of teachers felt a districtwide reading initiative began to dominate their collaboration time and overshadow critical issues in their classrooms. Teachers and administrators had a facilitated conversation where they discussed their goals and interests and negotiated a reasonable solution. Building coherence across initiatives and protecting teacher collaboration time is critical to this work, and the teachers' work was able to continue down a path that everyone found acceptable. Some principals insulated their teachers from school and district mandates when they saw the teachers' work as potentially powerful, while other learning communities found ways to insulate themselves. In either case, a teachers' and principal's ability or inability to articulate his or her vision and manage conflicting interests were key factors in the level of teacher buy-in and maintaining a content-specific inquiry focus.

Principals were also part of the PRiSSM project leadership team, which planned and oversaw all activities. In fact, the leadership team made the decision to form its own pro-

Each team defined its own questions and methods of inquiry.

Considerations for content-specific professional learning community work

1 Teachers should define their own inquiry focus and methods, and facilitators should help them effectively undertake this work and connect it to school/district initiatives.

2 Principals should not just be aware of teacher needs, but should be involved and flexibly attentive to teacher needs.

3 Single-disciplined professional learning communities generate richer content-specific inquiry foci and discussion than do cross-disciplinary teams.

4 Professional learning community work is hard, and it is important to support teachers in developing research skills and ways to discuss student data and learning goals around specific content.

5 Teacher leaders should be, or eventually become, community facilitators.

fessional learning community in order to better understand the context of teachers' work. The team devoted half of its meeting time to project oversight and half to its own learning, which was focused by the question "How can we foster and sustain a culture of collaborative inquiry?" This allowed for a better understanding of how to support the teacher groups and to experience, firsthand, the intricacies, challenges, and benefits of work of this kind (Nelson, Slavit, Perkins, & Hathorn, 2008). Further, each of the above initiatives influenced some PRiSSM partners to develop districtwide professional learning communities for all school principals, adding an important layer of support for the teachers' work.

3. Benefits of single-disciplined learning communities

In addition to developing facilitation and leadership skills, mathematics and science teachers worked together in Year 1 on problems of practice. The cross-content focus better connected building colleagues across departments, horizontally aligned curriculum, and allowed the professional learning community work to have a greater schoolwide impact. However, the cross-content work also diffused the creation and discussion of content-specific learning goals to more general foci, such as student engagement and classroom communication. By far, the richest content-specific work occurred in the final two years, when the professional learning communities were composed entirely of mathematics or science teachers. Learning goals became more

content-focused, common assessments and teaching actions were more frequent, and analysis of shared student learning data became more common.

4. Supporting research skills and content-specific discussions about student learning data

The figure below illustrates that most groups took a path of inquiry that consisted of three interdependent activities. These involved initial planning, a collaborative action (such as a common lesson), and a period of assessment (such as looking at student work). However, as the arrows suggest, most groups did not linearly follow this path, but instead doubled back during periods of readjustment. Not only did this provide teachers with feedback for making changes to the inquiry focus and plan, it allowed them to collect and analyze student learning data multiple times.

Content-specific professional development of this kind is hard work, and not without its limitations. Many teacher groups reported that they were spinning their wheels during various phases of the inquiry cycle. Most of these struggles involved finding a focus, working with student data, and not getting into deep conversations about teaching and learning issues. Karen Ramey, one of the teacher leaders, noted her group was "information rich and data poor," while other groups stated they were "drowning in data." Some facilitators also reported that they were having difficulty "getting teachers to ask the hard questions." Ted Beaumont, another teacher leader, summed it up by saying, "Qualitating is hard to grasp." While research shows that these are not uncommon occurrences (Kazemi & Franke, 2004; Slavit & Nelson, 2010), one of the inadequacies in the design and facilitation of PRiSSM was insufficient development of both facilitation and research skills in some teacher leaders, and this led to periods of frustration and lack of progress in these professional learning communities.

5. Teacher leaders as facilitators

To realize sustained content-specific professional development with a collaborative focus, we believe that responsibility for the facilitation process must eventually fall to teacher leaders. External facilitators, coaches, and other leaders are important supports, but for a professional learning model to be intellectually and economically sustainable, leadership must be developed and nurtured inside the teacher group. Specifically, teacher leaders need support for facilitating their own content-specific discussions and analyzing student learning data. While we believe that PRiSSM succeeded on many levels,

Common inquiry cycle for content-specific collaborative work

- Disseminate findings
- Identify common areas for improvement in teaching or learning
- Derive implications for practice
- **ASSESS**
- Develop common goals and values
- Analyze data
- **FOCUS**
- Select an inquiry focus
- Collect data
- Develop an inquiry focus
- **IMPLEMENT**
- Implement common action
- Plan a common action
- Plan for data collection

Teacher-determined learning goals

Teacher groups were encouraged to:

- Focus on problems of practice directly tied to their instructional goals;
- Collect student work samples relative to a common teaching action; and
- Analyze these in a way that uncovered patterns in student understanding, not just levels of performance.

Examples of inquiry questions included:

- How can we encourage high-quality questioning by students?
- How we can help students reflect on their work in order to improve it?
- How can we improve students' written communication skills in mathematics and science?
- How do we use classroom-based learning in science and math to teach students to evaluate and apply their knowledge to different situations?
- Will a standard format for writing a science lab report conclusion improve the quality of students' reports?
- How can the use of rich mathematics tasks, worked in cooperative groups, increase student engagement and problem-solving ability?
- Will the deliberate and systematic use of learning objectives to design and implement formative assessments improve student achievement?
- How can we anticipate students' problems and support them as we (students and teachers) learn a new mathematics curriculum?
- How can we support students' understanding and use of scientific process vocabulary?

we also believe that the project could have done more to support teacher leaders in this endeavor. A more focused development of general research skills as well as more targeted work with collecting and analyzing classroom-based student learning data would have greatly benefited teacher leaders and their professional learning communities. Further, while some communities also asked for more structure (e.g. a predetermined inquiry focus, a specific research design they could follow), accommodating these requests may have undercut the inherent buy-in that is important to the project's success. This tension is one the project leadership still debates and has yet to resolve.

LONG-TERM INVESTMENT

It is safe to say that PRiSSM is a sustainable professional development model. Two years after the project's completion, every district continues to maintain professional learning community work, much of which is quite similar to the original model, with teacher leaders continuing to serve as facilitators. We believe we achieved this important result for various reasons. The inherent teacher buy-in attributed to the project design was the most commonly heard reason why teachers described the project as powerful, and we believe it was also a key factor in the project's sustainability. The importance of teachers wanting to come to school and work with colleagues on problems of practice cannot be overemphasized.

When teacher choice is present and collaborative inquiry is grounded in teachers' personal questions and concerns, they have motivation for and investment in the purposes and outcomes of the work. Under the right conditions, teachers have the ability and capability to learn more about critical aspects of teaching and learning specific content. Further, for content-specific professional development to be effective, teachers must be able to discuss teaching and learning issues that are surfaced by student learning data. This should be the highest priority of support for professional development providers, facilitators, and school administrators.

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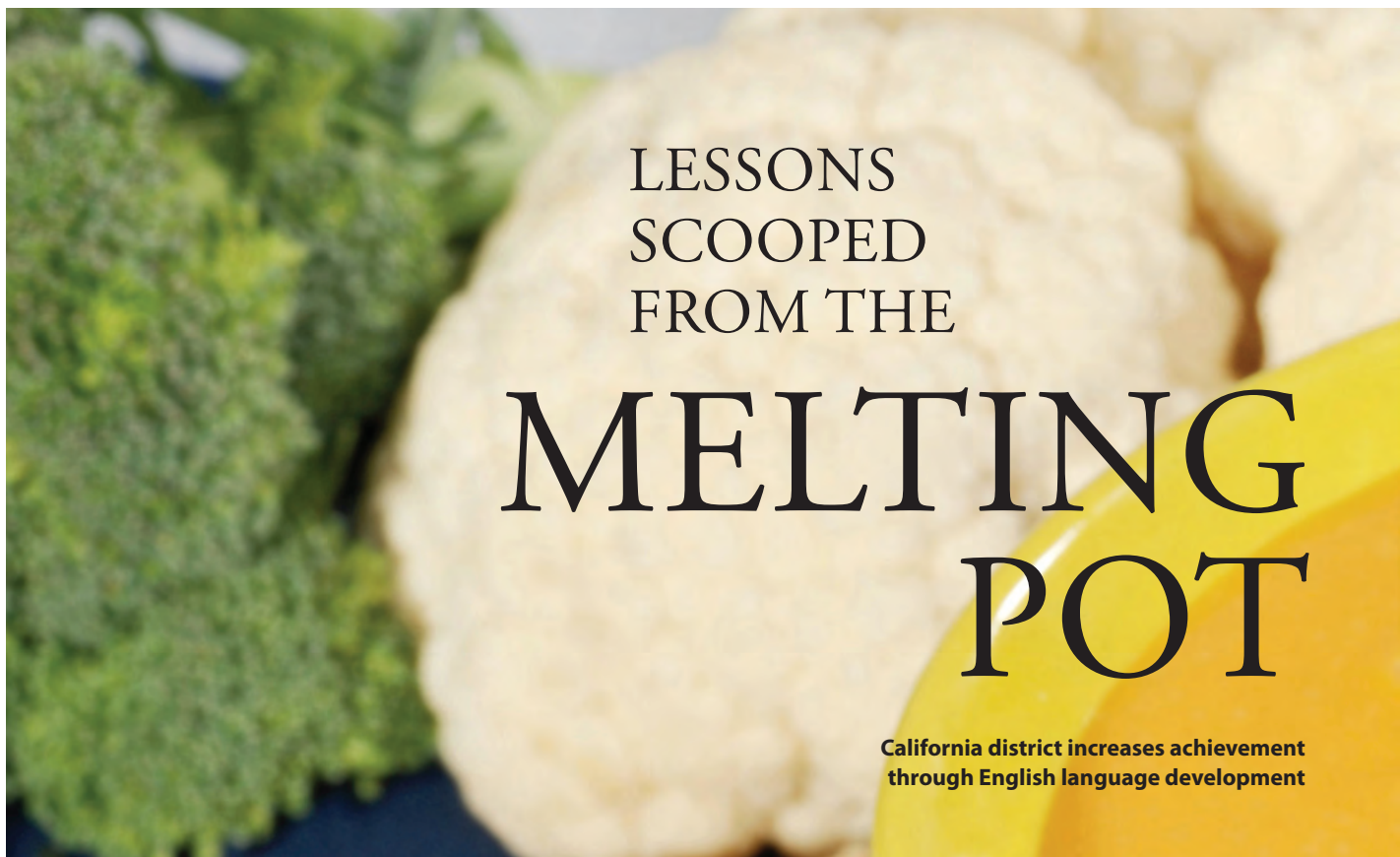
LESSONS SCOOPED FROM THE

MELTING POT

California district increases achievement through English language development

By Nancy Frey, Douglas Fisher, and John Nelson

Consider the challenges facing one district: 27,000 students in 44 elementary schools in a southern California border district. Most students — 72% — are classified as English language learners as measured by the California English Language Development Test (CELDT). Although 65% of the students are Hispanic/Latino and speak Spanish as a first language, 16% are Asian/Pacific Islander and speak Tagalog, Japanese, or Korean as a home language. In 2003, the state's accountability system, the Academic Proficiency Index (API), scored the district at 689, far short of the goal of 800. Yet by the 2009-10 school year, this school system had reached 833, and 77% of the schools had met all of their accountability targets. All of this had occurred without appreciable change in demographics or staffing. How did the district get these breakthrough results?

The short answer is focused content-specific staff development that has been sustained for five years. However,

what made this initiative unique was the choice of content. Rather than pursue a more conventional approach, such as a focus on mathematics, science, or history, the district chose English language development for all students, not just those designated through state measures. Using a gradual release of responsibility model of instruction (Fisher & Frey, 2008), the district elected to concentrate its professional development efforts on improving the academic language necessary for ELL students to achieve proficiency. To do this, the Chula Vista Elementary School District has been building the capacity of its teachers and administrators through school-based teams that customize learning for their context.

THE CONTENT: ACADEMIC LANGUAGE FOR ALL

A series of meetings and walk-throughs by district administrators in fall 2004 exposed a persistent barrier to language acquisition: little in the way of rich, academic student discourse. While classrooms were well-managed and taught by caring professionals, the teacher dominated classroom

talk. Decades of research backed up the concern that without the opportunity to interact using the language of the discipline, students would never acquire the academic vocabulary of the content (Cazden, 1988; Hicks, 1995).

The district leadership committee (headed by the third author, John Nelson) determined that it was not enough to merely declare that classroom discourse should increase. Teachers and administrators would need both a knowledge base and practical tools to achieve this. The district invited the other authors, both based at a local university, to partner in implementing a gradual release of responsibility model of instructional design to make discussion a cornerstone of the classroom. The content-specific professional development would focus on English language development of academic discourse, both verbal and written, to improve learning.

GRADUAL RELEASE

This model of instruction, first articulated by Pearson and Gallagher in 1983 and later expanded by Fisher and Frey (2008), consists of four phases of learning:
- **Focus lesson** to establish purpose, model, demonstrate, and think aloud to expose the cognitive moves of the expert (the teacher);
- **Guided instruction,** primarily small-group, to scaffold learning through the strategic use of questions, prompts, and cues;
- **Collaborative learning** through productive group work, where students work with peers to clarify their growing conceptual understanding; and
- **Independent learning** inside and outside of the classroom, for review, extension, and enrichment.

This instructional framework became the outline for all content-specific professional development in the district, including initiatives in algebra and integrated science. The linchpin of the gradual release of responsibility was the collaborative learning phase of instruction, when students work in partnership with one another to discuss, interact, and produce. However, it was vital for teachers and administrators to understand what constituted rich language development. Therefore, professional development also focused on academic language.

ACADEMIC LANGUAGE

Given the high number of ELL students, the content-specific nature of this professional development effort fo-

cused on academic language development. Over the course of the next several years, there were four recurring themes:

- **Planning for purposeful talk** by incorporating standards, establishing a clear purpose, and identifying learning, language, and social objectives for lessons;
- **Creating an environment that encourages academic discourse,** including the physical room arrangement, teaching the routines of talk, and scaffolding language;
- **Managing the academic discourse** through grouping and collaborative activities that increase confidence and provide students with ways to consolidate learning with peers; and
- **Assessing academic language development** using practical tools for monitoring progress and identifying areas of need (Fisher, Frey, & Rothenberg, 2008, p. 2).

The district leadership committee, which included teachers, building administrators, and central office staff, noted that implementing systemwide change would need to involve all 1,500 certified staff. Adding to the challenge, the 44 schools (six of them charter) represented a range of diversity. In addition to size, they varied according to socioeconomic status, number of ELL students, and rates of family involvement. A one-size-fits-all approach would not work well in a community that served new immigrants, a rapidly growing suburban area, and neighborhoods predating the district's inception in 1892. However, they had a powerful tool at their disposal — building-level teams.

Chula Vista Elementary School District
Chula Vista, Calif.

Number of schools: **44**
Enrollment: **27,000**
Staff: **1,400**
Racial/ethnic mix:

White:	**13%**
Black:	**1%**
Hispanic:	**67%**
Asian/Pacific Islander:	**14%**
Native American:	**1%**
Other:	**4%**

Limited English proficient: **35%**
Free/reduced lunch: **44%**
Special education: **11%**
Contact: **John Nelson,** assistant superintendent
E-mail: **john.nelson@cvesd.org**

INSTRUCTIONAL LEADERSHIP TEAMS

The district had spent the early part of the decade establishing instructional leadership teams. Their primary role is to lead each school's effort to support the improvement of teaching and learning. The teams make decisions about the school's instructional program and leads and monitors the implementation of a sound instructional focus. The leadership teams consist of teachers (usually one teacher per grade level), the principal, and other members of the school community. Schools are advised to include representation from bilingual, special education, and other specialists on the teams.

The teams meet regularly to discuss instruction and review information gathered from analyses of student work and teacher assignments to determine schoolwide needs. In addition, they monitor full implementation of promising practices, planning and adjusting professional learning as needed. Perhaps most im-

portantly, they are responsible for developing a plan to build capacity of all staff. They collect, organize, and display schoolwide data on student performance and monitor the effectiveness of current allocations of resources, adjusting as needed.

Using this existing structure, we involved the instructional leadership teams from each school in five daylong professional development sessions each year. The first half of the day focuses on a status check among school team members and work with the authors on building their knowledge base concerning language development and the gradual release of responsibility instructional model. The second half of each day focuses on capacity building, as teams construct plans for professional development they lead, as well as work with individual teachers who can benefit from additional coaching and mentoring.

Over the last several years, the instructional leadership team has evolved from a conduit for professional learning into a creator. During these professional development sessions, these teams created a bank of language frames for each grade level and content area to support the development of this instructional practice. Language frames provide students with a way to structure their academic discourse using complex rhetorical structures and content vocabulary. Teachers instruct students to use these language frames in their classroom discourse, especially during guided instruction and productive group work, and in their writing during independent learning. This bank of more than 200 frames provides members of each school's instructional leadership team with samples for use in working with teachers at their schools.

Examples of language frames include:
- How did (event, decision, law) impact (life, laws, society) today? (History)
- When I conducted the investigation of _____, I discovered that _____. (Science)
- My answer is reasonable because _____. (Mathematics)
- Based on _____, I predict the author's message will be _____. (Reading and language arts)

Similarly, teams have collectively created content and language purposes derived from state standards for each discipline and grade level. Establishing what will be learned and how students will use it is critical to ELL students (Hill & Flynn, 2006) and benefits all students. For instance, a teacher who begins a lesson by telling students that they will learn about the attributes of an isosceles triangle and will justify their answer to a partner using the terms *equal sides* and *equal angles* is establishing the purposes of her 3rd-grade mathematics lesson to her students. A teacher who begins a lesson by establishing a purpose related to understanding the life cycle of a frog provides students with several language frames, including "The _____ forms after the _____" and "I know that is a _____ because _____." As with the language frames bank, these team-created resources related to establishing purpose are available for all the teams to use in their schools.

WALK-THROUGH RUBRIC *Purpose* and *modeling* indicators of success

INDICATORS	Phase 4: Exemplary	Phase 3: Proficient	Phase 2: Approaching	Phase 1: Minimal
Purpose is established for content and language outcomes and is based on formative assessments.	Purpose is explicitly presented through content and language goals, which are based on content standards and the language demands of the task, as well as student needs identified via formative assessments.	Language and content goals are stated but are not well-connected to content standards or language demands of the task. Goals address student needs identified via formative assessments.	Only one purpose is stated (i.e. either the content purpose or the language purpose is missing) or purpose is not well-connected with content standards, the language demands of the task, or student needs as identified with formative assessments.	No content or language outcomes are stated or implied. Purpose is implied but not stated, and there is no evidence of the use of formative assessments to plan instruction.
The essential lesson elements of guided, collaborative, and independent tasks accurately reflect the established purpose.	All tasks that students complete throughout the lesson reflect the content and language purposes.	Most tasks that students complete throughout the lesson reflect content and language purposes.	Some tasks that students complete throughout the lesson reflect content and language purposes.	The tasks that students complete during the lesson are not consistent with the stated purposes.
Students can explain the purpose in their own words.	Randomly selected students can explain or demonstrate how the stated purposes related to their own learning.	Students can accurately restate the purpose of the lesson but lack a clear understanding of why they are being taught the content.	Students can restate portions of the purpose of the lesson but lack an understanding of why they are being taught the content.	Students are unable to correctly state the purpose of the lesson.
Teacher provides an authentic model.	Modeling includes naming the task or strategy, explaining when it is used, and using analogies to link to new learning. The teacher then demonstrates the task or strategy, alerts learners about errors to avoid, and shows how it is applied to check for accuracy. The modeling consistently contains "I" statements.	Modeling contains all the indicators (naming, explaining, analogies, demonstration, errors to avoid, and checking), but the teacher only uses some "I" statements.	Modeling contains some indicators (e.g. naming and explaining), but the teacher directs students through the use of "you" statements.	Modeling contains few indicators. The teacher uses "you" statements that focus on directions and process, not modeling of thinking.
Students use strategies and skills that were modeled.	After receiving adequate time in scaffolded instructional support, all students can complete tasks using the strategy or skill that was modeled.	After receiving limited time in scaffolded instructional support, complete tasks using the strategy or skill that was modeled.	Students move directly from teacher modeling to independent work, with little to no scaffolded instructional support.	There is a mismatch between what was modeled and what students are asked to do.

MOVING TO SCALE THROUGH CONTINUOUS IMPROVEMENT

While the instructional leadership team plays an important role in this professional development initiative, it can't be the only source of information. Therefore, the district digitally records each session and houses the video on its portal for staff members to view anytime. In addition, tools like the language frames are also readily available to teachers. Although these resources are valuable, they do not compare to witnessing a live teaching event. For this reason, the district is invested in instructional walk-throughs within and across schools.

Once again, the instructional leadership team plays a crucial role. They have developed several rubrics of quality indicators for establishing purpose, modeling, and productive group work. Throughout the school year, teachers from several schools gather at one site to observe a series of classrooms. The host principal leads the discussion of what has been observed, using a quality indicator rubric. See sample rubric for walk-through on p. 27. The participants focus on patterns they observe; evaluation of the teacher is strictly prohibited. Other specialized walk-throughs are job-alike in nature, as when a group of administrators, or bilingual specialists, observe. These instructional walk-throughs provide the host administrator with valuable feedback about the current status of the academic language development at his or her school, while simultaneously building a common vocabulary among the observers about what constitutes quality instruction.

> **The district is invested in instructional walk-throughs within and across schools.**

The purpose for the walk-through is vital and should not be overlooked in the rush to visit classrooms. Without a clear purpose, observers risk paying attention to different elements, only to discover that there is little common ground for discussion later. For example, a vaguely stated purpose such as "student engagement" might result in disparate comments on the number of students looking at the teacher, the amount of student work posted in the room, or even the teacher's general classroom management style. On the other hand, a specific purpose, such as "looking for evidence of teacher think-alouds to expose expert thinking," provides observers with a specific and observable event to look for. When the group members meet to discuss their observations, they confine their comments to description, not evaluation. City, Elmore, Fiarman, and Teitel (2009) go so far as to recommend that observers first individually write their observations on sticky notes. Members then meet as a group to sort the descriptive data into categories to look for patterns. The instructional leadership teams have developed quality indicators for each aspect of the instructional model. These quality indicators become the purpose statements for the walk-throughs, ensuring that teachers and administrators are working toward the same goals.

PROMISING RESULTS FOR STUDENTS

The results of Chula Vista's initiative on building the academic language skills of its students have had a profound effect on student achievement. In 1999, only one of the district's schools met its individual API target of 800; last year, 32 of its 44 schools had done so, and only three schools remain in program improvement. Much of this achievement has occurred because more ELL students are gaining steadily. Only 21% met growth targets in 2004; by 2008, 73% had done so. Their achievement translates to proficiency as well. In the last school year, 61% of the district's ELL students had reached proficiency, a key predictor of their ability to reach and exceed grade-level standards.

The content focus on English language development through a gradual release of responsibility model has served as an organizational tool to ensure that students are interacting and using academic English in all subject areas. By involving school leadership teams in the development, design, and implementation of professional development, the district has built internal capacity, and consultants are not traversing the district providing isolated, one-shot events. Instead, the district initiative has become part of the culture in Chula Vista.

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PRINCIPALS + ALGEBRA (- FEAR) = INSTRUCTIONAL LEADERSHIP

By Cynthia L. Carver with Michael Steele and Beth Herbel-Eisenmann

We were nearing the end of our series of principal study group sessions, and a small group was reflecting on what they had learned. That's when Diane Meyers, principal at an area middle school, spoke. She started out softly, but her voice grew louder and stronger as her private experience became public. "This study group

has been really good for me as a leader. I am more confident and clear about my vision for improving algebra instruction in the building, and I can talk about algebra with our teachers. But it's also been really scary. You might not believe this, but as I drive over here and anticipate what we are going to do each session, I break out in hives! I haven't solved math problems since I was in high school, and that was 20 years ago."

As one of the group's facilitators, I was not entirely sur-

prised by the revelation of Meyers (a pseudonym). It has been a long time since I had worked through middle school algebra problems, too. But her words suggest a deeper transformation that came from engaging in a deep and sustained learning of mathematics content. As a result of participating in the project, Meyers now knows what she wants to see teachers and students doing in an algebra classroom. She knows how to listen for student thinking about mathematical ideas, and she can identify the teacher moves that elicit such thinking. Moreover, she can (and does) have substantive conversations about mathematics with teachers.

Recent state legislation in Michigan mandates that all graduating seniors successfully pass algebra I and II. Numerous initiatives have been enacted to help mathematics teachers meet this challenge, yet school principals have had little preparation for the necessary curricular and instructional changes. To address this unmet need, we, as university-based facilitators, designed and tested a series of eight algebra-intensive sessions for secondary principals in six surrounding school districts in south-central Michigan. In recruiting participants, we were especially interested in attracting leaders, such as Meyers, without mathematics backgrounds.

Unlike at typical workshops, principals in the study group (with sessions that ranged from two to four hours in length) had opportunities to regularly solve and discuss algebra tasks commonly used in middle school, read and watch video of teachers implementing similar tasks in their classrooms, analyze student work around those tasks, as well as identify and talk about teaching practices that support meaningful student-centered learning in mathematics (see Smith, Silver, & Stein, 2005; Stein, Smith, Henningsen, & Silver, 2009). Importantly, our principals sustained this level of intensity across five short months, racking up more than 30 hours of quality professional learning.

Guiding our work was the construct of leadership content knowledge (Stein & Nelson, 2003), which argues that effective instructional leaders need a deep and flexible understanding of at least one subject area, including how it is best learned and taught, in order to effectively assess teacher performance and guide teacher development. Knowing that few principals have ex-

By solving problems in small groups, then sharing their work with others, principals experienced firsthand the value of learning from others' approaches to problem solving.

LEADERSHIP MOVES FOR ALGEBRA TEACHING

Algebra teaching	Potential leadership moves
LESSON PLANNING	
A teacher's selection of mathematical tasks has critical implications for what students can learn.	• Encourage a vision for algebra that puts an emphasis on mathematical reasoning. • Reassure teachers that time spent on high-level tasks will be rewarded. • Help teachers secure needed curricular and instructional resources. • When observing in the classroom, pay attention to the cognitive demand of selected tasks.
LESSON DELIVERY	
A teacher's skill at facilitating discussion around mathematical tasks, including the questions asked, has critical implications for what students can learn.	• Acknowledge teachers for engaging students in discourse around the big ideas of algebra. • Assist teachers in learning how to become more skilled at facilitating discussion-based classrooms. • When observing in the classroom, pay attention to how questions get asked and how discussions are facilitated.
A teacher's willingness to allow students time to muddle through problems together has critical implications for what students can learn.	Acknowledge the trade-offs that come from devoting time to high-level mathematical problem solving with teachers. • Help teachers manage the press of state content standards and benchmarks by clarifying local expectations. • When observing in the classroom, track student engagement with the task.
ATTENDING TO STUDENT THINKING	
Teaching for conceptual understanding requires that we listen closely to student thinking.	• Support and encourage the collaborative analysis of student work by teachers. • When observing in classrooms, pay attention to teacher-to-student talk and student-to-student talk.

perience teaching algebra, and many more principals lack recent teaching experience, this seemed the appropriate starting point. To help students and teachers succeed at reaching new graduation requirements in algebra, we were convinced that principals would need a foundational understanding of algebra and how best to teach it.

As program developers, we were especially interested in Stein & Nelson's (2003) notion of "post-holing," which argues that all leaders benefit from an in-depth exploration of representative slices of subject areas in which they are not familiar. Our intent with this project was to provide principals with a substantive experience "in which they experience what is like to be a learner of that subject (algebra), in which they study what is known about how children learn that subject and become familiar with the best instructional methods for that particular subject." Ideally, principals would then transfer what they learned into other mathematics classrooms and even other subject areas. As Stein & Nelson (2003) elaborate:

> From knowing a single subject well, administrators will bring to their exploration of the second and third subjects the recognition that every subject has its own domain of exploration, its own criteria for inquiry, its own rules of evidence and argument. They will bring their knowledge that the primary learning task is for children to be building knowledge of the central knowledge structures and modes of inquiry of each subject and that it can be predicted that some ideas will be more difficult than others for many students (pp. 433-444).

Author's note: The Building Capacity in Algebra: Teaching, Learning, and Leading project is funded through the Title II Teacher Quality Partnership grant program, administered through the Michigan Department of Education.

To develop principals' mathematical knowledge for algebra teaching, we focused the study group sessions around three big ideas: how algebra can be conceptualized as the study of patterns and functions; the ways in which algebraic reasoning can be developed through tasks of high cognitive demand; and the important role of representing algebraic ideas and translating among representations in the teaching and learning of algebra. Ultimately, we hoped that post-holing of this sort would prepare principals to engage with staff in rich and substantive discussions around the teaching and learning of algebra, and around the improvement of algebra instruction in their buildings.

What did our principals learn from this experience, and how is it changing their practice as school leaders? Three key observations stand out. First, principals are now better positioned to observe standards-based algebra instruction. Second, principals are more comfortable talking with teachers about what they saw and what they hope for in algebra classrooms. Finally, the experience of being a learner helped many of our principals to identify with those students who often struggle in the algebra classroom.

OBSERVING IN A MATHEMATICS CLASSROOM

The study group offered principals an opportunity to revisit content that they had not seen for many years and to understand that content in an entirely new way. From a technical perspective, principals were routinely exposed to algebra-specific terminology, problem-solving techniques, and instructional practices. They were introduced to new instructional resources that supported student learning, such as algebra tiles. They also became better acquainted with middle-school algebra content and the state-level standards linked to that content. This technical knowledge enhanced principals' ability to act responsively when observing algebra instruction. As one participant explained, "The principal study group has definitely made me feel more able to support my math teachers. I feel confident to walk into the classroom and see the teaching of algebra and the learning of algebra going on."

Perhaps more importantly, however, the study group experience presented participants with a new vision for algebra teaching that encouraged group problem-solving and class discussion around carefully selected mathematical problems or tasks. As a result, participants came to new understandings about the importance of selecting high cognitive-demand tasks, giving students ample time to solve those problems together, and using good questions to facilitate classroom talk about the mathematical ideas embedded in those tasks. When observing instruction, these principals now wanted to see teachers and students engaged in sustained discussion around high-level mathematical tasks. As many of them reported, they were no longer content seeing teachers walk students through a set of procedural steps. Rather, they were now more interested in seeing students' collective inquiry into important mathematical ideas.

CONFIDENCE TALKING WITH TEACHERS ABOUT MATHEMATICS

By drilling down into algebra content, principals became more aware of how disciplinary knowledge is structured in mathematics and the implications of that for teaching. Over time, participants were equally able to construct an understanding of algebra as the study of functions and patterns. In the words of one participant, "I learned the math behind the math." When asked how their leadership practice was changing as a result, principals told stories of spending more time observing in classrooms and then debriefing with teachers. They further described these conversations as lasting longer and addressing content in greater depth than previously. Notably, those without strong mathematics backgrounds were quick to credit these changes to increased confidence in their mathematics knowledge and in their growing ability to engage in mathematical reasoning.

RENEWED COMMITMENT TO STUDENTS WHO STRUGGLE

By solving problems in small groups, then sharing their work with others, principals experienced firsthand the value of learn-

ing from others' approaches to problem solving. This understanding helped principals see how all students can participate in mathematical reasoning when given appropriate support. This realization was perhaps most compelling to those in the group without a strong mathematics background, but a strong affinity toward students who struggled in mathematics classrooms. The study group process of engaging together in high-level algebraic problem solving demonstrated that well-designed tasks provide all students — especially those who struggle — an opportunity to engage with the content in a meaningful way. As the following quote highlights, this awareness can also help principals communicate to teachers the importance of maintaining high expectations for all students.

"I am NOT a math person. I never have been. The way I learned math (sit-and-get) contributed to my anxiety about math. Through the principal study group, I have been exposed to a different style/technique for math instruction, and I'm actually learning math. It's a message I can share with my staff since many kids feel the same way about math that I did."

LEADERSHIP FOR ALGEBRA REFORM

Looking back, the study group clearly helped participants develop a deeper appreciation for algebra content and adopt a set of concrete ideas around what it means to help students learn algebra. The study group also helped principals think differently about their leadership practices with respect to algebra teaching. As we talked with principals across the series, we stressed that school-level leadership is too often limited to evaluative activities such as summative observations and formative walk-throughs. Through the study group, we wanted to expand principals' conception of instructional leadership to include teacher support and development.

The data suggests, albeit subtly, that the development of leadership content knowledge (i.e. knowledge of the subject, knowledge of teaching, and learning the subject) among participants coincided with their ability to envision leadership practices that extended beyond supervision to include teacher support and development. Moreover, because study group sessions reinforced teaching practices most often associated with planning and leading instruction, the discussion of related leadership "moves" was often limited to those specific aspects of the classroom. Viewed together, this framing of the problem resulted in a wider range of leadership moves (e.g. support, develop, and assess) for a narrower range of teaching practices (e.g. lesson planning and delivery). Ultimately, this framing seemed to help principals gain traction on leadership practices that would be supportive of teachers as they adopted and implemented instructional strategies appropriate for all students.

From a practical standpoint, this framing further enabled us to pose questions that drilled down into content-specific leadership practice. For example, we could now ask: What can you do to support, develop, and/or assess teacher skill at selecting high-level mathematical tasks for group problem solving? As a group or individually, we could then brainstorm appropriate responses, such as encourage a vision for algebra that puts an emphasis on mathematical reasoning; reassure teachers that time spent on high-level tasks will be rewarded; help teachers secure needed curricular and instructional resources; and pay attention to the cognitive demand of selected tasks when observing the classroom. This kind of discussion happened frequently and often informally in the study group. See more examples on p. 31.

CONNECTING LEADERSHIP TO TEACHING AND LEARNING

The intended goal of these sessions was to enhance principals' mathematical knowledge for algebra teaching by actively engaging participants in a representative slice of mathematics content. Through a series of sustained, content-rich study group sessions, participants gained new insights for observing algebra instruction and acquired a working knowledge-base that facilitated mathematical conversations with staff. Participants were also reminded of its importance: All students are deserving of the opportunity to master algebra content. Alone, these are powerful outcomes. In sum, however, they have the potential to reframe the practice of instruction leadership. As Stein and Nelson (2003) remind us:

Principals became more aware of how disciplinary knowledge is structured in mathematics and the implications of that for teaching.

Without knowledge that connects subject matter, learning, and teaching to acts of leadership, leadership floats disconnected from the very processes it is designed to govern (p. 446).

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A DIFFERENT KIND OF DIVERSITY

**Collaboration across
content areas
intensifies learning**

By Ryan R. Goble and Nick Sousanis

Most high school graduates probably recognize the names Watson and Crick. Those with sharp memories might even remember that these guys discovered the structure of DNA. Few people outside the sciences know about James Watson's and Francis Crick's unwitting collaborator — Rosalind Franklin. Although many acknowledge Franklin had developed the best x-ray images of DNA, she did not have an "aha" moment enabling her to see the structure right in front of her eyes. Evolutionary biologist and science writer Olivia Judson (2009) proposes that Franklin "had a fixed idea about how the problem should be solved. Namely, she wanted to work out the structure using the methods she had been taught."

Franklin's work laid the foundation for Watson and Crick. They used her images (without Franklin's knowledge) to create their Nobel-winning hypothesis about the structure of DNA.

Allen Repko (2008) suggests interdisciplinary processes were essential for Watson and Crick in unraveling the structure of DNA. Early on, they recognized the limitations of coming at the problem from a single discipline and sought to verse themselves in several other relevant disciplines to construct a multidimensional picture of what they were after (pp. 229, 255). From that vantage point, they could integrate different sources of information, including Franklin's, to eventually find a

solution that those more deeply versed in particular areas could not (pp. 304-306). As for Franklin, Judson suggests her failure was due to a lack of imagination and an inability to see beyond the disciplinary boundaries that framed her perspective.

The discovery of DNA is a classic example of the importance of working across content areas. We are both pursing doctorates in interdisciplinary studies and are interested in learning experiences that "connect the dots" between disciplines. We've both experienced the possibilities of interdisciplinary work and find that our richest personal

and professional learning occurs when working with intellectually diverse groups of people and ideas.

While each of us focused on a specific discipline in the undergraduate stage of our journeys, we have both always sought to expand our reach beyond those disciplinary

boundaries. Presently, Goble works with both preservice and inservice teachers. One of his classes, "Reading Across the Curriculum," is for undergraduate preservice teachers in every discipline. Many of those who are not working on language arts certifications come to the course with a preconceived notion that only English teachers need to worry about reading and writing. Fortunately, the course is designed to transform those assumptions as students discover common ground across content areas.

For the course's final assessment, each student develops a unit that they share with practicing teachers at an open house. While this seems like the obvious course climax, the real transformations occur during the month that precedes the final showcase. Students spend four weeks participating in a series of 40-minute workshops, where their lessons are critiqued using a protocol by interdisciplinary groups of their classmates.

After one round of workshops in the spring, Goble asked the students about their experience working in these intellectually diverse groups. Megan Allen, an English teacher, said, "I do not know how to edit my lesson plan for students who are not specifically English creative. It's helpful when I have a math or science major in my group. If they don't fully understand the material, they can look carefully at what seems to be most confusing and tell me why."

The course is evolutionary by design. After intense collaboration, students used to working with people in their major start to see the value of collaborating across content areas. Sarah Lavery, a preservice English teacher, articulates one of the things we believe is an essential characteristic of interdisciplinary collaboration. She says, "What comes naturally to me — like literary criticism — I would have to explain carefully to [math and science teachers] just like 9th graders. Similarly, I need things in math explained to me in-depth. Teaching me math is like teaching a 9th grader."

We believe it is essential for teachers at every level to be able to teach "who they are" and "who they aren't." This ability to see things from multiple points of view is why many believe interdisciplinarity is essential for professional growth.

We must work inside and outside our content-area specializations.

INTERDISCIPLINARITY

Conceptually, interdisciplinarity can be fuzzy. Thankfully, scholars like Repko and Julie Thompson Klein offer definitions we can build on. Klein (1990) sees interdisciplinarity as a bridge that links different disciplines while

AS THEIR PERSPECTIVE EXPANDS, THEY BECOME MORE DEEPLY INTROSPECTIVE AND CONTINUE TO BRING THEIR WORLD INTO THEIR IMAGERY. THE IDEAS THEY'RE DEALING WITH ARE BEGINNING TO MIRROR WHAT ADULT ARTISTS DO.

Nick Sousanis uses art to expand his disciplines. This is a panel from his "Expansive Foundations: An Overview of Artistic Development in Children," based on a college course.

restructuring and integrating knowledge on a grand scale (p. 28). The interdisciplinary approach is not against disciplinary knowledge. It recognizes the disciplines as enabling great sight, but insists that they do not show us the whole picture. In the same way that we do not have stereoscopic vision with a single eye, a single discipline's reliance on a solitary viewpoint restricts our perception.

In interdisciplinarity, multiple points of view are essential to create the "aha" moments. By putting diverse disciplines in conversation with one another, spaces open up for making unexpected connections. These connections across content areas usually yield solutions that most people would label as creativity in action. Max Ernst (Ghiselin, 1952) defines creativity as "the pairing of two realities which apparently cannot be paired on a plane apparently not suited to them" (p. 66). When we start making a practice of pairing unrelated content areas, creative breakthroughs occur that transcend existing disciplinary thinking and boundaries.

When we as teachers don't reach outside our discipline to connect to content that might be of interest to our students, we increase the risk that our students might miss out on the richness of the subject we are trying to explore. Disciplinary specialization can narrow perspective. Creativity researcher Sir Ken Robinson (2001) writes, "As knowledge expands, greater specialization is inevitable. The risk is that we lose sight of the larger picture, of how ideas connect and can inform each other" (p. 171).

Elizabeth Gebauer, a science teacher, said, "I enjoy working in interdisciplinary groups because those outside of your own discipline approach the topic from a completely different point of view. As a science major, I sit in science class after science class, and the majority of [the courses] are taught in the same way. It is only natural that I would approach the topic in a similar manner. It is beneficial to work with people that have not been in that same classroom environment and can provide new insight."

WORK ACROSS CONTENT AREAS

In their groundbreaking creativity research, psychologists Mihaly Csikszentmihalyi (1997) and Howard Gardner (1993) began to articulate the value of working across domains as a ma-

jor source of creative innovation. These ideas have moved into natural science, where "breakthroughs increasingly come from teams of bright, diverse people. That's why interdisciplinary work is the biggest trend in scientific research" (Dreifus, 2008). While many educators have gut feelings about the value of working outside their content areas, we can now look to a developing body of research on collaboration, problem solving, cognition, and creativity to rethink traditional disciplinary school structures.

Kevin Dunbar (Lehrer, 2009), a professor at the Laboratory for Complex Thinking and Reasoning at the University of Toronto, uses the term "failure-blindness" to describe what Gebauer's quote and Rosalind Franklin's story clearly illustrate. Failure-blindness describes scientists' inability to deal with or even see unexpected results in their experiments, which happens frequently. Rather than realizing that they have made a new discovery, Dunbar says, scientists typically dismiss unexpected findings as failures. Dunbar has researched these issues in lab settings and found that scientists transcend their blindness most successfully when they debate and discuss ideas with groups composed of others with a diverse knowledge base.

Dunbar found scientists working in diverse groups "forced them to think, if only for a moment, like an intellectual on the margins, filled with self-skepticism." In our opinion, teachers miss critical learning opportunities when they ignore the margins, where many of their students might be located in relation to their discipline. Sometimes teachers approach Shakespeare, quadratics, or quantum theory as if they were teaching specialists in their content area. When teachers make an effort to collaborate with educators outside of their content areas, they can use the same skepticism their students might bring to a topic to see it a new way. When we reach outside "who we are," we begin to contextualize the content, process, product, and culture of learning for people "who we aren't." This approach helps us address the fact that most people, including our students, don't have the same background knowledge or learning style as we do.

In related research, Scott Page, a professor of political science and economics at the University of Michigan, found that "teams of individuals with different backgrounds find faster and better ways of solving a problem than a team in which everyone

has similar training and, thus, similar modes of thinking" (Oskin, 2009, p. 48). Page's work reinforces the value and importance of divergence and diversity for the creation of new ideas within groups.

When we frame professional development around diverse interdisciplinary dialogues before we begin teaching our lesson, unit, or course, we can see beyond our disciplinary blind spots and expand our visions of teaching and learning. Lavery echoes Dunbar and Page's research. "When I have math or science majors in my group, I make things as clear and specific as possible because they probably don't think the way I do," she said. When working in a K-12 setting, we strive to see content we've mastered with a beginner's mind. If teachers want to reach as many learners as possible, they must think beyond their content specialization.

INTERDISCIPLINARY PROFESSIONAL DEVELOPMENT

During Goble's third year as curriculum coordinator at a Bronx high school, the administrative team moved professional development into classrooms. Over the course of the year, Goble collaborated with staff to create highly differentiated learning cohorts. These cohorts were a unique hybrid of professional learning committees and instructional rounds.

Goble's team created a series of two-week observation windows. During each window, about five staff members would open their rooms for observations. Staff had two days to sign up for observations during that window. Sometimes all the math teachers might rush the signup sheets so they could do a math team observation, but most of the time an interdisciplinary group of staff would observe a teacher over a two-week period. Teachers learned about classroom observation, and they focused on schoolwide themes, such as literacy and differentiation. These lenses were built into pre- and post-observation protocols.

Every other week, instead of department meetings or traditional after-school professional development, teachers chose colleagues and classrooms as their laboratories for professional growth. Teachers enjoyed seeing the school with a wide-angle lens and were excited to collaborate with teachers across disciplines. Many valued the unique perceptions of those not trained in their discipline.

In retrospect, this professional development initiative was a series of creative partners and partnerships. That term captures the spirit of the interdisciplinary professional development that we believe is essential for creative teaching and learning.

Remember, interdisciplinarity is not antidiscipline. One teacher pointed out the value in both approaches saying, "People outside my discipline ask great clarification questions. People inside the discipline offer suggestions for good activities and help break down the material into lessons that are manageable."

Working both within and beyond a content area does not need to be a source of conflict. Robertson (2005) lays out a series of generative paradoxes that are essential to be an effective teacher. He explains that teachers must live between things like "control and flow" and "subject knowledge and teaching knowledge." Robertson shows that things that seem contradictory are actually paradoxes that generate new ways of thinking. To those ends, we'd like to add an additional generative paradox to Robertson's list. We must teach "who we are" and "who we aren't" to grow as teachers and to serve a wide range of students. This means we must work inside and outside our content-area specializations regularly to improve our practice and grow as professionals.

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FRAMEWORK FUELS
the NEED
to READ

Strategies boost literacy of students in content-area classes

By Ruth Schoenbach, Cynthia L. Greenleaf, and Gina Hale

A diverse group of urban middle and high school teachers sits around tables in interdisciplinary school teams, silently reading "Father's Butterflies," an essay by Vladimir Nabokov. The text's densely layered sentences, specialized scientific language, and use of multiple languages challenge the fluency of almost all readers in the group.

After reading to themselves, participants share their reading processes. A high school biology teacher offers her way of getting into the text: "I know about classification systems, so I skipped all the long-winded introductory stuff, and went down to the part where he starts talking about classifying butterflies." An English teacher mentions a connection to the author that helped him with the text: "Nabokov … I know he can be very ironic, sophisticated, so I was looking for a kind of undertone in the piece, and that helped me through all the scientific stuff." Some teachers confess that they were tempted to put the text aside because they were

not interested in it, while others admit that they feared that their own lack of reading proficiency or knowledge would be exposed in front of colleagues. Many heads nod.

literacy in history/social studies, science, and technical subjects. This means that the responsibility of preparing students to read, write, talk, and think critically about complex texts and across such texts is no longer just the English teacher's job. As the CCSS Initiative web site describes it, "Literacy standards for grade 6 and above are predicated on teachers of English language arts, history/social studies, science, and technical subjects using their content-area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields." Yet, from working with hundreds of secondary teachers around the country, we know that most of them already feel rushed to cover the subject matter content that will be assessed on current high-stakes tests. Many also feel that their primary goal of helping students build deep disciplinary knowledge has been sacrificed to the demands of superficial content coverage. The suggestion that they teach reading and writing as well as disciplinary content seems an impossible addition to an already-packed syllabus. Because most secondary teachers have not been successfully prepared to teach reading in their discipline, many no longer see reading as a viable way for most students to learn. As one teacher said, "I assign reading every night, but, realistically? Very few students actually do it."

> **As teachers develop knowledge about disciplinary literacy that they can modify and adapt for the context of their classrooms, they gain confidence in their ability to help students become independent learners in their subject areas.**

Solutions to the challenge of bringing reading into content-area classrooms are more complex than teaching a set of isolated generic reading comprehension strategies such as summarizing and questioning. Indeed, years of research on teaching teachers to use such reading comprehension strategies point to meager returns (Alvermann & Moore, 1991; Durkin, 1978; Snow, 2002). In our work, we have found that beginning at the point of teachers' disciplinary interests and expertise often opens a gateway to instructional transformation that generic comprehension strategies workshops do not achieve.

Since 1995, we have developed a set of inquiry-based professional development tools that leverage teachers' expertise as readers, writers, and thinkers in their own disciplines. Through these inquiries, teachers learn to apprentice their students to the practice of reading and comprehending complex subject matter texts. This text-based inquiry stance is at the heart of our Reading Apprenticeship instructional framework as well as our professional development model. Several randomized controlled studies, as well as a number of qualitative studies, provide evidence that this approach leads to significant changes in teachers' classroom practice, and that these changes, in turn, lead to significant changes in students' academic motivation, content learning, and reading comprehension.

Middle and high school teachers across academic disciplines face increased pressure to address the Common Core State Standards (CCSS) for English language arts and for

THE READING APPRENTICESHIP INSTRUCTIONAL FRAMEWORK

The Reading Apprenticeship instructional framework and accompanying professional development help teachers support secondary students to develop positive literacy identities and engage productively with challenging academic texts. Teachers working with the Reading Apprenticeship model often see a dramatic, positive transformation not only in students' literacy, but also in their engagement and achievement in academic disciplines.

Reading Apprenticeship leverages four interacting dimensions of classroom life to support reading development and writing in response to reading:

1. **Social:** The social dimension draws on students' interests in peer interaction as well as larger social, political, economic, and cultural issues. Reading Apprenticeship creates a safe environment for students to share their confusions and difficulties with texts and to recognize their diverse perspectives and knowledge.

2. **Personal:** This dimension builds on strategic skills used by students in out-of-school settings; their interest in exploring new aspects of their own identities and self-awareness as readers; and their purposes for reading and goals for reading improvement.

3. **Cognitive:** The cognitive dimension focuses on developing readers' mental processes, including their repertoire of specific comprehension and problem-solving strategies such as summarizing, questioning, visualizing, and making connections.

4. **Knowledge-building:** This dimension involves surfacing and expanding the knowledge that readers bring to a text and develop further through personal and social interaction with that text. Students build knowledge about word construction, vocabulary, text structure, genre, language, topics, and content embedded in the text.

These four dimensions are woven into subject matter teaching through metacognitive conversations — conversations about *how* students and teachers make sense of what they read. In these conversations, students not only share difficulties and ways of reading, but also work together to clarify confusions and make sense of materials with teacher support. Also central to this framework are:

- Extensive reading, meaning increased opportunities for students to read a wider range of texts on a topic; and

- Writing in response to reading, ranging from simply annotating the text while reading with questions, connections, reactions, and summaries to discipline-based writing.

By attending to these four dimensions of learning and by making reading and thinking processes visible through metacognitive conversations, the Reading Apprenticeship instructional framework:

- Demystifies reading, helping teachers and students see that reading is complex and that it changes depending on the text and purpose for reading;

- Makes teachers' reading processes and knowledge visible to students and vice versa;

- Helps teachers develop a repertoire of classroom routines for building students' sophisticated literacy skills into content-area learning goals;

- Transfers increasing responsibility to students through routines for text-based social interaction; and

- Builds students' motivation, stamina, and repertoire of strategies for understanding and engaging with challenging academic texts.

These teaching and learning processes support students to become self-regulated, active readers who can use a repertoire of strategies flexibly and appropriately in various content-area reading contexts.

BUILDING SKILL AND WILL

By delving deeply into challenging texts and looking more closely at the varied kinds of thinking processes they use as adult readers, participants in Reading Apprenticeship professional development often come to new ways of thinking about the challenges of the varied types of texts in their subject areas. Teachers are also able to see that they already have many more mental resources than they had realized for apprenticing students to specific hidden rules of reading in their subject area. In a professional community of biology teachers, for example, facilitators lead a variety of reading process analyses, with participants reading an array of challenging science texts to uncover how they read in ways that engage them in thinking scientifically. Metacognitive routines such as think-aloud (Kucan & Beck, 1997) and talking to the text (Jordan, Jensen, & Greenleaf, 2001) help readers slow down and surface their thinking while reading, making the invisible visible. Through these experiences, teachers develop awareness of their own expertise as readers in their disciplines and insight into how they can support their students.

In addition to developing tools and protocols for exploring disciplinary reading, our team has developed video- and text-based case study inquiries that take a close look at individual students' reading and specific Reading Apprenticeship classroom interactions. As participants engage collaboratively in these inquiries, they have opportunities to develop new ways to observe and assess student reading and thinking. By looking closely at case studies and reflecting on these with colleagues, content-area teachers can do what classroom teaching rarely affords: listen closely to how students are thinking and approaching reading and see more of the "promise of the underprepared" (Greenleaf, Hull, & Reilly, 1994). With these new insights, they collaboratively design content-embedded literacy lessons designed to build on students' observed strengths and accelerate literacy growth and content learning simultaneously.

As teachers develop knowledge about disciplinary literacy

that they can modify and adapt for the context of their classrooms, they gain confidence in their ability to help students become independent learners in their subject areas. Inquiries such as the close reading of "Father's Butterflies" help teachers gain awareness of the invisible processes of skillful reading that they and their colleagues use to make sense of texts. This helps them appreciate the central role of literacy in their discipline and to see, as one teacher reflected, "Teaching literacy in my content area is teaching my content area."

As their students become more independent disciplinary readers, writers, and thinkers, many teachers express pride in their own changing role. "I see I have changed my opinion about what they can learn from each other," writes one teacher in an end-of-year reflection. "I would hear them talking in their groups about a topic and ask myself, 'Where did they learn that? I didn't teach them that!' But it's good, too, that they don't need me so much."

EVIDENCE OF EFFECTIVENESS

Several large-scale experimental studies have shown positive effects for this discipline-based literacy model. A multiyear research study funded by the National Science Foundation tested the effectiveness of professional development using Reading Apprenticeship in 9th- and 10th-grade high school biology courses.

Compared with teachers in a matched control group, teachers who participated in 10 days of Reading Apprenticeship professional development over a two-year period were better able to integrate science and science literacy learning in classroom instruction in statistically significant ways. In addition, these teachers offered their students more opportunities to read extended texts with support, more modeling of discipline-based reasoning, more-collaborative learning environments, and more explicit instruction in comprehension strategies than teachers who had not participated in this professional development.

> **We have found that beginning at the point of teachers' disciplinary interests and expertise often opens a gateway to instructional transformation.**

These statistically significant differences in the Reading Apprenticeship teachers' instructional practices led to significant changes for their students compared to students in the control group classes. Researchers found that in the classes where teachers implemented Reading Apprenticeship, students reported several benefits:

- Significantly higher motivation to read science materials;
- More positive student identity;
- Greater confidence while approaching challenging texts; and

- Increased use of reading comprehension strategies.

Further, the treatment group students' test scores on state standardized tests in biology, reading comprehension, and English language arts were significantly higher than those of control group students (Greenleaf et al., 2009).

A similar study is under way to investigate the effectiveness of Reading Apprenticeship professional development for 11th-grade U.S. history teachers as well as a new group of 9th- and 10th-grade high school biology teachers. Preliminary results show similar impact on treatment teachers' classroom practices. For example, in U.S. history classes taught by teachers who participated in 10 days of Reading Apprenticeship professional development over a two-year period, students demonstrate more disciplinary reasoning and content knowledge in essays based on reading primary and secondary source documents than students in the control group.

IMPLICATIONS

A number of the broad features of high-quality professional development recognized by the field (Ball & Cohen, 1999; Guskey & Huberman, 1996) are deeply integrated into Reading Apprenticeship professional development. These include:
- Engaging teachers as learners over time;
- Offering teachers the resources necessary to gain skills and knowledge; and
- Creating opportunities for teachers to reflect on their teaching and their students' learning.

In addition, we believe the following features are necessary for professional development to support stronger disciplinary literacy:
- Taking teachers' concepts about themselves, the domain of reading, their subject area, and students as a starting point for inquiry;
- Drawing on teachers' disciplinary expertise and interests to build new conceptions of and practices to support reading to learn; and
- Engaging teachers in practicing inquiry-based instructional routines with texts representative of the complex academic reading and writing that will prepare students for college and careers.

The ideas teachers hold about reading, thinking, talking, and writing in their disciplines and about themselves as teachers of disciplinary literacy deeply inform their approaches to supporting disciplinary reading. To reach the high standards envisioned in the Common Core State Standards, teachers need deeper engagement in the kinds of generative professional development we have described and studied.

We have seen evidence that through text-based and discipline-specific professional inquiries such as those sketched in this article, large numbers of teachers across a broad range of experiences and grade levels build new concepts and new theories about why using such tools is important, even essential, to learning in the content areas.

Note: The Strategic Literacy Initiative team at WestEd has recently been awarded funding through the Investing in Innovation Fund (i3) from the U.S. Department of Education to scale up their content-specific literacy professional development in four states to reach an estimated 300 schools, 2,800 teachers, 250 teacher leaders, and 400,000 students.

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GOING THE DISTANCE FOR
RURAL SCIENCE TEACHERS

**California consortium develops strategies to provide
science content professional development for isolated teachers**

By Judi Wilson and Cathy Ringstaff

Teachers in rural settings find it difficult to access quality professional development that can improve student science achievement. These teachers are serving the 10 million students, or about 19% percent of the nation's total public school enrollment, who attend school in a rural district (Johnson & Strange, 2009). Studies show that long-term, in-depth methods of teacher learning are the most successful, but few professional development opportunities exist for teachers in rural districts, and access to university-sponsored resources is also limited. Rural teachers and schools are often invisible as they are dwarfed by the needs of larger urban districts in dense population areas.

To assist with science professional development for rural teachers, the San Joaquin County Office of Education's Office of Science and Special Projects in Stockton, Calif., formed a multicounty consortium of 26 rural districts and 44 schools and launched a major project to offer professional development to teachers in grades 4-8. The Science STARTS project (Science & Technology Achievement for Rural Teachers and Small Districts) was funded by the California Department of Education as part of the California Math/Science Partnership initiative. California, the most populous state in the nation, has a significant number of rural teachers and districts. While the state has the smallest percentage of residents living in rural areas, it has the 8th-largest number of rural people in the nation (Johnson & Strange, 2009).

Rural teachers polled in preparation for the project offered the following professional development challenges:

- **Sparse or nonexistent curriculum leadership within the school/district.** No curriculum personnel for science existed within any participating Science STARTS school. Rural districts are often very small; some rural districts consist of a single school.
- **Remote locations and long distances between schools and support providers.** Access to quality professional development, especially intensive science summer institutes, often requires teachers to pay for room and board because of the travel distance. Professional development during the school year often requires driving long distances after a full day of teaching. Moreover, resources from universities and colleges are often beyond geographic reach.
- **Limited opportunities for sharing new knowledge and for teacher collaboration.** Opportunities for collaboration among teachers of the same grade level, with its infusion of new ideas — what Michael Fullan (1999)

calls "knowledge creation" — is often difficult when there is a lack of new information from the outside. Frequently there is only one teacher per grade per site in these rural schools, and several teachers who teach multiple grade levels.

While rural schools face challenges associated with professional development, they also have characteristics that can have a positive impact on student achievement. For example, rural schools tend to be smaller, more personal, and have lower student-to-teacher ratios than urban schools, which allows for more individualized attention. Students tend to feel safer than their urban counterparts, and teachers often utilize group learning techniques that are mutually beneficial for older and younger students. Rural schools have strong ties to the communities that they serve. Studies have also shown that in recent years, rural schools have higher graduation rates and fewer discipline problems than urban schools (Brown & Swanson, 2003). Rural settings are also ripe for science learning, since schools frequently have easy access to natural settings to enhance science lessons.

Science STARTS enlisted 30 teachers in a three-year program designed to enhance their science content knowledge, instructional methods, and reflective practice through 80 hours of learning per year. A key component of this professional development focused on improving teachers' ability to implement the California Science Standards effectively,

as well as to learn strategies for teaching the many English language learners they were encountering.

Science STARTS studied the participation of its three-year cohort and learned much about rural teachers' specific needs and how to serve this unique population. Moreover, we learned how to put structures in place that would survive once grant funding ended. These lessons are informative for both curriculum planners and implementers and for rural teachers who are struggling to improve their professional learning.

Rural teachers have specific needs.

Teachers in rural settings are often challenged to access high-quality professional development that meets their specific needs. Before we began the project, we surveyed teachers about their needs. Surprisingly, they requested face-to-face, rather than online, content learning to get out of their environment and maximize the networking and collaboration that a weeklong summer institute offers. While online options are beneficial for rural teachers, face-to-face opportunities are important and productive in building collaborations that exist long beyond the initial institute. Teachers were clear, however, about their need for the project to cover residential costs for the summer institute, and we were able to offer free room and board so they wouldn't have to drive long distances during the institute.

NOW I REALLY UNDERSTOOD WHAT I WAS TEACHING

By Kelly Carr

I was first introduced to Science STARTS when student teaching. My master teacher and her colleagues would get together and brainstorm ideas, share investigations, and plan science lessons, then share the results with their respective grade levels. Their collaboration paid off in the classroom — the kids really learned difficult concepts (like elements) and had fun doing it! I was sold and became a Science STARTS teacher myself. As a teacher in a rural school, science professional development is not always available, and I felt I should take advantage of how Science STARTS was tailored to our needs.

What I knew about Science STARTS was that teachers got great ideas from other teachers. I was especially interested in science notebooking and experiments my students might enjoy. What I didn't know is that Science STARTS would teach me science content knowledge that I could then pass along to my students. Instead of getting a teacher's edition and hearing "teach it," I learned science in an interactive way at an adult level so that I could then go back and teach the kids — only now I really understood what I was teaching. After attending one summer institute, I finally "got" circuits and loved learning along with my colleagues. This continued when I went back to my school and participated in a cluster to discuss science and complete a project.

Not only did I receive in-depth science content training, but I have had opportunities to collaborate with other teachers from surrounding areas. The real power of collaboration is the ideas and activities I bring back and share with my students. This week, my class went on a water cycle journey. This was an activity I participated in while at the Science STARTS Summer Institute. ALL my students, regardless of level, now understand the water cycle; they had an absolute blast learning about it! I'm especially proud of a young man who has a very difficult time expressing himself, and who is diagnosed with Asperger's Syndrome. He was able to write a narrative describing his journey through the water cycle, and he was able to complete it independently. This is a huge accomplishment for him!

Kelly Carr is a 5th-grade teacher at Selma Herndon Elementary School in Livingston, Calif.

Carr

Networking and relationships through summer institutes are important.

Key components of Science STARTS were the three annual six-day summer institutes held at various colleges and universities in the region. Designed to improve teacher science content knowledge, these institutes were taught by a team of university faculty members with a science teacher leader. Three institutes were held in three different locations so that all teachers would not have to travel distances all three years.

Teachers consistently rated the summer institutes highly. Many, for example, stated that the content training was the best workshop they had ever attended, and most found the hands-on activities that were the centerpiece of the institute particularly valuable. A highlight of the project was the third-year summer institute, held at a rural community college, which aligned an existing earth science course to the California Science Standards and the teachers' needs. All teachers received community college credit for the summer institute, which included a two-day overnight field trip to a Sierra Nevada camp. Community colleges can provide valuable professional development resources to rural teachers as their courses can be appropriate for teachers and are frequently more accessible to rural teachers than large universities. Since most elementary teachers do not have a science degree, a wide variety of science courses at the community college can enhance teachers' content knowledge.

Teachers consistently shared how important the relationships they formed at the institutes were to them. They stated that staying in the college dorms offered in-depth opportunities for sharing and continued learning with other grade-level teachers, a rare experience for rural teachers, who are frequently the only teachers of their grade level at their school. The relationships built during these institutes have continued via e-mail communication among the teachers.

Clusters of rural teachers can be productive for ongoing collaboration and group learning.

After the summer institute, teachers were placed into teams of three to four based on geographical proximity. If enough teachers at a school participated in the project, they were on a school team, but, in some cases, a cluster was formed from teachers from multiple schools. The cluster met for a total of eight hours during the year to design and conduct a project.

Teachers presented final projects at a one-day symposium in the spring and represented major efforts that benefitted their sponsoring rural school. Projects included conducting an inventory of science equipment at the school, selecting and purchasing new science materials, setting up a school science lab, providing a school-based community/family event for science, or instituting a schoolwide science fair. Administrators at the sponsoring schools responded to all of the projects enthusiastically. Each project represented science leadership by the participating cluster groups. Comments such as, "We have talked more

in our grade level and between grade levels about science than at any other time," and, "There is a lot more open communication among the teachers in STARTS" were common.

School-based science teacher leaders are an antidote to lack of curriculum personnel.

The Science STARTS project promoted a grassroots and inclusive definition of leadership. Teachers were encouraged to take action in areas that were important to them and fill the needs they saw in science at their schools. In addition, one teacher in each cluster received additional support. These teachers took on a leadership role by calling cluster meetings, keeping colleagues on track, and assisting the group in coming to consensus on the focus of the group project. Teacher leaders participated in 24 hours of learning in addition to the 80 hours required of all participants. They learned how to support and plan meetings and gained leadership skills specific to their roles, such as group facilitation and project development. Teacher leaders became important not only in the clusters but also in the organization of the entire project. Several teacher leaders presented at the summer institutes and assisted with the preparation of all project events.

Rural teachers are accustomed to taking leadership roles at their school site, since much needs to be done with few personnel on hand to help. Science STARTS simply harnessed those leadership skills. The cluster meetings at the school sites were valuable in changing the culture of isolation at the school sites, and teacher leaders were instrumental in making sure these meetings were productive. E-mail support, a project web site, and periodic face-to-face meetings of teacher leaders helped to solve problems and support them in their role.

Rural teachers can benefit from leadership opportunities outside of the school to avoid becoming entrenched in a single grade level. Such leadership allows teachers to create and participate in learning from colleagues at other sites.

Science STARTS was, as its title suggests, a start, or a down payment on continued improvement of science education among 4th- to 8th-grade teachers at targeted rural schools. Judging from the continued enthusiasm evident from the teachers in the project, it continues to pay back dividends of quality science instruction for students. The project provided important information about what works for the many rural teachers who seek ways to improve their professional practice.

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ROCK-SOLID SUPPORT

Florida district weighs effectiveness of science professional learning

By Linda Shear and William R. Penuel

The best science teachers are not only experts in teaching and knowledgeable about science content, but they are also great at teaching science. They have specialized teaching knowledge, including knowledge of effective pedagogical practices in science, student difficulties with understanding content, and curricular purposes (Ball & Bass, 2000; Hill, Rowan, & Ball, 2005). As a result, professional development that is both content-specific and anchored in what teachers must do in the classroom is becoming the norm for helping teachers improve their science instruction.

Less widespread is professional development that prepares teachers to design units of instruction for stu-

dents by using available materials or developing their own lessons. This may be in part because some education leaders and researchers do not believe teachers have sufficient skills and knowledge to design instruction for students, so they focus on preparing teachers to follow curriculum developed by subject-matter experts (Atkin & Black, 2003). But teachers inevitably do adapt curricula and programs to fit their classroom contexts.

In our work, we have found that content-specific professional development that prepares teachers for principled adaptation of curriculum has potential for improving student learning. Here, we describe the comparative teacher and student outcomes of three content-specific professional development programs that were tested in a school district in Florida. We also examined costs that districts may want to consider in selecting a professional development model to adopt.

THREE DISTRICT MODELS

With the goal of improving standards-based science instruction, Florida's Duval County Public Schools redeveloped its standards under a National Science Foundation grant. The district followed the curriculum design and teaching model called Understanding by Design (Wiggins & McTighe, 1998). This model promotes student learning goals related to the "big ideas" of a discipline. These learning goals, or "enduring understandings," drive the development of curriculum and link to another essential component of Understanding by Design: formative assessments that provide students and teachers with feedback on the depth of student understanding.

Following Understanding by Design principles, Duval County Public Schools organized the state standards for middle school science into nine-week segments designed to build a set of enduring understandings of the big ideas defined in the state standards. The district provided some related web-based materials to help teachers teach to these new standards. However, the district lacked resources to create content-focused professional development that would prepare the teachers to design units of instruction that were fully aligned with Understanding by Design. The district partnered with professional developers at TERC and the American Geological Institute to offer content-based professional development on Understanding by Design and with researchers at SRI International to study the impact of the professional development on teachers and students.

Those involved in the initiative tested three different programs, each of which put teachers in a different role relative to the science curriculum: teachers as designers, teachers as adopters, and teachers as intentional adapters of curriculum units. Each program included a two-week workshop over the summer and four days of follow-up support

METHODS USED TO EVALUATE THE THREE PROGRAMS

The researchers conducted a randomized experimental study of these three programs with a total of 39 6th-, 7th-, and 8th-grade teachers who were each assigned to one of the programs: Investigating Earth Systems, with teachers as adopters; Earth Science by Design, with teachers as designers; or the hybrid program, with teachers as adapters.

An additional 14 teachers, assigned to a control condition, did not participate in any district-sponsored professional development but were expected to teach to the same Understanding by Design-based content standards.

Each of the three professional development approaches in the study provided an equivalent duration of training and follow-up opportunities and were designed to be as similar as possible relative to commonly acknowledged characteristics of effective content-specific professional development, except for the teachers' expected role in unit design.

The study measured the impacts on student learning using a standards-based test of Earth science content developed for the study and measured the impacts on teaching using a combination of surveys, observations of classroom instruction, and analyses of teacher assignment quality.

during the school year. The three programs are described below.

Teachers as curriculum designers

Developed by TERC and American Geological Institute with funding from the National Science Foundation, Earth Science by Design applies the Understanding by Design curriculum development approach to earth science content at the middle school level. This approach is intended to help teachers be effective designers of students' earth science learning experiences, sequencing and organizing coherent units of instruction based on existing or teacher-developed curriculum materials. The two-week workshop that TERC organized and facilitated for the district's teachers addressed the nature of student understanding in science, design frameworks and processes, the "Earth as a system" approach to Earth science, the value and application of tools for scientific visualization (such as working with satellite data), and powerful formative assessment strategies. The workshop allotted time for teacher groups to begin designing their own unit of instruction, based on the essential questions and enduring understandings that they drafted and mapped to the revised standards. The follow-up professional development days in the fall and spring included time for mentoring, teacher presentations of their units, and shared analysis of results.

Costs by professional development model

Cost element	Examples	Cost by model		
		INVESTIGATING EARTH SYSTEMS (teachers as adopters)	EARTH SCIENCE BY DESIGN (teachers as designers)	HYBRID (teachers as adapters)
Teacher time	Teacher hours, substitutes	$26,160	$26,160	$26,160
Training and coaching	Planning and delivery, district staff and contractors	$28,320	$5,912	$15,692
Administration	District or school administrator time	Not applicable		
Materials, equipment, and facilities	Workbooks, binders, catering	$32,750	$1,732	$34,574
Travel and transportation	Local travel; flights and expenses for contractors	$6,912		$2,423
Tuition and conference fees	Course tuition, registration costs	Not applicable		
Total		**$94,142**	**$33,804**	**$78,849**

Teachers as adopters

Developed by the American Geological Institute with funding from the National Science Foundation, Investigating Earth Systems is a 10-module curriculum focused on five big ideas in Earth science. For Duval County Public Schools, the American Geological Institute worked with district educators to select the content modules that most closely aligned with Florida's standards and prepared teachers to use those modules in their classes. The institute facilitated a two-week workshop that introduced inquiry-based science and the Earth systems approach as learning actively engaged teachers in the specific modules and content that they would be teaching. Follow-up training during the academic year provided mentoring and support for teachers and discussion of curriculum adaptations and outcomes in their classrooms.

Teachers as intentional adapters: The hybrid approach

The hybrid program combined elements from both Earth Science by Design and Investigating Earth Systems. In the two-week workshop, following the Earth Science by Design model, TERC facilitated discussions about the nature of science understanding, the Earth as a system approach, and frameworks and practices in the principled design of curriculum and assessments. Unlike Earth Science by Design, in which teachers assembled their units out of curriculum materials that they already had access to or that they developed, in the hybrid model teachers worked with the same high-quality curriculum modules as their peers in the Investigating Earth Systems program and had time to adapt and sequence them to develop the units they would teach. As with the other two programs, the hybrid training included follow-up coaching and workshops during the year.

EFFECTIVENESS OF THE THREE MODELS

Both programs in which teachers received explicit instruction in how to design units following the Understanding by Design approach — Earth Science by Design and the hybrid program — had positive impacts on teaching and learning relative to the control group and the Investigating Earth Systems group. Data showed that teachers in both programs became more thoughtful planners of instruction, considering the enduring understandings that students should develop before considering what activities to implement. As a result of their participation, teachers in these programs were more likely to use strategies featured in the professional development for developing understanding, such as prompting students for explanations and interpretations, not just recall of facts. Furthermore, while teachers in the hybrid program were judged to use a higher-quality curriculum than their peers in Earth Science by Design, students of participating teachers in both programs outgained students in the Investigating Earth Systems and control classrooms on the standards-based test administered as part of the study. More detailed results of these studies are available both

in journal articles (e.g. Penuel, et al., 2009; Penuel & Gallagher, 2009) and in conference papers (e.g. Gallagher & Penuel, 2009).

COSTS, HIDDEN OR OTHERWISE

Effectiveness is just one part of the decision about adopting content-specific professional development programs in science. We conducted a cost analysis of the three programs (see chart on p. 50) using the framework of Odden and colleagues (Odden, Archibald, Fermanich, & Gallagher, 2002), which suggests common elements of total professional development costs.

The reported costs include actual costs for preparation, delivery, and follow-up for each program, adjusted slightly to standardize the number of participants. (Costs of curriculum, incentives, substitute time, and refreshments assume 15 participants per class.) They do not include initial development costs. The costs listed here parallel those that districts would incur if they purchased each type of program as an existing package. Investigating Earth Systems and the hybrid model were led by outside consultants, and the Earth Science by Design program, which operates on a train-the-trainer model, was led by two previously trained district professional developers. The consultants cost more, but hidden in the breakdown is the initial cost of developing district capacity for training.

Although Earth Science by Design and the hybrid program both produced strong instructional planning and student outcomes, the hybrid program appears to be substantially more expensive ($78,849 vs. $33,804). The significantly higher cost of the hybrid program, however, includes the cost of purchasing the Investigating Earth Science curriculum. The Earth Science by Design program did not require new curriculum materials, but districts adopting this program may wish to consider replacing their textbooks or curriculum to reflect the learning goals they seek to promote. Districts will need to consider the cost of purchasing appropriate curricula as they make decisions about the most appropriate professional development.

A substantial hidden cost is that of teacher attrition. In science, 8% to 9% of all teachers in the United States leave the profession each year, and another 7% to 8% move to another school (Ingersoll, 2003). When a teacher leaves the district or school or even changes assignment within the school, district investments in developing that teacher's knowledge of how to teach the subject matter are lost.

IMPLICATIONS

This study suggests the value of content-based professional development programs that train teachers in principled design of curriculum units, with strong and coherent science curricula they can use as building blocks. Extended professional development workshops that blend content, curriculum, and pedagogy, accompanied by opportunities for further support and coaching during the school year, can significantly increase the quality of the science education experience that teachers can of-

fer students and the depth of student learning that results. Important financial considerations include not just the cost of instruction but also of curricula, and attention to conditions that promote teacher retention as a way to maximize return on staff development dollars.

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> **This study suggests the value of content-based professional development programs that train teachers in principled design of curriculum units, with strong and coherent science curricula.**

POCKETS
of EXCELLENCE

Study explores how policy affects professional learning in 4 high-performing states

By Ann Jaquith, Dan Mindich, and Ruth Chung Wei

According to national survey data (NCES, 2004, 2008), access to and participation in professional development varies widely across states (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009; Wei, Darling-Hammond, & Adamson, 2010), and the quality of professional development across most states is far from meeting research-based definitions of effective professional development, with a few pockets of excellence in some states. In this study, *Teacher Professional Learning in the United States: State Policies and Strategies,* we look into those pockets of excellence and examine the policies and professional development strategies of a few high-performing states and their districts through case studies.

The goal of this study is to deepen our understanding of the kinds of policy contexts that may be connected to excellence in professional development at local levels. We began by conducting a broad scan of past and current state policies that support professional development in each state. We investigated the specific professional development programs, initiatives, and structures in each state and the conditions that supported these efforts. In doing so, we were able to draw some conclusions about the role of state policy and other factors that might be linked with high-quality professional development.

This article is based on *Teacher Professional Learning in the United States: State Policies and Strategies.* This is the third in a three-phase study by Learning Forward and the Stanford University School Redesign Network that explores the status of professional learning in the United States. The final report, to be released in November, will include the full case studies examining state-level policies related to professional development. Reports from the first two phases of the study are available at **www.learningforward.org/stateproflearning.cfm.**

Four high-performing states (Vermont, New Jersey, Missouri, and Colorado) were selected based on high levels of teacher participation in professional development on the 2007-08 Schools and Staffing Survey (NCES, 2008), a reputation for enacting policies that are consistent with research on effective professional development, and improvements in student achievement on the National Assessment of Educational Progress (2009). We also looked for states with geographic and demographic diversity within and across states, as well as diverse policy contexts.

FINDINGS

The table on p. 53 displays some of the major state provisions directly related to professional development that are common across the four states.

This snapshot indicates that most have several common features supportive of professional development. Most:

- Have professional development standards; have a state-level body that oversees teacher licensing, professional teaching standards, and professional development;
- Require individual professional development plans for teachers;
- Require minimum levels of professional development for license renewal; and
- Require induction and mentoring for beginning teachers.

Two states provide monetary subsidies for teachers seeking National Board for Professional Teaching Standards certification.

Of the four states, Missouri has the strongest system in place for ensuring that state-level policies are enacted locally through a guaranteed level of state and local funding of professional development, district and school-level professional development committees, individual professional development plans, and a means for the state to monitor districts' use of regional professional development centers and participant satisfaction.

- **State case studies , pp. 54-55**
- **Policy strategies and contexts, p. 56**

PROFESSIONAL DEVELOPMENT POLICY PROVISIONS IN FOUR STATES

Feature	COLORADO	MISSOURI	NEW JERSEY	VERMONT
Standards for professional development	Professional development guidelines for license renewal only.	Includes mechanism for enforcement/monitoring.	Includes mechanism for enforcement/monitoring.	Professional development guidelines for license renewal only.
State resources for professional development	Indirect funding through other state department units that implement professional develoment.	Yes.	Indirect funding through other state department units that implement professional develoment.	Indirect funding through other state department units that implement professional develoment.
State-level professional teaching standards board (or similar board)	Yes.	Yes.	Yes.	Yes.
District or school-based professional development committees required (or similar body, e.g. local standards board)	No.	Yes.	Yes.	Yes (for individual license renewal).
Individual professional development plans required for all teachers	No.	Yes.	Yes.	Yes.
Professional development requirements for license renewal	Yes.	Yes.	No.	Yes.
Role of professional development in teacher evaluation	No.	Yes.	Yes.	No.
Role of professional development in career paths/ladders (e.g. Master Teacher license)	Yes.	No.	No.	No.
Induction/mentoring policies or programs	Includes mechanism for enforcement/monitoring (e.g. program approval process, induction required for license advancement).	Includes mechanism for enforcement/monitoring (e.g. program approval process, induction required for license advancement).	Includes mechanism for enforcement/monitoring (e.g. program approval process, induction required for license advancement).	Yes.
State mechanism for monitoring professional development quality	No.	Yes.	Yes.	No.
Support for National Board Certification	State monetary or license advancement incentive.	Federal subsidy only; local monetary incentives only.	Federal subsidy only.	State subsidy for application.
Role of professional learning communities in state policy	Yes.	Yes. (School professional development committees required.)	Yes. (School professional development committees required.)	Yes. (Mandated in schools not meeting Adequate Yearly Progress.)

COLORADO

As a local-control state, Colorado's policies and strategies have been shaped by a seemingly contradictory set of conditions. On the one hand, Colorado has a long history and climate of innovation that has allowed independent professional development providers to build the infrastructure needed to meet school and district needs and to influence the instructional improvement approaches of the state's Department of Education. On the other hand, over the last two decades of standards-based systemic reform, the state has seen an increasingly tighter regulatory environment in which federal and state mandates, supported by grant funding incentives as well as sanctions, have driven the kinds of professional development demanded by local districts.

The Colorado Department of Education has increasingly used regulations and incentives to drive instructional improvement and professional development. The Educator Licensing Act of 1991 requires all districts to provide a state-approved induction program and also requires teachers to complete 90 hours of professional development every five years for license renewal. While the state has no professional development standards, it does have guidelines for the content and type of professional development that qualifies for license renewal.

In the last decade, the state has focused on improving mathematics and literacy instruction. The Colorado Department of Education conducted statewide reviews of student performance and engaged with stakeholders across the state to revise its model content standards. The state has also invested its own state funding, including $99 million in Read to Achieve grants over five years, to support schools working to improve reading instruction. These investments build on previous state efforts to improve literacy instruction, such as the Colorado Basic Literacy Act of 1997.

Because of the Colorado Department of Education's limited capacity and resources to provide professional development broadly, it relies on an infrastructure of independent professional development providers. These organizations appear to align with federal and state mandates for results-driven professional development aimed at improving student achievement.

MISSOURI

Missouri's professional development efforts are noteworthy for the enduring support of state policy makers over the past several decades. In 1993, the Outstanding Schools Act established that in order to be eligible for state aid, a district must allocate 1% of monies received to the professional development committee for spending on professional development of certified staff. In addition, another 1% of the state budget is dedicated to statewide professional development. The act also stipulated that three-fourths of the budget allocation must be spent in the year in which it was received and investment in teacher professional learning became ongoing and continuous.

The act also specified that each school's professional development committee will determine how the mandatory professional development funds will be spent in conjunction with the local school board to meet the district's comprehensive school improvement plan goals. All schools are furnished with state professional development guidelines, which were developed by a state advisory committee that included teachers, administrators, professional associations, and personnel from the Missouri Department of Elementary and Secondary Education and are updated frequently. The legislative investments that Missouri has made have produced two substantial dividends: 1) local systemic capacity to provide effective supports to low-performing schools across the state, and 2) a robust network of regional resource-rich professional development centers that share a common vision for supporting high-quality teaching.
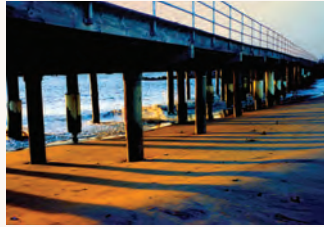
Missouri's network of 11 regional professional development centers was established by the Missouri Department of Elementary and Secondary Education in 1992. These centers have become a linchpin in the state's efforts to build educators' professional capacity to develop engaging learning environments and provide high-quality instruction. In 2010, the governor cut state funding for the regional centers. However, nine of the 11 centers have found sufficient alternative funding sources to remain viable.

NEW JERSEY

Twelve years ago, New Jersey had no professional development requirement for teachers nor a cohesive plan for schools and districts to focus their efforts. In 1998, as a result of discussions between the commissioner of education and the New Jersey Education Association, the Department of Education created a minimum professional development requirement for teachers and a governing system led by the Professional Teaching Standards Board. Comprised of a majority of teachers along with a diverse group of other educators and community members, this group met with national experts, reviewed research, and shared expertise to create governance structures, standards, and planning and approval tools to guide professional development at all levels in the state.

Today, New Jersey requires that new teachers receive high-quality mentoring, and all teachers must create data-driven personal professional development plans to reach a minimum of 100 hours of embedded or external learning per five-year cycle.

Similarly, New Jersey code states that school-level committees should follow state professional development standards and state content standards to create school professional development plans. These plans are collected by district-level committees and evaluated by a county panel, keeping the work local and the responsibility on schools to identify needs and develop action plans.

To do this work, schools are encouraged to develop professional learning communities. The standards board and other organizations have prepared schools by creating a common language around professional learning communities, supplying training materials, and offering coaching support. A range of providers from university-based networks to private professional organizations support professional learning needs as well.

The New Jersey example demonstrates a state's ambitious efforts to use a grassroots team to create policy that requires changes in the way schools do professional development and a support network to build the necessary capacity.

VERMONT

Vermont has a history of innovative educational work and reform efforts with roots in state policy and local initiatives that value teacher and community input. Ideas such as portfolios, locally designed standards work, and job-embedded professional development have been part of Vermont's educational practice for a long time.

However, application of these largely nonmandated innovations has been uneven, and while Vermont ranks high on tests such as the National Assessment of Educational Progress, there is a sizable gap between high- and low-income students. With a 20% drop in Department of Education positions due to the economy, the state's ability to have an integral role in much of the work that needs to be done is limited.

Educational service agencies and other state-supported intermediary organizations such as Teaching All Secondary Students work in conjunction with school districts to fill that gap by supplying training and project evaluation and to pool resources for districts and schools to meet their professional development needs and share knowledge. Furthermore, organizations such as the Vermont Math Initiative, with state and university ties, have provided access to deeply thoughtful professional development for teachers across the state.

Vermont has benefited from coaching through state-supported programs such as the Formative Assessment Project, which used external coaches to help schools build capacity to take on whole staff curricular change, and through local use of teacher leadership.

Vermont continues to search for what University of Vermont professor Charles Rathbone called its "center" (Rathbone, 2000). To achieve that goal, Vermont is balancing the Department of Education's role in coordinating statewide, coherent professional development on a shoestring budget in an environment that values innovation and state vision but resists regulative interference.

KEY FACTORS IN STATE POLICY

The four state cases suggest that the professional development focus, the strategies used to implement professional development, and the extent to which professional development is widely available are shaped by several policy-related factors. Policies related to a state's **leadership, infrastructure,** and **resources for professional development** are three factors that play important roles in shaping the quality of professional development in each state. Another important factor we observed was the **position and role of intermediary organizations and professional development providers** in relation to state education agencies.

Leadership. In all states, we saw an increasing focus on school accountability as a strategy to guide instructional improvement and student achievement, resulting in a stronger focus on professional development in tested subjects such as literacy and mathematics. At the same time, how those accountability measures are implemented varies across states.

Professional development strategies employed by a state also seem to depend on who is allowed to participate in making decisions regarding instructional improvement, accountability policies, standards revision, and professional development initiatives. When state leaders value the expertise of professionals and make room for distributed leadership, policies and strategies to improve professional learning and instruction look quite different from those that are designed purely from a top-down perspective.

> In this period of economic recession and budget crises at all levels, resources play a critical role in shaping professional development. All four states in our study face severe challenges in their ability to support professional development, often having to make difficult choices to cut programs.

Infrastructure for professional development. State policies that establish and support an infrastructure for implementing professional development are a second critical factor. Some states deliberately created formal structures, such as regional professional development centers, educational service agencies, or boards of cooperative educational services, to provide professional development services, particularly for remote areas. In some cases, these organizations serve as administrative units or pool resources in ways that make it possible for small districts to access essential services. In others, these organizations are responsible for meeting the needs of local schools as well as directly supporting the state's accountability initiatives.

In other cases, the state may have invested in specific initiatives to build regional or local capacity by training leaders. State agencies have also partnered with professional organiza-

> As state resources have dwindled, there has also been a corresponding increase in states' dependence on federal funds, giving federal mandates even more power. Some states have leveraged these federal funds well to advance their own visions for school improvement, but only insofar as these visions are aligned with federal goals (e.g. Reading First and No Child Left Behind).

tions and providers with similar goals, recognizing the limitations of their own influence and capacity.

Resources. State polices related to professional development resources affect the ability of states and districts to implement instructional improvement initiatives thoughtfully and effectively. As noted above, Missouri demonstrated a commitment to support professional learning by appropriating funds specifically for professional development. Other states provide indirect funding through state department units that provide training and technical assistance, or through state initiatives, such as Colorado's Read to Achieve and Closing the Achievement Gap.

In this period of economic recession and budget crises at all levels, resources play a critical role in shaping professional development. All four states in our study face severe challenges in their ability to support professional development, often having to make difficult choices to cut programs.

As state resources have dwindled, there has also been a corresponding increase in states' dependence on federal funds, giving federal mandates even more power. Some states have leveraged these federal funds well to advance their own visions for school improvement, but only insofar as these visions are aligned with federal goals (e.g. Reading First and No Child Left Behind).

The position and role of intermediaries and independent providers in relation to the state education agency. Local and regional professional development organizations, including formal intermediaries such as regional professional development centers and educational service agencies, are a common strategy for providing professional development to schools. Analysis suggests that opportunities differ depending on the provider's relationship to the state system. A provider's positional authority seems to influence how effectively the provider can connect the state's vision to local needs. For example, in Missouri, regional professional development centers have a formal role in the state's accountability system and were directly funded by the state (although this changed in 2010 due to state budget cuts). This em-

powers the regional professional development centers to have a greater role in translating state policies into practice at the local level. In contrast, in Colorado, where the boards of cooperative educational services are independently funded and primarily accountable to member districts, professional development decisions are driven by district needs rather than by the state's vision. This has implications for state policies aimed at building capacity and expanding professional development that directly advances the state's instructional and school improvement priorities.

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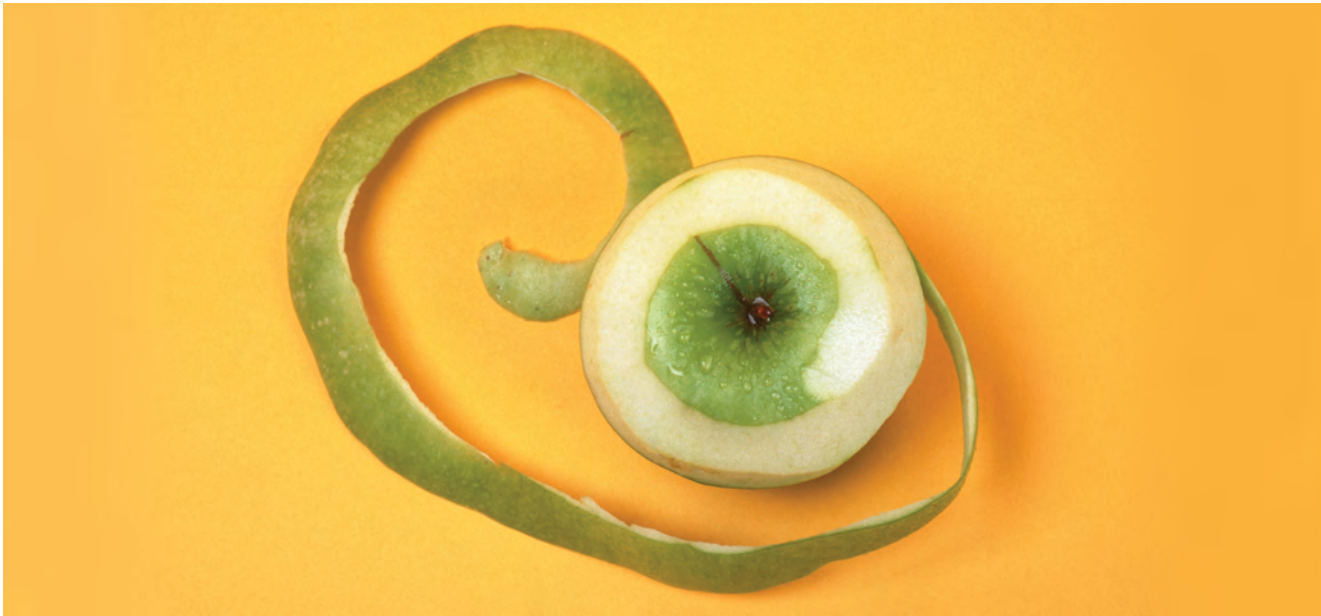
PEELING A STANDARD

A new set of standards places a new set of demands on educators. Use this strategy to help teams and teachers better understand how curriculum content standards and the cumulative progress indicators are used to make instructional and assessment decisions. Teachers can identify essential learnings (content and skills) for their own level by examining the strands within content standards and the cumulative progress indicators for each strand for the grade levels below and above their current grade level. When teachers know what students are expected to know and be able to do in order to demonstrate cumulative progress indicators, they can focus instruction and assessment on essential learnings. In the sample standard outlined here, a team of 3rd-grade teachers addressing a geography standard studies the 2nd- and 4th-grade cumulative progress indicators for that standard to identify prior and future student learning. With this knowledge, they can identify key learnings to include in their 3rd-grade curriculum to ensure that students are able to demonstrate the 4th-grade cumulative progress indicators by the end of 4th grade.

GRADE LEVEL: 3rd
CONTENT: GEOGRAPHY

STANDARD 6.6 (Geography)
All students will apply knowledge of spatial relationships and other geographic skills to understand human behavior in relation to the physical and cultural environment.

DESCRIPTIVE STATEMENT: The study of geography is based on the principle that thinking in and understanding spatial terms will enable students to understand the many relationships of place, people, and environments. By taking an active, questioning approach to the world around them, students learn to devise their own worldview. As students engage in critical thinking to interpret patterns in the evolution of significant historic events and the movement of human populations on the Earth's surface, their understanding of geography, history, economics, and civics deepens. Furthermore, the use of geographic tools and technology assists students in understanding the reasons for, and the economic, political, and social consequences of, human impact on the environment in different areas of the world.

Strands	2nd-grade cumulative progress indicators	4th-grade cumulative progress indicators	3rd-grade essential learnings *(content and skills)*
A **World in spatial terms**	**1.** Explain the spatial concepts of location, distance, and direction, including: • The location of school, home, neighborhood, community, state, and country; • The relative location of the community and places within it; • The location of continents and oceans. **2.** Explain that the globe is a model of Earth and maps are representations of local and distant places. **3.** Demonstrate basic globe and map skills.	**1.** Use physical and political maps to identify locations and spatial relationships of places within local and nearby communities. **2.** Describe and demonstrate different ways to measure distance (e.g. miles, kilometers, time). **3.** Estimate distances between two places on a map using a scale of miles. **4.** Identify the major cities of the state, the United States, and the world. **5.** Identify the major countries, continents, bodies of water, and mountain ranges of the world. **6.** Locate time zones, latitude, longitude, and the global grid.	
B **Places and regions**	**1.** Describe the physical features of places and regions on a simple scale. **2.** Describe the physical and human characteristics of places.	**1.** Identify the physical and human characteristics of places and regions in the state and the United States (e.g. landforms, climate, vegetation, housing). **2.** Explain changes in places and regions over time and the consequences of those changes. **3.** Describe the geography of the state. **4.** Discuss factors involved in the development of cities (e.g. transportation, food, marketplace, religion, military protection).	
C **Physical systems**	**1.** Recognize that the relationship of Earth to the sun affects weather conditions, climate, and seasons.	**1.** Describe the basic components of the Earth's physical systems, including landforms, water, erosion, weather, and climate and discuss their impact on human development.	
D **Human systems**	**1.** Identify the types of transportation used to move goods and people. **2.** Identify the modes of communication used to transmit ideas.	**1.** Describe the development of transportation and communication networks in the state and the United States. **2.** Identify the distribution and characteristics of populations for different regions of the state and the United States.	
E **Environment and society**	**1.** Describe the role of resources such as air, land, water, and plants in everyday life. **2.** Describe the impact of weather on everyday life. **3.** Act on small-scale, personalized environmental issues such as littering and recycling, and explain why such actions are important.	**1.** Differentiate between living and nonliving natural resources. **2.** Explain the nature, characteristics, and distribution of renewable and nonrenewable resources.	

Guerra

Nelson

What culturally responsive educators can do to prepare high school students, parents for college

Whenever we talk about preparing kids for college, we often hear, "College is not for everyone." This comment is disturbing because, in most cases, educators are referring to culturally and linguistically diverse students and white students from working-class backgrounds. But more troubling, because personal beliefs greatly influence practice, this belief may indicate that culturally unaware educators with little knowledge of students' abilities, aspirations, and

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In each issue of *JSD*, Patricia L. Guerra and Sarah W. Nelson write about the importance of and strategies for developing cultural awareness in teachers and schools. Guerra (pg16@txstate.edu) is an assistant professor in the Department of Education and Community Leadership at Texas State University-San Marcos and co-founder of Transforming Schools for a Multicultural Society (TRANSFORMS). Nelson (swnelson@txstate.edu) is an assistant professor in the Department of Education and Community Leadership and associate director of the International Center for Educational Leadership and Social Change at Texas State University-San Marcos, and co-founder of Transforming Schools for a Multicultural Society (TRANS-FORMS). Columns are available at www.learningforward.org.

interests are depriving students and their families of their right to decide whether to pursue higher education.

HOW DOES YOUR SCHOOL DO?

To determine if this is the case in your high school(s), consider the following questions:

• Which students are placed in honors and advanced placement classes offering a rigorous and challenging curriculum, and which are steered into remedial courses?

• Which students are advised to take higher-level science and math courses, and which are tracked into vocational education?

• Which students are advised to take at least two years of a foreign language, and which are assumed to not need these courses?

• Which students are advised to join band, cheerleading, student council, and other extracurricular activities to demonstrate well-roundedness, and which are not?

• Which parents are invited to attend college night and made to feel welcome, and which do not receive the information or feel marginalized at the event?

• Which students are urged to make college visits, and which are not?

• Which students take college admissions exams such as the ACT or SAT, and which do not?

• Which students are advised to apply to a four-year university, and

which to the local community college?

• Which students are encouraged to apply at prestigious institutions, and which are discouraged from doing so?

• Which students are given applications for academic scholarships, and which are informed only of student loans?

• Which students are supported in their pursuit of college admission with encouragement, advice, and information? Which are told, "You're not college material," "You don't have what it takes to make it at _____ University, so consider the community college," or "With your family's lack of financial resources, perhaps you should go to work and think about college later"?

If the answer to the first question in each set is predominantly white middle- and upper-class students and the answer to the second is culturally and linguistically diverse students and white working-class students, it's highly likely the decision about higher education is being made *for* students and their families rather than *by* them. While it's true that college may not be for everyone, a college degree can have a significant impact on a person's quality of life.

All students and their parents, not just some, should have the right to make this decision.

DEVELOP STRONG RELATIONSHIPS

Culturally responsive educators question inequities and work to transform them into culturally responsive practices. They purposefully reach out to diverse families who may have different expectations of schooling, less knowledge of the educational system, fewer economic resources, and limited English skills.

Because many culturally, linguistically, and economically diverse parents have not attended college, they may lack the knowledge, advice, contacts, and strategies for facilitating college admissions that middle-class parents have. Culturally responsive educators first work to develop strong relationships with students and parents. Then, in high school, they work methodically to build families' knowledge and skills, establish support networks, identify contacts in the community, create opportunities, and develop parent confidence. Specific practices include support for parents and students.

> **The discouraging comments to students are real. But these students ignored them.**

SUPPORTING PARENTS

• As soon as students enter high school, educators make personal contacts with parents to learn about families' expectations and aspirations for their children and enter into ongoing conversations about how the school and families can work together to develop college readiness. When parents and educators speak different languages, the educators obtain translators and provide written materials in the parents' native language – not just for this meeting, but for all future contacts. Initially, these meetings may be held in the community until parents feel comfortable in the school.

• Educators capitalize on parents' funds of knowledge, such as inter-dependence and collective work, to build relationships with and among parents to help parents realize they have common concerns and to share support, assistance, and resources.

• In regular meetings with parents, educators share implicit knowledge, including which courses students should take; parents' right to question and advocate; the implications of a student's placement in a college-readiness track versus regular, remedial, or vocational education; the importance of extracurricular activities for college admission; the pros and cons of attending of a university, a community college, or a trade school; tips for completing college applications and financial aid paperwork; how to make college visits; important dates to remember; and options for financial support, such as scholarships, grants, and on-campus jobs. Planning for these sessions should consider parents' native language and their racial or ethnic identification with educators (and speakers). In addition, consideration should be given to the meeting's location and scheduling, the availability of child care, providing refreshments, and helping parents feel welcome.

• Once trust is established with parents, educators address reservations parents may have, such as fearing strong familial bonds will weaken due to students' acculturation, believing children will not return to live and work in the community, and worrying about the lack of income children would ordinarily contribute to the family while attending high school and college. Educators recruit college graduates working in the community to share their stories with parents and students and discuss how concerns can be resolved.

• In a continuing dialogue, educators help parents understand that a college degree will economically benefit the family, not just the child. Additionally, they explain funding sources and that children may be able to send a little money home monthly to contribute to the family's support.

SUPPORTING STUDENTS

• Like their parents, students are convened regularly to develop relationships and build a network of support. Topics covered in these sessions include courses to take, the importance of a challenging curriculum, students' rights, college information web sites and tools and how to use them, writing a personal essay for college admission, developing contacts who can facilitate college admission, college interviewing skills, and asking for strong recommend-ations, not just recommendations.

• Educators recruit community members with a college degree who are willing to serve as student mentors throughout high school and who may have important contacts inside and outside of the community.

• Educators help students identify funding sources other than loans (i.e. scholarships, grants, on-campus jobs) and guide students through the application process.

• Educators talk with students about the ramifications of decisions such as not pursuing higher education, going to a community college rather than a university, or attending a prestigious institution, and they encourage students to aim high and try the unknown.

• Educators encourage students accepted to the same college or university to attend as a group and room together to reduce their loneliness and increase their likelihood of academic success.

By purposefully reaching out to culturally, linguistically, and economically diverse students and their parents in these ways, culturally responsive educators provide the same access to college readiness and, consequently, to college admission that middle-class families enjoy. ■

Confrontation model of conversation provides tools to discuss and resolve tough issues

I applaud Jamie Sussel Turner's use of the confrontation model with her staff members. In our schools, in our lives, not speaking to the heart of the issue with grace and skill costs us dearly. Speaking to the heart of the issue, addressing attitudinal and behavioral issues with grace and skill, and gaining clarity about where we need to go with our colleagues is essential and allows us to tackle and resolve our toughest challenges while enriching the relationship.

— *Susan Scott*

By Jamie Sussel Turner

Nearly every school I've worked in has an "Anne" on its staff. Teachers talk about how Anne isn't the teacher she used to be. Parents don't want their children in Anne's

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In each issue of *JSD*, Susan Scott (susan@fierceinc.com) explores aspects of communication that encourage meaningful collaboration. Scott, author of *Fierce Conversations: Achieving Success At Work & In Life, One Conversation at a Time* (Penguin, 2002) and *Fierce Leadership: A Bold Alternative to the Worst "Best" Practices of Business Today* (Broadway Business, 2009), leads Fierce Inc. (www.fierceinc.com), which helps companies around the world transform the conversations that are central to their success. Fierce in the Schools carries this work into schools and higher education.

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class. Students walk on eggshells, careful not to upset her. Some principals talk with Anne about the problems they see, while others complain about Anne to their administrative colleagues and stick their heads in the sand, counting the years until she finally retires.

I know about the "Annes" in schools because I saw this scenario many times as a teacher and as a principal. This is one aspect of my leadership where I wish I had a do-over. Many times, I felt flustered with finding the right words to help this type of teacher. I once told a teacher she should consider retiring, and you can imagine how that went over!

The confrontation model outlined in *Fierce Conversations* became the key that opened the door to help me consider talking with Anne in a different way — a way that could enlist Anne in looking at the situation with me.

Here are the steps in the confrontation model:
- Name the issue.
- Select a specific example that illustrates the behavior or situation you want to change.
- Describe your emotions around the issue.
- Clarify why this is important — what is at stake to gain or lose.
- Identify your contribution to this problem.
- Indicate your wish to resolve the issue.
- Invite your partner to respond.

The confrontation model incorporates these seven steps into a 60-second opening statement. Susan Scott recommends that after expressing these words, you invite the other person to talk. You sit back and listen, digging for full understanding when you need to. I found it helpful to plan the statement in advance, focusing on getting clear about the issue I really needed to address. I even practice my 60-second opening statement aloud several times so that I own the words and can deliver them with grace and skill.

Here's something similar to what I said to Anne:

Anne, I want to talk about the effect your use of sarcasm is having on the emotional state of your students and also the effect your decision not to incorporate new strategies is having on your students' engagement and learning. Last week when I was in your classroom, you

Jamie Sussel Turner

snapped at John for not doing his homework. He lowered his head in his hands to hide his tears. Also, last week I was in the hallway and heard you sigh as you used a sarcastic tone to tell the class, "I wish every class was as smart as you are." Also, I wanted to note that during my last observation, you lectured the class for the entire period without engaging your students in any discussion or activities as our staff has been learning to do. I am concerned about the emotional state of your students and for their learning. I want you to know I also feel concern for you. I feel sad to see these changes in your teaching since I have always known you to be a kind teacher who is positive with students, is willing to try new strategies, and holds student learning as a priority. There is a great deal at stake for your students, for you, and for me. The daily emotional well-being and achievement of your students is at stake. Your students deserve to have a teacher who will speak to them with respect and genuine affection and teach them in a way that truly engages them in the learning process. My effectiveness as a principal is at stake because the success of our students lies squarely on my doorstep. I recognize that I have contributed to this situation by not speaking with you about this sooner in a way that clarified my growing concerns. I apologize. You

Work toward full understanding

How we use this model for confrontation is also important — I have a couple more steps to the model that follow up on that key opening statement. First, when you invite the other person to give his or her perspective, be sure to dig for full understanding, as Jamie Sussel Turner suggests. As you work towards resolution, think about what you and your partner have learned. Where are you now? What is your next step forward? And finally, how will you follow up in the future with one another? It helps to think ahead to your next conversation as you build your ongoing understanding and relationships.

— Susan Scott

deserved better. I hope to see you continue and eventually wrap up your career as the well-respected and beloved teacher who began this career years ago.

I want to listen now. Please tell me what's going on from where you sit.

"Are you trying to get rid of me?" Anne angrily responded.

I calmly repeated that I wanted to understand her point of view.

Anne took a deep breath before launching into an explanation of her need to continue teaching for two more years "for the benefits." "You have no idea how hard it is to just make it to school each day," she sighed, "The constant curriculum changes are stressing me out, the kids can't pay attention like they used to, and the parents try to solve all of their problems."

I didn't disagree with Anne or try to dissuade her. I continued to listen, paraphrasing her comments from time to time.

After several minutes, she said she needed time to mull over our conversation and asked if we could meet again in a few days.

I thanked her for joining me in this conversation and we agreed on a time to talk again.

About a week later, Anne and I talked again. She spoke about how she's struggled since the death of her mother, admitting that she may be suffering from mild depression. She recommitted to improving how she interacted with her students and to planning more engaging lessons. We both agreed to check in from time to time to keep Anne's new goals in sight.

I used the confrontation model many more times over the years and found that it brings me clarity each time. For the last several years of my principalship, I was on a mission to create a school culture that valued relationships and honest conversation. I started with myself, changing how I engaged with others. This doesn't mean that I talked with every single person about every single issue. Instead, I gave

time and space to situations and waited to see which ones seized hold of my attention and didn't let go. I learned to soften my tone and invite other people to share their perspectives, so that confrontation was about our combined search for the truth.

I became calmer in confrontation conversations because I had greater clarity. I no longer shoved aside issues that I had avoided talking about in the past. This conversational model gave me the tools I needed to tackle and resolve tough issues. And as a surprising byproduct of my growth, several staff members began having successful confrontation conversations, too.

I can't say that by talking with Anne I eliminated all problems with her or between her and other staff members. What I can say is that I felt less stress as I now had the conversations that previously weighed me down and more self-confidence in my growing ability to communicate with others in an authentic way.

I learned that each conversation we have builds trust in each of our relationships. Over the years, I had many other confrontation conversations about conflicts over curriculum approaches, scheduling issues, instructional practices, absenteeism, and more. By changing how I discussed difficult issues, I invited others to do the same. I like to think that my leadership helped our school community to talk about our conflicts in a direct and trusting way. I saw evidence of this in the years that followed when many more successful confrontation conversations led many members of our staff to listen to one another with greater respect and understanding, benefitting our students and enhancing the learning environment.

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Jamie Sussel Turner, an elementary principal for 12 years, mentors principals and leads *Fierce Conversations* workshops. ■

FREE ONLINE BOOK

www.learningforward.org/advancing/whypdmatters.cfm

For all those times you need to explain what professional development is and why it is important, we've published a collection of basic Q-and-A's on the topic. Written by Hayes Mizell, Learning Forward's distinguished senior fellow, *Why Professional Development Matters* covers the basics as well as details on ensuring quality learning and how districts implement professional development.
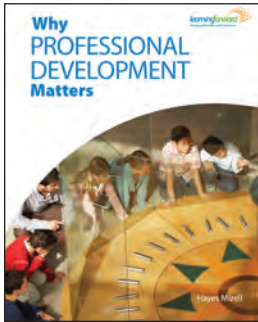
Designed to share with parents, community members, and policy makers, *Why Professional Development Matters* is an ideal tool for your advocacy and community engagement efforts. Read a free PDF version or purchase printed copies in our online bookstore.

DATABASE OF EVIDENCE

www.learningforward.org/evidence/search.cfm

Search this database for information about the link between professional learning and student achievement. Learning Forward annotates resources from a wide variety of sources, including research studies, peer-reviewed and nonpeer-reviewed journals, occasional reports, firsthand stories of success, news reports, and our publications.

▶ **TELL US:** WHAT'S MISSING FROM THE DATABASE? We want to know which studies you consider to be the foundational research about professional learning. We've created a survey link at Zoomerang and would appreciate your input: **www.zoomerang.com/Survey/WEB22BA5Z2JJZY.**

STATE OF PROFESSIONAL LEARNING

www.learningforward.org/stateproflearning.cfm

Review the second report from Learning Forward's multiyear research initiative examining the status of professional learning in the United States. *Professional Development in the United States: Trends and Challenges* indicates that the nation is making progress in providing increased support and mentoring for new teachers. However, the study also reveals that teachers' opportunities for ongoing, intensive professional learning that research shows has a substantial impact on student learning are decreasing. See related article on p. 52.

EDUCATION IN THE SPOTLIGHT

www.learningforward.org/learningblog

Frederick Brown writes:

"It's too soon to tell if *Waiting for Superman*, the new Davis Guggenheim documentary, will be the latest "Sputnik moment" for our field. However, for those of us who live and breathe education and care deeply about meeting the learning needs of our children, we must seize this opportunity and add our voices to the collective dialogue.

While the education debate is extremely complicated, two messages have been consistently clear: 1) Quality instruction is the No. 1 school-related factor that supports increased student learning; and 2) Highly skilled principals, working in collaboration with their building leadership teams, create the conditions in schools that enable effective teaching and learning. What doesn't get discussed enough, however, is how teachers and leaders reach this 'highly effective' status."

Frederick Brown

Brown and other staff members wrote several postings about the recent media attention to education. See all postings and share your input.

FACEBOOK AND TWITTER

www.facebook.com/learningforward   www.twitter.com/learningfwd

Find Learning Forward's Facebook page at www.facebook.com/learningforward. At the top of the Facebook page, hit the "Like" button to become a fan of the page and receive updates on your Facebook wall. Also, Twitter users can follow us by going to www.twitter.com/learningfwd. Hit the "Follow" link to see the latest news.

abstracts

1 district, 1 set of math goals.
By Timothy Kanold and Jhone Ebert

Disappointing student results motivated leaders in the sizable Clark County School District (Las Vegas, Nev.) to develop challenging goals in mathematics. Common assessments, professional learning teams, and coordinated leadership across the district were critical elements to success.

Laser focus on content strengthens teacher teams.
By David Slavit, Tamara Holmlund Nelson, and Anne Kennedy

Middle and high school mathematics and science teachers in Washington state participated in a three-year project to become leaders of professional learning communities. When teachers defined their own focus and enjoyed the support of school leaders, they strengthened their practices and eventually facilitated their teams for sustained growth.

Lessons scooped from the melting pot:
California district increases achievement through English language development.
By Nancy Frey, Douglas Fisher, and John Nelson

When one district found that rich academic student discourse was missing in classrooms, leaders knew that educators would need support to make drastic changes. Through a gradual release of responsibility model of instructional improvement, educator learning teams created encouraging student results.

Principals + algebra (-fear) = instructional leadership.
By Cynthia L. Carver with Michael Steele and Beth Herbel-Eisenmann

When principal study groups in Michigan tackled algebra in depth, they learned to support teachers in promoting a new vision for teaching. Their mathematics knowledge helped them to expect higher-level student tasks and connect leadership moves to content-specific improvements.

A different kind of diversity.
Collaboration across content areas intensifies learning.
By Ryan R. Goble and Nick Sousanis

While content-specific learning is critical for students and adults, exploring interdisciplinarity provides fresh perspectives on complex topics. Encouraging educators to collaborate with their colleagues from other subject areas benefits teachers and students alike.

Framework fuels the need to read:
Strategies boost literacy of students in content-area classes.
By Ruth Schoenbach, Cynthia L. Greenleaf, and Gina Hale

The Reading Apprenticeship instructional framework helps educators learn about the thinking processes involved in reading challenging texts. Teachers find that students improve not only their reading and writing skills but also deepen their engagement in the academic subjects they study.

Going the distance for rural science teachers:
California consortium develops strategies to provide science content professional development for isolated teachers.
By Judi Wilson and Cathy Ringstaff

When education leaders in San Joaquin County, Calif., created a network of 26 districts and 44 schools, often-isolated science educators found effective support from intensive summer sessions and year-round support. In addition to improving science instruction, the effort resulted in leadership development among participating teachers.

Rock-solid support:
Florida district weighs effectiveness of science professional learning.
By Linda Shear and William R. Penuel

Duval County (Fla.) Public Schools carefully examined the effectiveness of science professional learning. The district studied teachers as designers, adapters, and intentional adapters of curriculum units to determine which strategy produced the best results. The district also did a comparative cost analysis.

call for articles

Theme: Standards for professional learning
Manuscript deadline: Dec. 15, 2010
Issue: August 2011

Theme: Learning designs
Manuscript deadline: Feb. 15, 2011
Issue: October 2011

Theme: Resources for professional learning
Manuscript deadline: April 15, 2011
Issue: December 2011

• Please send manuscripts and questions to Tracy Crow (tracy.crow@learningforward.org).
• Notes to assist authors in preparing a manuscript are at **www.learningforward.org/news/jsd/guidelines.cfm.**
• Themes for additional upcoming issues are available at **www.learningforward.org/news/jsd/themes.cfm.**

columns

Collaborative culture:
Confrontation model of conversation provides tools to discuss and resolve tough issues.
By Susan Scott and Jamie Sussel Turner

An elementary principal used a confrontation model to effectively navigate conflict with colleagues.

Cultural proficiency:
What culturally responsive educators can do to prepare high school students, parents for college.
By Patricia L. Guerra and Sarah W. Nelson

A series of actions and behaviors help create a culture where educators, students, and community members consider college as a realistic option.

From the director:
Mastering content will require teams to dig into deep content learning.
By Stephanie Hirsh

Educators with the chance to develop content teaching knowledge and skills will be well-prepared for common core standards.

feature

Pockets of excellence:
Study explores how policy affects professional learning in 4 high-performing states.
By Ann Jaquith, Dan Mindich, and Ruth Chung Wei

The third phase of Learning Forward's study of the state of professional learning in the United States examines the role of state policy in promoting effective practices. Case studies explore the specific policy contexts in four states: Colorado, Missouri, New Jersey, and Vermont.

coming up

in December 2010 *JSD*:
Policy

@ learning forward

Are you learning forward?

Every educator engages in effective professional learning every day so every student achieves.

Learning Forward's commitment to this purpose is stronger than ever. National Staff Development Council (NSDC) has changed its name to Learning Forward. The name change reflects not only the organization's growth over its 41-year history, but also better represents the vision of the organization as a powerful advocate for teacher and student learning.

Learning appears first in the new name as a reminder that learning is at the heart of the organization's purpose. Learning Forward signifies moving ahead to ensure effective professional learning that results in student achievement. Learning Forward expresses the organization's call to action — actions the board, members, and staff commit to each day to ensure effective teaching for every student. The new name distinguishes Learning Forward as both a membership association and an advocacy organization that marries practice, policy, and research.

Learning Forward's values, beliefs, and driving purpose remain the same: To strengthen teaching and learning through effective professional development. Learning Forward relies on its community of members as well as allies in the field to learn, grow, advocate, and serve.

Learning Forward will continue to offer the valuable products, services, and learning opportunities that support the important work educators do.

> Learning Forward is a nonprofit, international membership association of learning educators committed to advancing professional learning for student success.

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book club

UNMISTAKABLE IMPACT:
A PARTNERSHIP APPROACH FOR DRAMATICALLY IMPROVING INSTRUCTION

Author Jim Knight's latest book simplifies the process for becoming an "impact school" through targeted, consistent professional learning that is done *with* teachers, not *to* teachers. In the latest Learning Forward Book Club selection, the author illustrates how to translate staff members' joy of learning into high-leverage practices that achieve dramatic student outcomes. Characteristics of impact schools include:
* A focused, clearly defined improvement plan that takes into account the complexity of teaching and learning relationships;

* A school culture that encourages enrollment in ongoing professional development; and
* Alignment of purpose and actions among all staff members.
  Resources include tools for principals, workshop leaders, professional learning communities, and instructional coaches.

Through a partnership with Corwin Press, Learning Forward members can add the Book Club to their membership at any time and receive four books a year for $49. To receive this book, add the Book Club to your membership before Dec. 15. It will be mailed in January. For more information about this or any membership package, call 800-727-7288 or e-mail office@learningforward.org.

Deep content learning for better teaching is the day-to-day work of a learning team

on board
INGRID CARNEY

Professional development on specific content and the ways in which students learn that content is vital to a well-developed teaching force. Teachers need to actively keep abreast of current research and best practices in their content areas. In today's classrooms, teachers need to be flexible, open-minded experts on how a diverse student population learns that content. Teachers must simultaneously be teachers and learners. How do we ensure that teachers get the content and process they need to do the best they can for their students?

Teachers report that professional development that has a significant, positive effect on their knowledge and skills and that promotes changes in their classroom practice has a focus on content knowledge (Garet, Porter, Desimone, Birman, & Yoon, 2001). When teachers in the same school and content area work collaboratively and learn collectively to increase their knowledge and skills, students benefit. With support and follow-up that includes peer coaching, peer observation, and critical reflection, teachers are able to confidently construct and implement new knowledge and skills. When they share a common language about their

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Ingrid Carney is president of Learning Forward's Board of Trustees.

content, they help to create alignment and coherence for their students. Students experience a corps of well-prepared, confident, and motivated teachers who can then ensure a great opportunity for every student to learn.

Here is an example of what happens to students when teachers don't participate in content-specific professional learning and collaborate on its implementation. Two 8th-grade social studies teachers in one school do not share a common planning period and are not required to work in the context of a professional learning community. Teacher A chose to participate in a district workshop about thematic units and how to incorporate current events into a standards-based lesson. Teacher B, who routinely spends too much time managing student behavior, simply assigned work from the social studies text. Teacher A collaborated with the school librarian to create a theme-based unit related to the trapped miners in Chile, and integrated both history and geography standards into the lesson. Students in that class were excited and motivated to learn about a current world situation. Students in the other class complained to the librarian that their teacher's work was not up to date and would not help them become global citizens. Collective

content-specific professional development along with a healthy dose of collaboration could remedy such a problem.

Content-specific professional development for teachers can eliminate opportunity gaps, teaching gaps, and achievement gaps. Every student deserves a highly effective teacher in each core area. When teachers continue to develop their knowledge and skills through content-specific professional learning, students have more opportunities to learn. Their learning is no longer dependent on being assigned to the "right" teacher. The teaching gap is eliminated because teachers have learned together and can support and provide technical assistance to each other's efforts to teach rigorous content in a compelling way. And finally, achievement gaps will close when all children have equal opportunities to learn from highly qualified teachers.

REFERENCE

Garet, M.S., Porter, A.C., Desimone, L., Birman, B.F., & Yoon, K.S. (2001, Winter). What makes professional development effective? Results from a national sample of teachers. *American Education Research Journal, 38*(4), 915-945. ■

Photo by **SARAH LESKO/Learning Forward**

We have a TV star in our midst

Executive Director Stephanie Hirsh, second from right, prepares recently for an appearance on "The Balancing Act." Here she joins show hostess Danielle Knox, seated at left, and Judith Baenen, educational consultant with National Middle School Association, right, on the Pompano Beach, Fla., set of the show, which airs 7-8 a.m. weekdays on Lifetime Television.

Learning Forward will be featured in the show's Parent-Teacher Corner, along with several organizations belonging to the Learning First Alliance. Hirsh filmed two segments — on effective teaching and on high-quality professional development. Watch www.learningforward.org for dates. Urge your peers to share the dates with parents and community members who share an interest in effective professional learning.

STANDARDS REVISION UNDER WAY

The revision of NSDC's Standards for Staff Development began with the first meeting of the task force in Washington, D.C., in October. The task force includes representatives from many of the associations that contributed to the original standards and the first revision. This revision process will include an opportunity for feedback from our members, an advisory team representing a wide variety of organizations in education, and the general public. The revised standards will be shared publicly at Learning Forward's Summer Conference in Indianapolis in July 2011.

Powerful words

"Why should society feel responsible only for the education of children, and not for the education of all adults of every age?"

— Erich Fromm

Foundation honors Georgia superintendent

The Impacting the Future Now Foundation has awarded the first Leading for Learning Sybil Yastrow Superintendent's Grant to Samuel T. King, superintendent of Rockdale County Public Schools in Conyers, Ga. King has served as Rockdale's superintendent since 2005. During that time, he has led the district of more than 13,000 students (62% free and reduced lunch) to noteworthy achievement gains and earned recognition from the state and governor of Georgia.

Samuel T. King

King refers to himself as the lead learner in his district. He gives priority to ensuring that the leadership team provides the highest-quality service to meet the social, emotional, physical, and academic needs of all students.

Thanks to generous contributors to Impacting the Future Now, Dennis Sparks, NSDC executive director emeritus, will guide King and his district's leadership team to continue their learning journey to ensure the success of all students. Sparks will work as a teacher and thinking partner to assist the team in realizing their goals through in-person and virtual learning sessions.

LEARNING FORWARD IN THE NEWS

GREAT TEACHERS: In the Sept. 20 issue of *Education Week*, Hayes Mizell writes, "It's time to have a serious discussion about what it takes to develop and sustain great teachers." In his commentary, "The misuse of professional development," Mizell says that professional development's primary role must be to raise student and teacher performance, and such a focus will require meaningful change.
www.edweek.org/ew/articles/2010/09/22/04mizell_ep.h30.html?tkn=RMQF8CX6p8s/KNhJQBT9bNWlZHyWW8DOb8EG

NOT SATISFIED: On the Learning First Alliance blog, Anne O'Brien speaks with Deputy Executive Director Joellen Killion, NEA Senior Policy Analyst Linda Davin, and NEA Executive Committee member Joyce Powell about the recent report, *Advancing High-Quality Professional Learning Through Collective Bargaining and State Policy.*
In discussing the report's findings, Killion says, "We are not satisfied with the fact that there's fragmentation and inconsistency. We're not satisfied with the fact that professional development fits into so many different places in state policy without a coherent system. And we want to address some of those issues as we have opportunities to work with state policy makers and with union leaders in districts and states."
www.learningfirst.org/visionaries/AdvancingProfessionalLearning

WORKING TO TRANSFORM: Maggie Hos-McGrane, a blogger and teacher in an international school in Switzerland, shares her reactions to Learning Forward's book *Becoming a Learning School.* Hos-McGrane reflects on the potential benefits and implications for herself and her colleagues as they work to transform their learning environment to become more collaborative.
www.maggiehosmcgrane.com/2010/09/collaborative-professional-learning_09.html

Mastering new standards will require teams to dig into deep content learning

To date, more than 44 states have adopted the new Common Core State Standards, and I think about what this means for every teacher and student. I recall the summer I was part of a team writing a curriculum guide to accompany a newly adopted economics textbook. The team spent all summer translating state objectives into a semester course. By the end of the summer, we had developed expertise far greater than what we had gained from other experiences.

I had a great time teaching the course that year. I felt confident in my subject matter knowledge and, as a result, could focus significant attention on my students' learning and differentiate instruction as needed.

My experience reminds me that in the coming year, many teachers will be asked to implement new standards. In many cases, these standards will represent unfamiliar content and skills. Teachers will need support translating them into quality instruction and successful learning outcomes.

I believe there are important actions that educators can take to ensure that all teachers have the opportunity to develop deep subject-matter knowledge and content pedagogical expertise in the courses they are assigned.

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Stephanie Hirsh (stephanie.hirsh @learningforward.org) is executive director of Learning Forward.

Engage educators in the process of translating the common core standards into the knowledge, skills, and dispositions students will be expected to master. Use the information to provide teachers with a rich curriculum that offers background on standards, explains underlying concepts, and suggests pedagogically sound instructional strategies and assessments. Demonstrations of effective teaching can also be helpful to teachers.

Seek educator input regarding the knowledge and skills they need to promote student mastery of the standards. For every set of knowledge and skills students are expected to master, there is a corollary set of knowledge and skills teachers must have to teach effectively. Giving teachers support to develop deep content knowledge associated with new core standards is one key to their success in the classroom. Equally important are substantive conversations about the discipline underlying the standards.

Support school-based learning teams to promote deeper understanding of the standards, the curriculum, and content through team learning time. They will benefit with access to rich curricula as well as protocols that allow them to facilitate their own conversations about how to translate standards into daily instructional lessons. Teachers with deeper understanding and more success in particular areas can volunteer to share or demonstrate what they know. Team leaders can ensure discussion of standards occurs before designing joint lessons and assessments. Teams can use their results to prompt requests for additional assistance from experts beyond the school.

Establish vertical and horizontal teams from within and across schools. Ensure the curriculum is vertically and horizontally aligned. Examine assessments for clues of any problems that may exist. Identify strategies that have the greatest impact and share them. Extend the commitment to students beyond a single grade level or course to the entire school and to schools within the system.

Establish online communities to extend educator learning. Educators can find learning communities that are ready to meet at times that are convenient to them. Communities can store resources virtually and effective lessons can flow from time zone to time zone.

I am hopeful that every teacher will have the opportunity to join at least one community or team and experience serving as and learning from resident experts in a subject area. ■