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## ■ BRIEFLY

- » New toolkit elicits student perspectives and engagement to address local school improvement problems.

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- » Student-voice tools can give disengaged students more responsibility and buy-in for school improvement efforts.

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- » Washoe County collaborated with students at risk of dropping out in order to better address their unique challenges.

# When Students Speak and Educators Listen

NEW TOOLS FOR DROPOUT PREVENTION AND OTHER SCHOOL CHALLENGES

Asked what she would tell adults trying to understand why students drop out of high school, Andrea<sup>1</sup> quietly responds: "Just because a student wants to drop out of school doesn't mean she's stupid or she's lost hope."

"Listen to her. It might be the best thing you ever do."

Like a disconcerting number of students across Nevada, Andrea, a teenager in Washoe County School District (WCSD), dropped out of high school. With only 71 percent of the state's students graduating in the class of 2013, WCSD administrators have tried various strategies to reengage students like Andrea and keep them supported and on track to graduate. But they found that even when, through considerable effort, they could get students who had dropped out to return to school — attending district reengagement centers and receiving academic coaching — the same students often dropped out again.

So WCSD decided to tap into a rich source of data that had been missing from their previous efforts to reduce dropout rates: input from the students themselves.

"To support students in persisting and graduating, we knew we needed a deeper understanding of their reasons for quitting school," says Jennifer Harris, a WCSD program evaluator. "And to do that, we needed to ask students to tell their personal stories of dropping out and returning to school, and really listen to what they had to say."

Stress from mental health problems and bullying led Andrea to leave school, but she says that her determination to earn a high school diploma and pursue vocational

training helped her decide to reenroll. She shares these insights in a powerful student-produced video in which she and seven other students who reenrolled in WCSD schools speak frankly about why they stopped attending school, the kind of support that would have helped them persevere, and why they came back. The video grew out of a partnership between WCSD and the Regional Educational Laboratory (REL) West at WestEd that focused on collaborating with WCSD students at risk of dropping out in order to better address their unique challenges.

This video has become a powerful tool for raising district- and state-level awareness of the challenges, strengths, and aspirations of individual students who dropped out of high school but later returned, giving themselves another chance to graduate — told in the students' own words. The student-produced video has been shown to counselors and principals across WCSD, and Nevada's state superintendent has requested that it be shown to school leaders in the state.

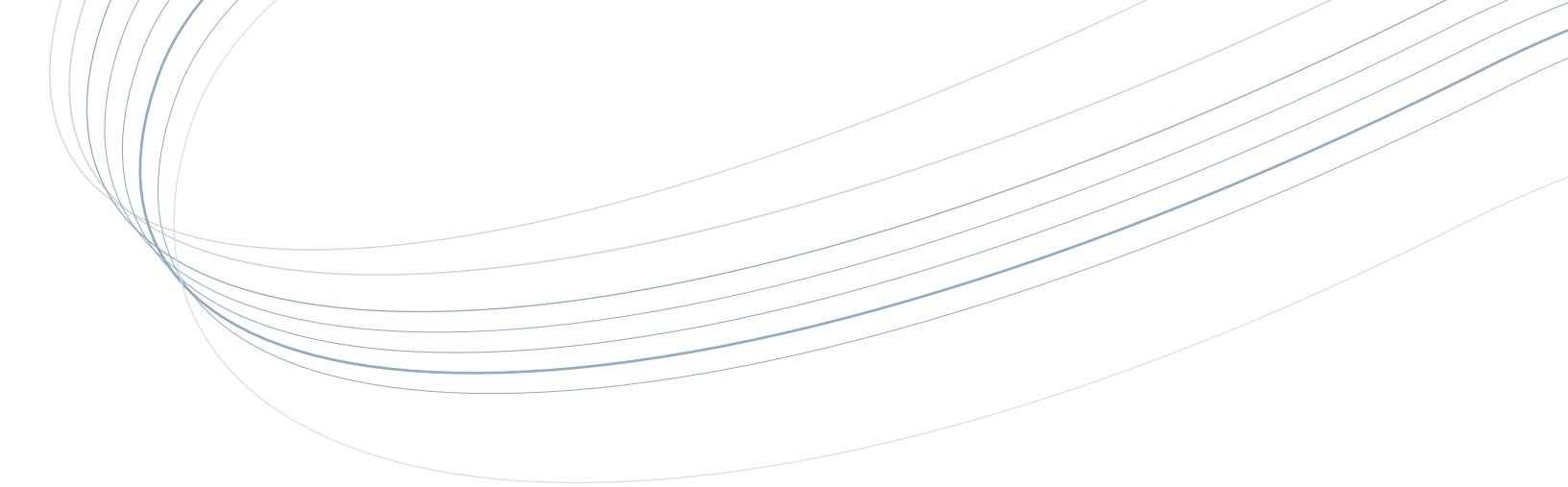
"I usually get calls from principals after it's shown," Harris says. "They ask me to show it to their whole staff."

## FINDING THE RIGHT TOOL FOR THE JOB

Even though WCSD was committed to the notion of listening to student ideas about school improvement, "we had difficulty imagining what that would look like," says Harris, who is part of a WCSD team that secured a

<sup>1</sup> Andrea is a pseudonym used to protect this student's privacy.





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five-year High School Graduation Initiative (HSGI) grant in 2011 from the U.S. Department of Education to build new pathways to graduation for students at risk of dropping out or for dropouts who return to school.

With momentum from their HSGI projects, in 2013 the WCSD team began to discuss additional practical strategies with BethAnn Berliner, a senior REL West researcher who works with a number of states and local education agencies in making data-based decisions to address dropout prevention and reengagement efforts. Those conversations led to the idea of developing a toolkit designed to elicit student perspectives and engagement – or *student voice* – to inform districtwide approaches to helping students persist and graduate.

While eliciting student perspectives to guide school improvement initiatives is not necessarily a new strategy, student experiences and ideas are usually “voiced” indirectly through responses to surveys or participation in meetings structured and led by adults, says Berliner. “It’s much less common for students to have authentic opportunities to partner with adults to wrestle with school problems,” she says, “and even rarer for students to plan and lead such efforts.”

Although the toolkit initially focused on dropout prevention, the final version developed and produced by WCSD and REL West, *Speak Out, Listen Up! Tools for Using Student Perspectives and Local Data for School Improvement*, is designed for use by all grade levels to address local school-improvement-related topics or problems. Research on the effectiveness of using student voice to address school change is just emerging, says Berliner, but the literature suggests that listening closely to what students say about their school experiences can help

educators better understand and address local challenges and rethink policies and practices.

School climate research corroborates the connection between the use of student input to inform school improvement decisions and positive school outcomes. For example, a 2011 federally funded project to improve the climate of 58 California schools drew heavily on two strategies to incorporate student perspectives: using Student Listening Circles (like the Inside-Outside Fishbowl tool described later in this article) and having students analyze and discuss data from the California Healthy Kids Survey. A WestEd report on the project revealed that after two years, 86 percent of participating schools – which were selected based on their poor climate scores – improved their school climate. Furthermore, a large majority significantly improved their academic performance, as measured by students’ results on statewide standardized tests.

### EMPOWERING STUDENTS TO TAKE ACTION

Published by the U.S. Department of Education’s Institute of Education Sciences, the toolkit comprises three student voice tools, each of which has three essential components: collaboration between adults and students in a school setting, local data gathering and/or analysis on a school issue or problem, and an action step to address school improvement. The tools are:

- » **ASK (Analyzing Surveys with Kids):** Students analyze and interpret existing local data (like survey results) associated with a school-related topic or problem, then produce explanations and suggestions for school improvement.



The student-produced video has become a powerful tool for raising awareness of the challenges, strengths, and aspirations of students who dropped out of high school but later returned.

- » **Inside-Outside Fishbowl:** Students and educators trade roles as speakers and listeners during a structured discussion of a school-related topic or problem, and jointly develop an action plan.
- » **S4 (Students Studying Students' Stories):** Students lead a digital storytelling process in which they produce and analyze videotaped interviews of other students discussing a school-related topic or problem, then host forums with educators to suggest improvements.

The tools vary in complexity; for instance, the S4 tool used to produce the WCSD video took a class of students at an alternative high school an entire semester to develop. Those students — who had themselves dropped out of school and reenrolled — developed the interview questions, interviewed and videotaped the volunteer subjects, created a story line from the raw video footage, and participated in the editing. While they were still attending high school, they also introduced the video at showings for educator groups and participated in structured, reflective discussions afterward.

“The tools can help give disengaged students more responsibility and buy-in for school improvement efforts,” Berliner says, “and can help ensure that changes made to the school environment actually reflect student perspectives and needs.”

### GAINING INSIGHTS AND CHALLENGING COMMON PERCEPTIONS

Many student comments in the video interviews confirmed that the reasons for dropping out are varied, complex, and personal. Some examples: mental health challenges not being addressed; special learning needs not being recognized or met; parents who have

addiction and other problems; being bullied or in abusive relationships; or other life circumstances that interfere with staying on track to earn a diploma.

A common theme voiced across all the interviews was the fundamental need for a caring adult in the school setting who checks in with them regularly. “One of the reasons these students persisted was because they had caring teachers, coaches, and others in their lives who believed in them,” says Berliner.

Both Harris and Berliner have noticed that the students' stories are challenging common preconceptions about who these students are as individuals. “They are smart and articulate, they take pride in being students, and they have high aspirations,” says Berliner. “And they want to be happy.”

Five of the eight students in the WCSD video graduated and are now working or in college. Two students are currently working toward a high school diploma, and one student dropped out again.

### USING STUDENT VOICE TO ADDRESS A RANGE OF LOCAL CHALLENGES

Beyond offering a practical way to support dropout prevention, the *Speak Out, Listen Up!* toolkit has become a catalyst in WCSD for a different way of thinking about and acting on a range of school issues and problems. “New conversations are taking place in the district,” Harris says, “on topics like student mental health, the need for stronger wraparound supports for at-risk students, and improving school climate.”

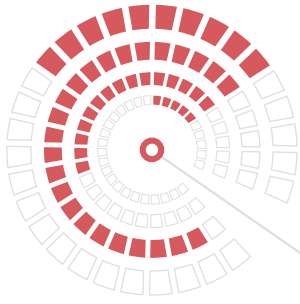
WCSD has launched an interdisciplinary districtwide task force to better incorporate student voice in school



## BRIEFLY

- » Data literacy is the ability to use multiple forms of data to inform targeted solutions.
- » Data literacy in education goes beyond just using assessment data.
- » Study found that most schools of education don't focus enough on teaching data literacy skills.





# Using Data to Transform Teaching and Learning

Data-driven decision making is one of the strategies most widely endorsed by policymakers and educational leaders as an effective way to improve instruction.

“Yet, when we show up to do workshops on data-driven decision making and I ask teachers how many of them have had a course on using data, I don’t see many raised hands,” says Ellen Mandinach, a senior research scientist at WestEd. “Schools of education, which would never send their students into the classroom without a methods course, too often don’t ensure that their graduates have similar preparation in understanding and using data.”

Mandinach believes strongly in the potential of data-driven decision making (DDDM), which research is beginning to show has the power to transform educators’ practice and improve student achievement. As director of WestEd’s Data for Decisions Initiative, Mandinach and her colleagues work with a variety of stakeholders to advance the use of data to improve teaching and learning. She is encouraged that policymakers at the highest levels, starting with U.S. Secretary of Education Arne Duncan, see the importance of DDDM.

“They talk about the importance of arming educators at all levels with data,” says Mandinach, “and that to be more effective, teachers should tap into a range of information about their students, beyond just student assessments.”

## TURNING INFORMATION INTO ACTION

Educators who apply DDDM to their practice can reap significant results. Consider, for example, a group of teachers in one rural school district trying to uncover the reason behind poor behavior and academic performance in a particular group of students. “They had looked at

every test score and performance measure imaginable but still couldn’t figure out why the kids were having so much difficulty,” says Mandinach. It was only after looking more deeply at all the data available to them, and specifically at transportation data, that they discovered that the struggling students were in fact those who spent the most time on the school bus. “They then were able to take that raw data — time on the bus — to create learning opportunities.”

In this case, bus schedules were modified to shorten students’ commutes, and Wi-Fi was installed on buses to make travel time more productive for the students. Mandinach calls this *data literacy* in action — the ability to understand and use multiple forms of data (e.g., data on attendance, student demographics, behavioral referrals, school surveys, classroom artifacts, and observations, as well as student performance data) to inform targeted solutions.

Mandinach contends that teachers need support to become data literate so they have information to inform their decisions, change their practice, and boost student achievement.

“States and districts are getting pretty good at collecting data,” says Mandinach. “But until you learn ways to take the raw data and put them into some kind of education context, you don’t really have much useful information to help you determine the best instructional steps to take in the classroom.”



While assessment data is critical to helping teachers understand students' academic performance, it's only one piece of a much larger set of knowledge that educators can tap into.

Mandinach remembers working with a high school math teacher in Arizona who had a student struggling to complete his homework assignments and who often fell asleep in class. The teacher learned that the student's father was incarcerated and that he had two after-school jobs to help support his mother and four siblings. Armed with a clearer understanding of the student's competing responsibilities, the teacher made changes to his lesson plans — including adding more small-group activities and structured classroom discussions — to keep *all* his students more alert and engaged during class. He also found more classroom-based ways in which the struggling student and others could learn and succeed in the course, knowing that completing homework after school would continue to be a challenge.

#### NEED FOR DATA LITERACY IN TEACHER EDUCATION PROGRAMS

Mandinach led a WestEd study designed to examine the extent to which schools of education are teaching data literacy skills. The study found that although most schools reported that they included data literacy in their curriculum, a closer examination of the syllabi revealed that the focus on data literacy was almost always cursory and usually concentrated solely on *assessment* data. While test data is critical to helping teachers understand their students' academic performance, Mandinach says that it's only one piece of a much larger body of knowledge that educators can, and should, tap into.

"True data literacy," says Mandinach, "is the ability to connect a deep understanding of multiple forms of data with performance standards; curricular, content, and pedagogical knowledge; disciplinary practices; and an understanding of how children learn."

According to the study's findings, a greater emphasis on data literacy at schools of education could result from external pressures: new credentialing or licensure regulations, as well as demands from local school districts that new teachers possess such skills.

To be sure, many school districts try to provide their teachers with DDDM skills through professional development opportunities. But the process is costly, time-consuming, and often ineffective. "There are a few really good providers out there, but even if a district finds one, the information can't be delivered in a one-shot session. It has to be ongoing," says Mandinach.

She also believes that because understanding data can affect virtually all instructional and classroom management decisions a teacher makes, "training on data literacy has to be introduced as early as possible in a teacher's education — ideally at the teacher preparation stage — so it becomes an embedded skill set."

Schools of education are beginning to realize that school districts increasingly want teachers skilled in DDDM, says Mandinach. Furthermore, she notes that the tests teacher candidates need to pass for licensing and certification, such as the PRAXIS, are developing data literacy components. Given such powerful incentives, some schools of education are starting to rethink — and beef up — their data-related coursework.

#### UNIVERSITY OF DELAWARE AMONG SCHOOLS OF EDUCATION LEADING THE WAY

That's the case at the University of Delaware, where educators are working to better align the School of Education's teacher preparation program with the edTPA teacher licensing test. According to Elizabeth Farley-Ripple, an assistant professor of education at the university, the



edTPA seeks to evaluate, among other things, how well teacher candidates can use data about their students to differentiate education or assess whether or not students have met instructional objectives.

“To prepare our students for the edTPA and to meet new state regulations that make data literacy part of the agenda, we began to look for ways to teach them how to better use data related to the academic, behavioral, and social-emotional components of teaching,” says Farley-Ripple.

Such external incentives, however, tell only part of the story. Faculty members meet regularly to engage in an internal improvement process. “As we discuss how well our courses are meeting our objectives, we increasingly find ourselves talking about the importance of data literacy for making our teacher candidates more pedagogically effective and well-rounded,” she says. Currently, the School of Education at Delaware does not offer a stand-alone course in data literacy. Instead, faculty members are addressing the subject themselves within the context of the subjects they teach. For example, in a math methods course, teachers typically learn how to identify errors in students’ mathematical reasoning. Ideally, says Farley-Ripple, they would simultaneously learn how to use data related to such errors to come up with targeted lesson plans to address students’ misconceptions.

Another example: Students taking a course in classroom management might learn not only how to record data on classroom behavior in the form of running records, but also how to turn that data into practical information to inform classroom strategies. For instance, a student in Delaware’s teacher leadership program took running notes on her third graders who were frequently having

a hard time staying seated and paying attention. From analyzing this classroom behavior data, she was able to identify times of day when her students were the most restless so she could intervene accordingly; she also researched kinesthetic learning and began introducing movement into her classroom. Notes Farley-Ripple, “Teaching data literacy in a classroom context helps ensure that it becomes part of what teachers do, which means they are more likely to use it day to day.”

#### LESSONS LEARNED, NEXT STEPS

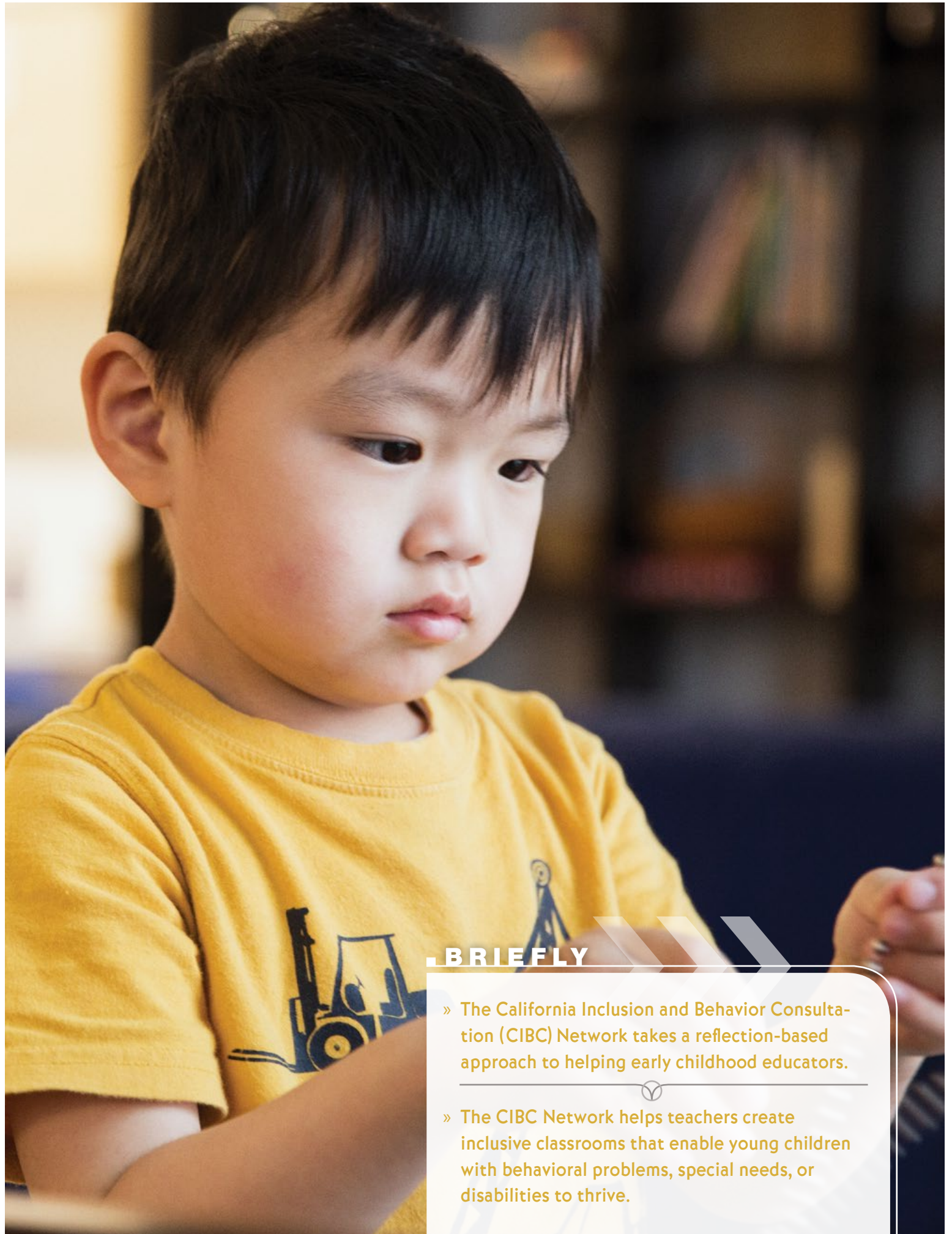
Mandinach is encouraged by what is happening at teacher preparation programs like Delaware’s, and by “small pockets” of data-literate educators around the country. Supported by strong school and district leaders, and equipped with user-friendly data-related technology, they are finding ways, she says, to effectively use a range of educational data far wider than standardized test scores to transform their teaching.

However, Mandinach remains frustrated that so many schools of education offer very limited data-literacy training and support for their teacher candidates, though she acknowledges there are challenges, such as tight budgets and personnel constraints.

“We need to find a route around the impediments,” says Mandinach. “If you train teachers to use data in meaningful ways, it changes what they do in their classrooms and improves student performance. That’s a goal well worth pursuing.”



For more information about WestEd’s work on data literacy, contact Ellen Mandinach at 202.674.9300 or [emandin@WestEd.org](mailto:emandin@WestEd.org), or visit the Data for Decisions Initiative website at [DataforDecisions.WestEd.org](http://DataforDecisions.WestEd.org).



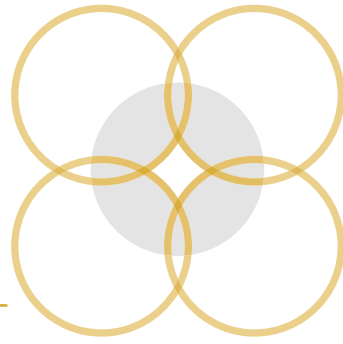
## BRIEFLY

» The California Inclusion and Behavior Consultation (CIBC) Network takes a reflection-based approach to helping early childhood educators.



» The CIBC Network helps teachers create inclusive classrooms that enable young children with behavioral problems, special needs, or disabilities to thrive.





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# HELPING EARLY CHILDHOOD EDUCATORS DEAL WITH CHALLENGING BEHAVIOR

**Mirell O'Brien remembers visiting a preschool class in which a small group of boys were regularly darting around the room and yelling, distracting their classmates. As the classroom felt increasingly chaotic, the frustrated teacher focused more and more of her attention on trying to keep the boys in line.**

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O'Brien is a consultant with the California Inclusion and Behavior Consultation (CIBC) Network, which takes a unique teacher-focused, reflection-based approach to helping early childhood educators build the skills needed to create an engaging and inclusive classroom that enables infants and young children with behavioral problems, special needs, or disabilities to thrive alongside their peers.

"While many early childhood social-emotional support programs work directly with the child to provide a diagnosis and appropriate services," says Virginia Reynolds, director of the Center for Prevention and Intervention at WestEd, "the CIBC approach is markedly different because it offers support directly to the teacher — providing him or her with an opportunity to reflect on how to effectively engage *all* students in the classroom." This teacher-focused approach is reinforced by the fact that almost all requests for assistance come directly from individual teachers.

Harking back to the group of young boys she saw racing around one classroom, O'Brien notes that "addressing these types of behavioral challenges can be very difficult and draining for teachers, but consultants suggesting short-term solutions are unlikely to help a teacher build sustainable teaching and classroom management skills."

Instead, O'Brien and her fellow consultants with the CIBC Network — which is operated by WestEd — introduce teachers to an approach called *reflective practice*. In doing so, they provide practitioners a powerful tool that enables teachers to access and apply the knowledge and skills they already have to address challenging behavior. "We help the teacher shift toward proactively responding to problem situations rather than reacting to them in the moment," O'Brien says.

## PROBLEM SOLVING THROUGH REFLECTION

O'Brien believes CIBC's reflective approach to problem solving helped the preschool teacher who was getting bogged down by constantly reacting to the challenging behavior of a small group of students, to the detriment of the rest of her class. After hearing the teacher's understandable frustrations, O'Brien prompted her to track the times and situations each day in which the boys' behavior was a problem, then reexamine those behavioral patterns over the course of a week: When are they the loudest and most unruly? At what points do they seem to be the most engaged? What might they be telling us with this behavior?

"Through observing and reflecting on children's patterns, teachers can better understand the root of the problem



I love seeing the look in teachers' eyes when their students are engaged in learning and the teachers themselves are enjoying their jobs again.

and design ways to address it," says CIBC Network Coordinator Sue Bollig of WestEd. "The intent isn't to blame the teacher, but to help the teacher choose an approach that might work better. The ultimate goal is to help teachers develop a sustainable, inclusive plan of action that will benefit *all* students."

The teacher in question determined that the boys were the most unruly during transitions between activities — particularly from outdoor to indoor activities, when they were likely over-stimulated and had trouble calming down. In reflecting on her classroom practices, the teacher realized she needed to structure some transition from outside to inside the classroom — one that could provide the children adequate time and space to settle down. To achieve a more orderly and accommodating environment, she and her two classroom assistants each took a group of 8 students back into the classroom and got them settled one group at a time, rather than having all 24 students crowding back indoors together, feeding off each other's energy.

The teacher also recognized that, instead of focusing so much attention on the children when they were *not* following directions, she could draw students back into the group by focusing the attention of all the children on engaging activities that awaited them indoors. "She was then in a position to reinforce children's positive interactions rather than getting stuck on distracting behavior," says O'Brien.

When O'Brien later followed up with the teacher, she found that, through a few strategic changes, the teacher had improved the classroom atmosphere dramatically.

Although the idea of reflective practice may seem straightforward, it's not widely taught in programs that

prepare preschool-level teachers. While teachers in the K-12 system may learn some form of reflective practice during their teacher training programs, staff professional development, or department meetings, the preschool system has not traditionally sponsored formalized professional learning opportunities with this focus.

"By introducing teachers to reflective practice, you help them realize that they have the skills to assess the situation themselves and make a change," says O'Brien. "It was clear that the teacher in the classroom I just described knew what she had to do to keep children engaged in the classroom activities — she just needed to think a bit differently about some of the reasons behind the boys' behavior."

### CREATING INCLUSIVE LEARNING ENVIRONMENTS

Research indicates that experiences during children's early years shape the developing brain. Stable, nurturing relationships with adults and high-quality interactions and learning experiences are integral to supporting later success in school and life. So helping teachers reflect on their practice in order to create engaging, inclusive classrooms and to respond constructively to challenging behavior — the goals of all of CIBC's work — is critical to the healthy development of all the young children who spend at least a portion of their day in early care and education.

Reflective teachers who actively support all different types of students are especially important for those children who may, themselves, be the source of classroom challenges. Many children whose behavior is considered a problem are asked to leave early care and education programs. Being pushed out of general education environments so early in their schooling puts these children at an immediate disadvantage; academically and socially,



a successful transition to kindergarten and beyond becomes more difficult and unlikely.

In addition, for many young children with developmental disabilities and special needs, being part of a general education classroom is invaluable to their development. “Inclusion really benefits all children,” says CIBC consultant Janel Astor. “Modeling social behaviors is very powerful – being with peers who do things differently helps children with special needs develop by seeing other children’s behavior and interactions and learning various ways to communicate. And for children without developmental issues, inclusion offers an important chance to see development in different ways, and to understand and respect individual differences.”

By empowering teachers to thoughtfully implement strategies to engage all students, CIBC’s approach helps teachers create inclusive classroom environments in which students with challenging behaviors or developmental disabilities can flourish.

### TEACHER-CENTERED SUPPORT

CIBC’s work, which began in 2009, is aligned with California’s social-emotional learning foundations for infants, toddlers, and preschool-age children, which WestEd helped develop. As part of its management and oversight of CIBC, WestEd recruits and works closely with the network’s highly experienced consultants – all of whom have a background in early childhood education and most of whom have graduate degrees in early childhood special education, early childhood education, or infant and early childhood mental health. With a growing network of over 114 consultants across the state who visit and observe in classrooms, CIBC is able to offer quick-turnaround support when teachers need it most.

Over the last year, CIBC worked with over 550 educators, who, collectively, served some 3,000 young children – many of whom are from low-income neighborhoods – in 157 state-contracted programs throughout California. Consultants typically visit each teacher about three or four times, focusing not just on addressing teachers’ immediate classroom issues, but on helping teachers sustain a reflective approach to teaching and caregiving by incorporating the practice into their everyday routine. Bollig notes that setting an explicit goal as seemingly simple as spending five minutes at the end of each day thinking about what worked well, what didn’t, and how to improve the classroom can have a significant impact on a teacher’s practice and on children’s classroom experience.

In a 2014 evaluation of the program, over 95 percent of teachers reported that the CIBC consultant met their needs and 95 percent of teachers reported that they had applied information and insights gained from the consultation to their work.

“I’ve worked in the field a long time, and I’m just so impressed with this program,” says O’Brien. “There’s something very rewarding about working closely with teachers and helping them tap more deeply into the strategies they have begun to master. I love seeing the look in their eyes when their students are engaged in learning and the teachers themselves are enjoying their jobs again.”



**For more information about the California Inclusion and Behavior Consultation Network, contact Virginia Reynolds at 877.524.2422 or [cibc@WestEd.org](mailto:cibc@WestEd.org), or visit the website at [CIBC-CA.org](http://CIBC-CA.org).**



## ■ BRIEFLY

» Making Sense of SCIENCE (MSS) professional development weaves science and literacy together.



» Students whose teachers participated in MSS training outperformed their peers by nearly 40 percent; gains were greatest for English language learners and low-performing students.



# Closing the Achievement Gap

by *Making Sense of SCIENCE*

Christina Romero used to launch each of her fifth-grade science units with the time-honored assignment of asking her students to memorize a vocabulary list related to the topic at hand. Trouble was, the task often turned out to be an exercise in futility.

"The students could pass the vocabulary quiz on Friday," says Romero, a teacher at Gonzales Community School in Santa Fe, New Mexico, "but when I used some of those same words in class on Monday, most students had no idea what I was talking about."

Many of her students were English language learners who may have had extra challenges with the vocabulary and definitions compared to some of the native-English speakers. But Romero also realized that even the students who were able to master the relevant vocabulary were failing to acquire deep science knowledge.

What's more, she admits that for many years even she "found science intimidating" and "knew it was not my strength." Sure, Romero could teach her students how to memorize facts, restate definitions, or plug numbers into equations and come up with the correct answers to all kinds of science problems. "But I was teaching on a very superficial level."

That all changed when Romero joined her school's science committee and began participating in *Making Sense of SCIENCE* (MSS), a professional development program created by WestEd that weaves science and literacy together. Refined over more than a decade of testing and

input from teachers, scientists, and literacy specialists, MSS offers an array of professional development services and materials for K–8 science teachers to deepen their scientific knowledge and improve their pedagogy to better support their students.

Romero, who has been teaching for 20 years, describes her MSS training as the "best professional development I've ever had." She now focuses on having her students *interact* with science material — for example, during a recent unit on the microscope, students studied and used different kinds of lenses, generated a list of properties those lenses share, and developed their own definitions of "lens" — rather than just memorizing related vocabulary and facts.

"Once the students see how magnification works and which objects actually magnify," says Romero, "they develop definitions based on their firsthand observation and experience — meaningful definitions that they're much more likely to retain."

She credits MSS with helping her make sense of "everything my science teachers in high school and college tried to teach me." That, in turn, she says, has improved her students' science understanding. "They're internalizing concepts and making meaningful connections."



## A PROVEN APPROACH TO IMPROVING STUDENT LEARNING

Several research studies conducted over the last few years confirm what Romero has seen in her own classroom. In the most rigorous study, funded by the National Science Foundation, researchers at the University of California at Berkeley and Heller Research Associates conducted a two-year, cluster-randomized trial of MSS at eight sites across the United States. The study involved 49 school districts, more than 260 elementary school teachers, and nearly 7,000 students. Their conclusion: *students whose teachers had participated in MSS training outperformed their peers by nearly 40 percent.* What's more, the findings showed that MSS was closing the achievement gap, because the gains were greatest for English language learners and low-performing students.

Kirsten Daehler, director of the Making Sense of SCIENCE project, estimates that last year several thousand teachers participated in MSS courses, which cover topics such as earth systems, force and motion, energy, genes and traits, and weather and climate. In each course, teachers work in small, collaborative groups to explore the science content and analyze real classroom dilemmas through case studies.

"It's science learning for adults," explains Daehler. "We have teachers engage in inquiry-based science investigations, and they talk and write together about what they're doing."

MSS courses encourage teachers to be *metacognitive* about how they are engaging in science learning, and what they do when they read, write, and talk about science ideas. Metacognition, or thinking about how one thinks, has proven to be a valuable tool in boosting both adult learning

and student achievement. MSS asks teachers to reflect on and discuss, for example, how they gained understanding of complex concepts, or how they unraveled the faulty logic that led them to a common misunderstanding.

## PROMOTING SCIENTIFIC LANGUAGE AND LITERACY

In addition to its attention on metacognition, MSS differs from other science professional development in that it has a strong focus on literacy and scientific language, making it particularly beneficial for teachers of English language learners and students struggling with reading comprehension. Daehler notes that the literacy components embedded throughout MSS help science teachers learn to integrate language and literacy instruction into their classrooms in ways that help their students make sense of tricky science concepts.

"Science is a discipline that communicates with more than just words," says Daehler. "Just open a science text or visit a science website and you'll see pages packed with different forms of content, including images, symbols, equations, graphs, and other data representations. Being able to decode and comprehend these specialized text types is essential to understanding the meaning of science."

Accordingly, MSS encourages teachers to reflect on their own approaches toward reading and communicating using the unique language of science. For instance, each MSS course includes Literacy Investigations, which help teachers understand and explain their processes for translating and making connections among scientific words, actions, images, and symbols.

The MSS course on Matter, for example, prompts teachers to explore the reading strategies they use for comprehending periodic tables and chemical equations. Such



A study found that students whose teachers had participated in Making Sense of SCIENCE training outperformed their peers by nearly 40 percent.

strategies might include *chunking* the data to analyze discrete parts (such as considering only the columns or rows of the periodic tables) or *visualizing* the overall data pattern of each layer (such as observing how atomic size generally increases as you move from top to bottom on periodic tables).

In addition, “Teachers who have taken MSS courses tend to give their students abundant opportunities to talk, read, and write about science,” says Daehler. “Teachers model in the classroom with their students what they experienced in MSS by having small groups of students collaborate on engaging activities — then prompting students to think through and discuss what’s happening, using scientific language.”

Such an approach differs drastically from a more typical model in which students are asked to follow instructions for a lab, watch a teacher demonstration, or read a chapter from the textbook and then answer written questions about the material. In many classrooms, says Daehler, even when students get to do experiments themselves, there isn’t time built into lessons for them to talk about what they’re learning. MSS, on the other hand, encourages those kinds of conversations in what Daehler calls a “low-risk” setting. “We promote an environment in which students have a voice to express their ideas, and classroom norms that don’t demand those ideas have to be ‘right.’”

### CLOSING THE ACHIEVEMENT GAP

Daehler is greatly encouraged by the research findings on MSS, which not only quantified impressive teacher and student gains in knowledge, but also confirmed that teachers maintain what they learn over time. Perhaps the most gratifying finding of all: evidence that non-native

English speakers and low-performing students make the biggest gains.

“MSS promotes equity in the classroom,” says Daehler, “in part by providing a safe environment in which students who struggle with English can spend more time learning to talk together about science.”

“Another reason we think those students with the greatest need are showing the most progress is higher teacher expectations,” says Daehler. It’s common for participating teachers to believe their students can’t write or express themselves as well as the students whose work is highlighted in the MSS case studies. “Yet, after analyzing student work from their own classes, teachers find their students have more advanced science ideas than they originally gave them credit for,” says Daehler. “So teachers raise their expectations and increase the rigor of their instruction. In return, their students accomplish even more.”

These days, Romero — now a trained MSS facilitator — clearly loves and is at ease teaching science. She recalls laughing one day last fall when a student asked her, “Why aren’t you a scientist?” She readily concedes, “I didn’t start out like this,” and admits to having been so intimidated by college chemistry that she dropped out of an engineering program.

“Science is hard,” she says. “The concepts are abstract, esoteric. But thanks to Making Sense of SCIENCE, the most successful part of my students’ day is science.”



For more information about WestEd’s Making Sense of SCIENCE project, contact Kirsten Daehler at 650.381.6402 or [kdaehle@WestEd.org](mailto:kdaehle@WestEd.org), or visit the website at [WestEd.org/MSS](http://WestEd.org/MSS).

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The screenshot shows the R&D Alert Online website. At the top, there's a navigation bar with links for 'Careers', 'Contact Us', 'Subscribe', and 'Follow Us'. Below that is the WestEd logo and a tagline: 'Improving education through research, development, and service.' The main content area is titled 'Publications & Resources' and features a search bar and a 'MY ACCOUNT' link. A prominent article titled 'Closing the Achievement Gap by Making Sense of SCIENCE' is highlighted, with a sub-headline 'POSTED ON 04.15.2015' and a brief description of a study. To the right, there are smaller article teasers, including 'Using Data in Efforts to Transform Teaching and Learning' and 'When Students Speak and Educators Listen: New Tools for Dropout Prevention'. At the bottom, there's a section for 'ARCHIVED ARTICLES' and 'PRINT EDITIONS', with a list of articles from 'R&D ALERTS VOL. 15, NO. 2' and 'R&D ALERTS VOL. 15, NO. 1'.

## FEATURED RESOURCES



### Speak Out, Listen Up! Tools for Using Student Perspectives and Local Data for School Improvement

BethAnn Berliner, Leslie Poynor, and Lori Van Houten

School improvement is complex work that requires multiple sources of information, including input from students themselves. This toolkit provides educators with a purposeful and systematic way to gather and analyze student experiences to inform school improvement efforts.

The resource comprises three student voice tools, each of which has three essential components: (1) collaboration between adults and students in a school setting, (2) local data gathering and/or analysis on a school issue or problem, and (3) an action step to address school improvement. It also

includes a tool template that schools and districts can use to create new tools tailored to their particular needs and interests.

PDF | 63 pages | U.S. Department of Education, Institute of Education Sciences | 2014 | [WestEd.org/speak-out-listen-up](http://WestEd.org/speak-out-listen-up)

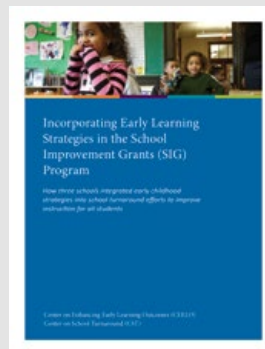
### Incorporating Early Learning Strategies in the School Improvement Grants (SIG) Program: How Three Schools Integrated Early Childhood Strategies into School Turnaround Efforts to Improve Instruction for All Students

Lori Connors-Tadros, Lenay Dunn, Jana Martella, and Carlos L. McCauley

A significant body of research shows that achievement gaps in persistently low-performing schools manifest, in many instances, prior to children entering kindergarten. High-quality preschool programs have proven to help close these gaps both for individual student subgroups in a school and for the school as a whole.

Produced by the Center on School Turnaround at WestEd and the Center on Enhancing Early Learning Outcomes, this resource focuses on case studies of three schools that have used School Improvement Grant (SIG) funds, with the support of their districts, to implement early learning strategies as part of their turnaround models.

PDF | 28 pages | National Institute for Early Education Research | 2015  
[WestEd.org/resources/earlylearningstrategiesinsigprograms](http://WestEd.org/resources/earlylearningstrategiesinsigprograms)



R&D Alert covers issues affecting schools, communities, and human development professionals throughout the United States. Current and previous issues are available at [WestEd.org/R&DAlert](http://WestEd.org/R&DAlert). Your comments are welcomed. Please address them to Ricky Herzog at [rherzog@WestEd.org](mailto:rherzog@WestEd.org).

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### Making Sense of SCIENCE Formative Assessment Task Banks

Kirsten R. Daehler and Jennifer Folsom

Formative assessment is an ongoing process that involves gathering and analyzing evidence of students' thinking, then using what is learned to inform instruction. This collection of formative assessment task banks can be used to augment your existing instructional activities.

Each task bank contains 20 or more black line masters on a range of concepts related to each of the following topics (all for grades 6–8):

- » **Science:** Matter, Energy, and Force & Motion
- » **Mathematics:** The Number System and Equations & Expressions

WestEd | 2014 | [www.WestEd.org/formativeassessmenttaskbanks](http://www.WestEd.org/formativeassessmenttaskbanks)



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improvement efforts. And the toolkit is being introduced to school teams across grade levels through the district's Social and Emotional Learning Initiative. "Students are better able to realize and practice their social and emotional competencies when they can communicate their views on issues that are important to them," says Harris.

"I only fully realized how valuable the toolkit was when we started introducing it to other educators," Harris says. "Now, when people ask us for support in using student

voice to address school-improvement issues, we have solid strategies to offer them."



For further information about the *Speak Out, Listen Up!* toolkit, contact BethAnn Berliner at 415.302.4209 or [bberlin@WestEd.org](mailto:bberlin@WestEd.org).

For further information about using the toolkit, contact Jennifer Harris at 775.333.3766 or [jharris@washoeschools.net](mailto:jharris@washoeschools.net).

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