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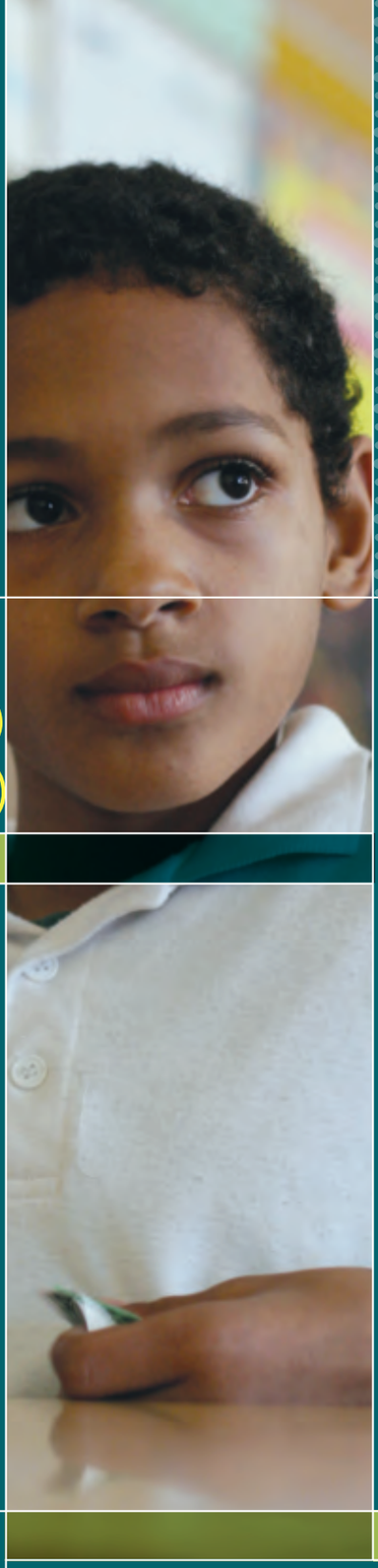

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NEXT-GENERATION Assessment Systems

Stanley N. Rabinowitz

Stanley N. Rabinowitz directs the Assessment and Standards Development Services program at WestEd, which manages the federal Assessment and Accountability Comprehensive Center. He also serves on the validation committee for the Common Core State Standards Initiative.

An unprecedented confluence of factors—economic, political, and educational—is causing many states to rethink their student-assessment programs. But careful thought and expert guidance will be needed if they are to avoid the problems of the past and take advantage of promising new developments.

Most state assessment programs, regardless of their history or goals, were revised early in the last decade to meet the requirements of the federal No Child Left Behind Act: All assess reading/language arts and mathematics in grades 3-8 and high school, and science in elementary, middle, and high school. Collectively, they are increasingly homogeneous, largely multiple-choice, with some sprinkling of constructed-response and direct writing.

Change is in the offing. The upcoming reauthorization of the Elementary and Secondary Education Act, of which No Child Left Behind is the current version, is likely to result in changes to assessment requirements, allowing more flexibility and providing greater support for innovative assessment models. Dissatisfaction with current limited options, coupled with the Common Core State Standards Initiative's potential impact—assessments covering fewer but clearer objectives, and advancing more rigorous content and skills requirements—will necessitate a broad reconceptualization of assessment. This inevitably will mean a shift away from state standardized testing as the only game in town, and a move toward the development of innovative state assessment systems.

This next-generation model will include differentiated roles for assessment at the federal, state, and school levels; the use of multiple measures; and assessments that support accountability programs focused on both growth and current status. It also will be likely to take greater advantage of technology, and will benefit from U.S. Department of Education initiatives and dollars, represented by the Obama administration's Race to the Top Fund and other grant programs.

What follows is an overview of key concepts states should consider as they move forward.

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Multiple Measures. The growing call for more performance-based assessment is reminiscent of past practice, when programs such as the New Standards Project and the Vermont and Kentucky writing and math portfolios of the early 1990s seemed to usher in a new era. But significant changes in the political context of accountability, along with technological advances such as the use of computer simulations, should encourage states to look to the future, not the past.

To do this, we need to create a new vision of technical evidence for performance-based assessments, building on advances in such work as alternative assessments for students with disabilities. And we must ensure that teachers get the necessary training to incorporate performance-based instruction into their teaching, and to use classroom-embedded assessments to diagnose students' strengths and weaknesses.

Balance. When researchers call for the development of a balanced assessment system, they typically mean balancing roles and responsibilities. But other factors also must be balanced:

- Cost. What is the most cost-efficient way to get teachers, students, administrators, policymakers, and parents the information they need about individual students and the system itself?
- Constraints. How do we overcome technical limitations in the next-generation assessments and properly train teachers and others to develop and use new techniques and understandings?
- Risk. How do we support true reform without overburdening students, teachers, and other key constituencies?

Complementary Components. What constitutes the "system" in our next-generation assessment system? Having a system means there are several assessment components, each playing a complementary, not duplicative, role. Our system would have both formative (diagnostic, classroom-embedded) and summative (used for accountability, mostly on-demand) assessments. Each type would be designated for its primary role. And having both would allow teachers to use formative assessments honestly: to focus on how well students are advancing, without worrying that short-term deficiencies will affect their own evaluations or reflect badly on their students.

Valuing efficiency, our ideal system would include multiple-choice, constructed-response, and performance tasks, as appropriate, to best measure the knowledge and skills called for in challenging new content standards. Indicators would need to justify these various options' inclusion: What is the incremental validity of each component (in other words, what would be lost if it were excluded)?

Roles and Responsibilities. In our system, each governing level would play a different primary role. The federal role would be limited but targeted, ensuring that all students achieved sufficient levels of reading, math, and science proficiency. States would build on that foundation by adding other content areas, such as social studies, and including additional indicators—those based, for example, on local economic conditions, resources, and values and beliefs. The primary local-level function would be curriculum

and instruction, ensuring that all teachers are prepared to meet, and are supported in meeting, the needs of all students, including those most at risk, such as English language learners, students with disabilities, and students living in poverty.

Assessments at each level would be consistent with that level's "system" responsibilities. One beneficial outcome of having differentiated roles with specialized assessments would be that the technical requirements could vary based on the purpose and the stakes, allowing different types of validity evidence, for example, to drive local diagnostic tasks, as opposed to state and federal accountability assessments.

Choice. While most assessment and accountability systems expect all students to master all content at a "major" level, regardless of students' interests or abilities, our system would incorporate an element of choice at the state, school, and student levels. Students could pick the content area or areas on which they wished to focus deeply, for example, and would be assessed accordingly, so long as they also demonstrated sufficient knowledge in other areas to support responsible citizenship and employment.

Some states have already moved in this direction by supporting magnet and charter schools, adding new content areas and indicators to state assessment and accountability programs, and requiring career "majors" for students at the high school level.

The bottom line when it comes to choice is that all schools and students should be great at something that society values, and sufficiently good at all else, to maximize motivation and success while keeping students' options open for later-developing needs and interests.

Too often, assessment reform plans are dismissed from the start because of the identification of what are thought to be barriers to their development and implementation. The real world certainly has real constraints. But before we say "we can't," we should ask ourselves the following questions:

- Is the barrier real, or is it just perceived?
- Is it real, or is the change just going against the traditional approach?
- Is it real, or is the change just difficult?
- Is it real, or does the change just require new technical tools?
- Is it real, or is the change just expensive?

We may find surprising opportunities if we dare to address perceived barriers to assessment reform honestly.

Our assessment and accountability systems should reflect what we value most for our students, schools, and society, and what we think it means to be a well-prepared student, worker, and citizen. Once these are clear, we should be willing to fight and to pay for their reflection in our system for measuring academic progress.

As states begin this important endeavor, they should take the following steps:

- Develop a vision statement that incorporates the values the system will represent.
- Devise an implementation plan with goals, key dates, milestones, responsibilities, and necessary resources.
- Secure sufficient funding to implement the plan.
- Develop a system for evaluation and feedback.

There is no time to waste. Much needs to be done, and the quality of American education is at stake.

This essay is adapted from his closing remarks at the 2009 Reidy Interactive Lecture Series. (First published as the Commentary in EdWeek, Vol. 29, Issue 22, pages 26, 36, on February 24, 2010.)

CULTURE and ASSESSMENT

DISCOVERING WHAT STUDENTS REALLY KNOW

How can we know what students know?

At first glance, the answer seems simple. After teaching students new information and giving them time to practice the concepts or skills, we assess their understanding with a quiz or test. To find out how one student or a group of students compares to peers, we standardize the tests so that all students answer equally challenging questions.

But what if the way we ask the questions unintentionally causes some students to fail? What if our assessments miss uncovering the depth and complexity of knowledge because they contain assumptions about language, culture, values, and experiences that these students don't share?

These concerns have inspired decades of work by Sharon Nelson-Barber, Director of WestEd's Center for the Study of Culture and Language in Education for the past 12 years. The center's research focused primarily on how culture, language, and socioeconomic status influence the ways people think and solve problems. More recently, Nelson-Barber has been exploring how cultural background, particularly of indigenous students, may affect performance on large-scale standardized achievement tests and what can be done to make the assessments more accessible and equitable.

"What is it about a test question that continually appears not to map onto some students' experiences?" she asks.

In one study, Nelson-Barber and colleagues looked at how students interpreted science and math items on the National Assessment of Educational Progress. An 8th grade science assessment item asked students to present one "advantage" and one "disadvantage"

to using laboratory animals such as mice, guinea pigs, and monkeys as "models" to help find cures for human diseases. An indigenous Hawaiian student described a disadvantage as follows: "There is no such thing as laboratory animals. All animals are our brothers and sisters and our spiritual teachers. We don't have the right to use or kill them unless it is for food."

The questions raised by the cultural mismatch between this student's view of the world and the test question aren't principally about what's a correct or incorrect answer. The bigger issue is that the question elicits very little of the student's understanding of laboratory science. On the other hand, it does provide useful information on how to be effective in teaching him.

Noting that some indigenous communities have developed culturally acceptable ways for their children to engage in classroom activities, Nelson-Barber says, "Getting to that point involves communication with community elders and others in the community based on mutual respect. In some situations elders may conduct an appropriate ceremony before students participate in an activity such as animal dissection, which would otherwise be taboo."

Assessing culturally rooted ways of knowing

Assessments that accurately reflect traditional ways of knowing for a specific cultural group can produce richer and more valid results, Nelson-Barber and her colleagues discovered. Consider schools where the curricula and assessments are based on the culture and experiences of the Yup'ik, an indigenous group from Alaska. Subject content is routinely taught through everyday activities in the Yup'ik culture, such as basket making, fishing, and navigating vast expanses of tundra using landmarks and, after dark, constellations of stars. Validity of the assessments is further refined, Nelson-Barber adds, when educators consult with tribal elders. These cultural authorities can determine if, for example, test questions correctly represent the perceptions and experiences of people whose traditional orienteering practices make use of sophisticated math and science reasoning.

Testing that is authentic in this way gives students the opportunity to draw on their cultural heritage to express deeper understanding of concepts and to use their experiences to interpret new information.

"Only a fraction of actual student knowledge is assessed by many test questions. With more culturally relevant assessment, we seek to increase that percentage considerably," Nelson-Barber explains.

Nelson-Barber cautions that her research does not suggest that each culturally cohesive group of students will need a culturally specific assessment. Nor does it mean that

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students needn't ever learn to take standardized assessments. But without investigating the varied perceptions that students bring to testing, she says, educators and policymakers may never be able to discover what students actually know, or to design tests that fully measure their understanding.

For years, educators and researchers have been aware that the format of a test and its language and vocabulary can sometimes unfairly penalize students who lack common context. Test developers have tried to correct for cultural bias, says Nelson-Barber. Schools also have made accommodations for certain groups of students, such as allowing extra time on tests for those who are learning English as a second language. But often the adjustments are ineffective because they are based on limited experience with particular cultural groups.

In some cases, Nelson-Barber adds, test developers might start with the faulty belief that students who share the same racial or ethnic heritage or language also share the same culture, when in reality there may be vast differences among the students' personal experiences because of family income or geography. Other times, the test questions or testing process might not account for the fact that some children are taught to publicly camouflage their knowledge so that others don't feel inferior. Additionally, before marketing a test, developers may not take the step of verifying that students with diverse cultural backgrounds actually understand what the assessment is asking.

"Only a fraction of actual student knowledge is assessed by many test questions. With more culturally relevant assessment, we seek to increase that percentage considerably."

Nelson-Barber recalls study team discussions about one math test question that focused on apportioning the ingredients used to make tacos, a food that test developers believed to be more familiar to Mexican immigrants and, thus, more relevant to Mexican students taking the assessment. But, in response to a test question about how many tacos could be assembled and distributed based on the identified ingredients, some students gave the wrong answer not because they didn't understand division but because their experience with portion sizes differed from those assumed by test developers.

Cultivating cross-cultural awareness to improve learning

Nelson-Barber's interest in refining testing goes beyond her belief that culturally sensitive assessments are more valid and fair. She advocates for cross-cultural awareness and competence in assessment and teaching because such understanding sets a more solid foundation for improving student success.

"This is much broader than assessment. We must better prepare teachers to understand cultural diversity," Nelson-Barber says. "They're not ever going to know everything about every possible child in their classrooms. But they will be more effective if they ask some basic questions about their students' cultural backgrounds: What are some of the general principles that I need to carry around with me? What individuals or institutions do I need to know about or what activities do I need to participate in so that I can get a sense of how people are thinking, how people are communicating, what they want for their children?"

How teachers assimilate that information into their instruction "can really make all the difference in moving a child's learning experience forward." In observations of teachers who are most effective with

students from diverse cultural backgrounds, Nelson-Barber and her colleagues have found that they respect and actively nurture the children's prior knowledge. By momentarily setting aside their own cultural assumptions to really listen to how students view the world, such teachers make it safe for everyone to ask questions, clear up misconceptions, and fully express their knowledge. "Understandably, students can be more fully engaged in learning when they don't feel they have to leave parts of their identity outside the classroom," she says.

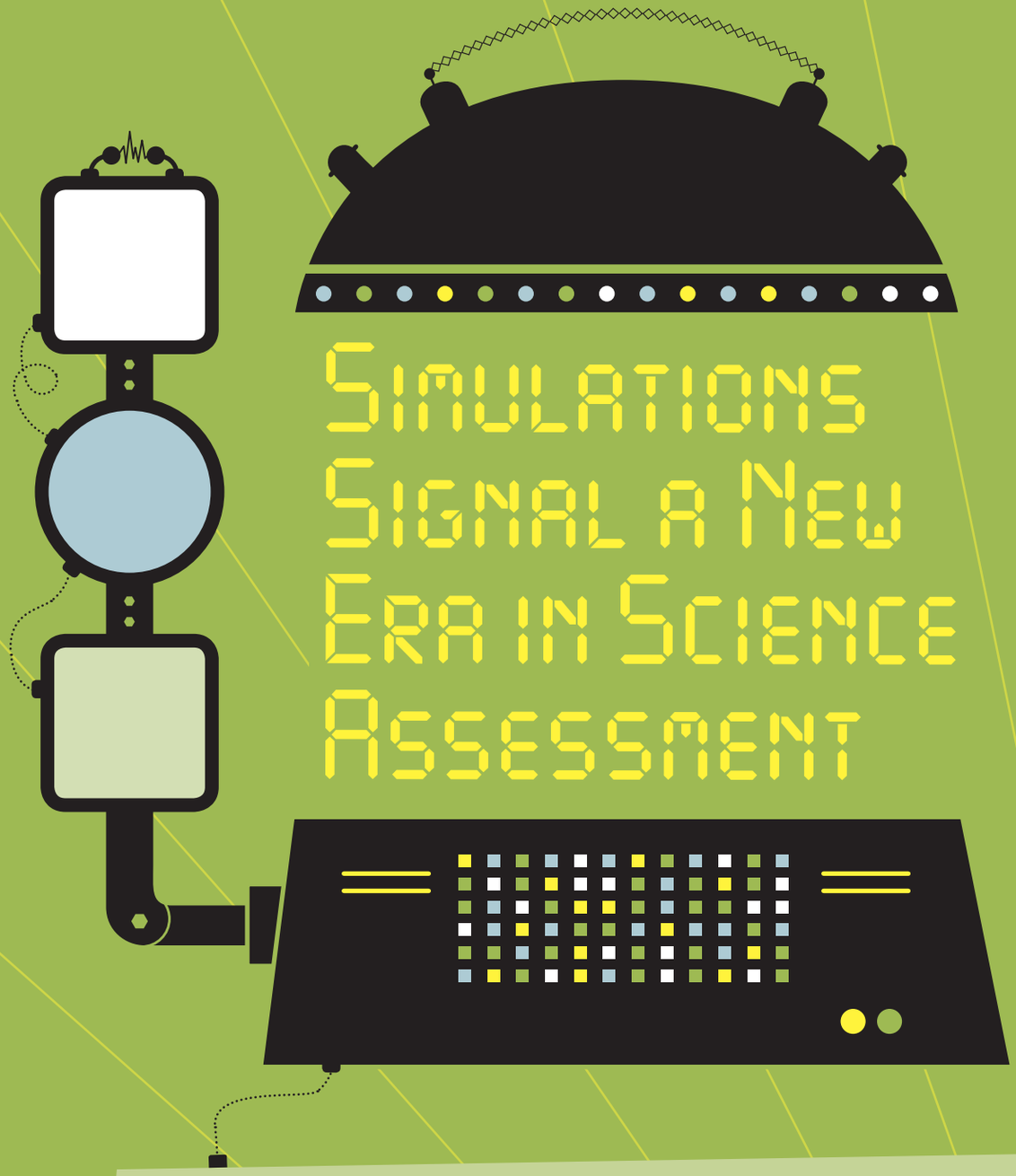
At a policy level, Nelson-Barber comments, test developers and education leaders can do more to investigate why some assessments produce poor results. Ideally, she says, deep cultural awareness would inform test creation, test dissemination, and test evaluation. Such a comprehensive approach might move closer to eliminating cultural bias in testing and the need for accommodations for some groups of students.

At the school level, teachers and administrators can forge alliances with parents and leaders of different cultural groups represented in the school population. These partnerships can be especially vital to school communities where demographic shifts have changed the student populations of many classrooms.

Sharon Nelson-Barber is currently President and Chief Executive Officer of Pacific Resources for Education and Learning in Hawaii.

For more information about culture and language in education research, contact Ursula Sexton at 650.381.6442 or usexton@WestEd.org.

"This is much broader than assessment. We must better prepare teachers to understand cultural diversity."



Simulations Signal a New Era in Science Assessment

Students taking a standardized science test might read a passage describing an underwater ecosystem and then answer a series of related multiple choice questions. One day soon, students could be asked, instead, to demonstrate how well they understand the way an underwater ecosystem works. They would respond using computer-based simulation activities — making observations, inferring relationships, predicting outcomes, and analyzing data about the ecosystem. In short, they would use scientific inquiry.

This type of test question might require students to design an experiment to determine what would happen if too many of a particular species of fish were introduced into the ecosystem, or to predict how pollution or global warming would affect the system over time. As part of their investigation, students would be able to observe various organisms and their interactions, create food webs, and explore and graph population models.

"It's not likely that multiple choice questions are going to disappear. But we will see new approaches to testing certain knowledge and skills," says Edys Quellmalz, Director of Technology Enhanced Assessments and Learning Systems at WestEd, "and science will lead the way."

Assessing students' knowledge of complex, dynamic processes

SimScientists, a five-year WestEd effort begun in 2007, is developing such science test formats — prototypes that will usher in a new era of computer-based assessment. The program encompasses five separate research projects, all on the role science simulations can play in improving middle school science instruction and assessment, and the optimum design of such simulations.

One project is investigating how to modify simulation-based activities for students with disabilities. Another focuses on cognitive research into how well various types of computer-based assessment tasks measure science learning, and the relative merits of simulation-based versus traditional assessment tools. The projects address three major science areas: life science (ecosystems, the human body), physical science (forces and motion, atoms and molecules), and earth science (plate tectonics, climate and weather).

SimScientists homepage

Quellmalz, SimScientists' principal investigator, says schools are increasingly using computerized animations — and, in a few cases, interactive simulations — to teach science.

"Some assessment tools don't adequately measure students' understanding of complex science systems or their ability to conduct scientific inquiry," Quellmalz says, because assessing that level of knowledge is very hard to accomplish with a set of "static" written questions. "We will be using an interactive

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"It's not likely that multiple choice questions are going to disappear. But we will see new approaches to testing certain knowledge and skills. Science will lead the way."

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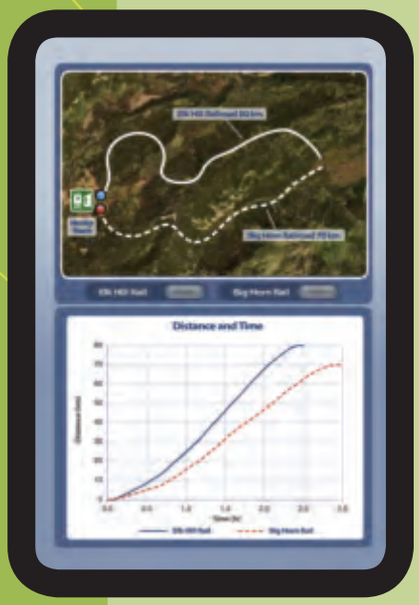
modality to get at neglected or poorly measured areas."

Science is the perfect context for such an approach, according to Quellmalz. "Science involves dynamic systems, such as ecosystems or plate tectonics, which have multiple components, a lot of causal interactions, and are challenging to observe because they take place over very long or very short periods of time, occur on a very large or very small scale, or are not easily visible," she says. "When students run a computer-based simulation, they get to see what happens to populations if, for example, something disrupts an underwater system and all the fish die. Such activity prompts questions about why the fish died: Did the number of predators change? Was the culprit a chemical introduced into the system?"



Using this simulation, students are expected to use their knowledge of force and motion to select the most efficient travel route

A physical science simulation might model the components, interactions, and system behaviors of forces acting on an object and the results of that action. For example, students might be asked to design an experiment to determine the effects of friction on a vehicle's speed and acceleration or predict how a change in mass influences an object in motion. In earth science, students might take part in a simulation on plate tectonics, using observations of earth's surface features and data sampling and analysis to understand geologic events such as earthquakes or volcanic eruptions.

Such simulations, says Quellmalz, allow students to "analyze what happens to a system, in terms of a set of cause-and-effect relationships, over time." That's something, she says, they may or may not be able to learn about from reading a textbook. It represents a level of model-based reasoning that cannot be adequately measured by conventional assessments. But with computer simulations, "The process is much more authentic," says Quellmalz. "You can present a model of a rich environment and its various components and then allow students to observe and investigate how those components interact."

Aiming for prototypes and wider replication

SimScientists projects are built on research from a three-year demonstration project that provided evidence of the technical quality, utility, and feasibility of simulation-based science benchmark assessments. The five new projects are still in the design phase, but several early outcomes have already undergone small-scale testing in classrooms. These include a number of computer-based simulations, some in the form of assessment tools and others in the form of curriculum modules with built-in coaching. Sixth graders in San Carlos, California, participated in the first demonstration project, testing the usability of several simulations. Two additional small-scale feasibility studies have begun in the San Francisco Bay Area, and additional pilot testing is planned in Utah, North Carolina, and Nevada.

Quellmalz says the project team decided to design curriculum modules after teachers who saw early

simulation activities designed for assessment asked, "Can we use these for instruction?" She said the question made researchers realize that "many of the science concepts we were trying to assess probably weren't being taught very well in the first place." The curriculum modules, compared to those used for assessment, include more explanation, demonstration, modeling, and coaching. Students also receive feedback as they work through the simulations.

Each of the program's five projects will produce prototypes that demonstrate effective design and can be replicated on a wider scale. Quellmalz says that she'd like to interest local school officials in pilot testing the prototypes, hoping they'll be motivated by realizing that traditional assessment tools don't adequately measure how well their students have mastered many state science standards, particularly the dynamic interactions within science systems. "It's an opportunity for a superintendent to get additional information about what students in the district know and can do in science," she says.

Meanwhile, Quellmalz notes, interest in and use of interactive formats — including computer simulations — is growing. "We're already seeing greater use of technology to deliver and score conventional kinds of test items," she says. "We will next move toward more innovative formats." In fact, this year's National Assessment of Educational Progress for science included a number of interactive computer tasks to test students' ability to engage in science inquiry. At the state level, Minnesota has begun using an interactive online science assessment.

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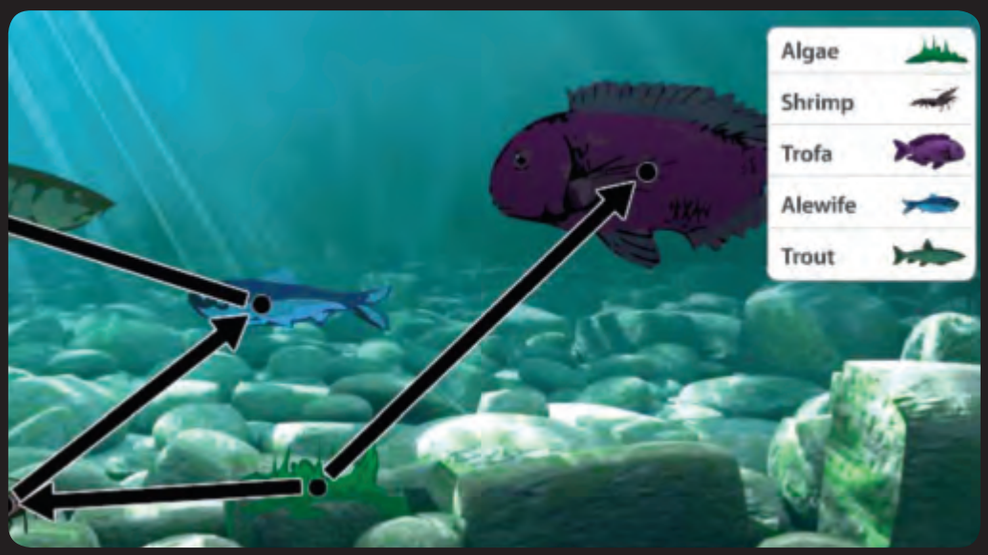

Students' ability to solve complex problems involving an underwater ecosystem can be tested using this interactive simulation

"Some assessment tools don't adequately measure students' understanding of complex science systems or their ability to conduct scientific inquiry."

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SimScientists projects are being funded through 2012 by the National Science Foundation and the U.S. Department of Education. Collaborators include the American Association for the Advancement of Science and the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) at the University of California at Los Angeles. Acting as co-principal investigators and project managers on SimScientists projects are Michael J. Timms, Associate Director of WestEd's Science, Technology, Engineering & Mathematics Program, Barbara Buckley, Matt David Silberglitt, and Jodi Davenport. Other project leadership is provided by Art Sussman and Mark Loveland.

For more information about WestEd's SimScientists program, contact Edys Quellmalz at 650.381.6427 or equellm@WestEd.org.

ALIGNMENT to Assure Learning for ELL Students

Many students who are English language learners are not being taught the academic language skills they need to fully understand and respond to the questions asked on standardized tests.

That is one of the key findings emerging from a collaborative study aimed at improving the achievement of English language learner (ELL) students through better alignment between classroom instruction and state achievement standards and assessments.

"It has profound implications for how we interpret the results of large-scale assessments used for accountability purposes because it raises the question: What are we really testing?" according to WestEd's Edynn Sato, a principal investigator for the study. "How much of what we're measuring is a student's English language proficiency — in this case, the ability to understand a test question — versus the student's academic content knowledge and skills?"

During the 18-month study, researchers collected and analyzed standards and assessment data from nine states and surveyed teachers about their instructional practices with ELL students. Titled "Improving Methods of Aligning Instruction to Standards and Assessments for English Language Learners and Analyzing the Relationship of Alignment to Student Achievement," the study also provided participating states with technical assistance aimed at improving alignment and supporting the achievement of ELL students.

Gearing academic language instruction to content standards

Even a student who is proficient in conversational English may have difficulty learning academic English language without explicit instruction and frequent opportunities to practice. Academic language — typically used in instructional materials, in classroom activities, and in assessments — is a specialized form of language. Its mastery requires more than simply learning new vocabulary; students must also learn content-specific ways of structuring their speech — and their thinking.

For example, to report findings from a science experiment to classmates, students must use discipline-specific language such as "Our hypothesis was ...," rather than "We thought probably ..."; or "The data we collected indicate ...," rather than "It looked to us like ... ."

"To help students achieve, we have to make sure they have the language skills necessary to engage meaningfully with academic content."

There are several points along the path from content standards to assessment where academic language instruction may be neglected. As Sato points out, the fact that state content standards failed to include expectations for students' academic language learning accounted for much of

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the misalignment among standards, instruction, and assessment revealed in their study. Even when districts use standards-based curricula that include an academic language component, she adds, classroom practices may not adequately address the skill. "We used teacher surveys to investigate the enacted curriculum, that is, the way curriculum is actually implemented in the classroom," Sato says, "and academic language wasn't necessarily being taught very explicitly or very well."

"States face new expectations for ELL students without clear models and examples of effective practices on how to meet them."

The study uncovered a notable gap between rigorous content standards and the instruction taking place in English language development (ELD) classes. "In the ELD classroom, the learning activities that students engaged in most often required basic language skills used for identifying, describing, or organizing information," Sato says. "But rigorous content standards and instruction, for example in mathematics and science, focus on more complex language skills, such as those students use to analyze or generalize. To help students achieve academically, we have to make sure the language skills taught in their ELD classes help them engage meaningfully with the content in their academic classes."

A tool previously developed by Sato and her colleagues proved useful for this study and may be useful to practitioners as well. The "Academic Language Demands and Language Complexity Taxonomy" describes general academic language functions necessary for skill mastery, ranging from basic to complex. Educators can use the taxonomy to determine the academic language skills necessary to meet specific content learning objectives. It also provides a common way for content and language specialists to categorize and discuss the language skills that students need in order to understand academic content and to demonstrate what they know.

Improving alignment of standards, assessment, and instruction

"States are facing new, expanded expectations for ELL students without the benefit of clear models and examples of effective practices on how to meet these expectations," says Sato, who directs Research and

English Language Learner Assessment for WestEd's Assessment and Standards Development Services program. "So, the full validity of assessment scores for these populations continues to be questionable, as does the use of standardized test scores to document accountability for improving achievement."

According to Sato, teaching academic English language skills to ELL students is critical for two reasons: the "persistent and substantial" achievement gap between ELL students and their English-proficient peers, and the continuing growth of the nation's ELL population. The impetus for the collaborative study also can be traced to provisions of the No Child Left Behind Act of 2001 that require states to set standards for English proficiency related to academic achievement, and to document the progress of ELL students in mastering English language and core subjects.

Sato says she would like to see academic English language expectations explicitly addressed in state standards and curriculum guides, consistently incorporated across the content areas in classroom instruction, and appropriately reflected in assessments.

As a result of their involvement in the study, several states have already begun revising their content and language standards, incorporating academic English language expectations to support academic achievement. Others are creating professional development modules to help teachers identify and explicitly address the academic language needs of their students.

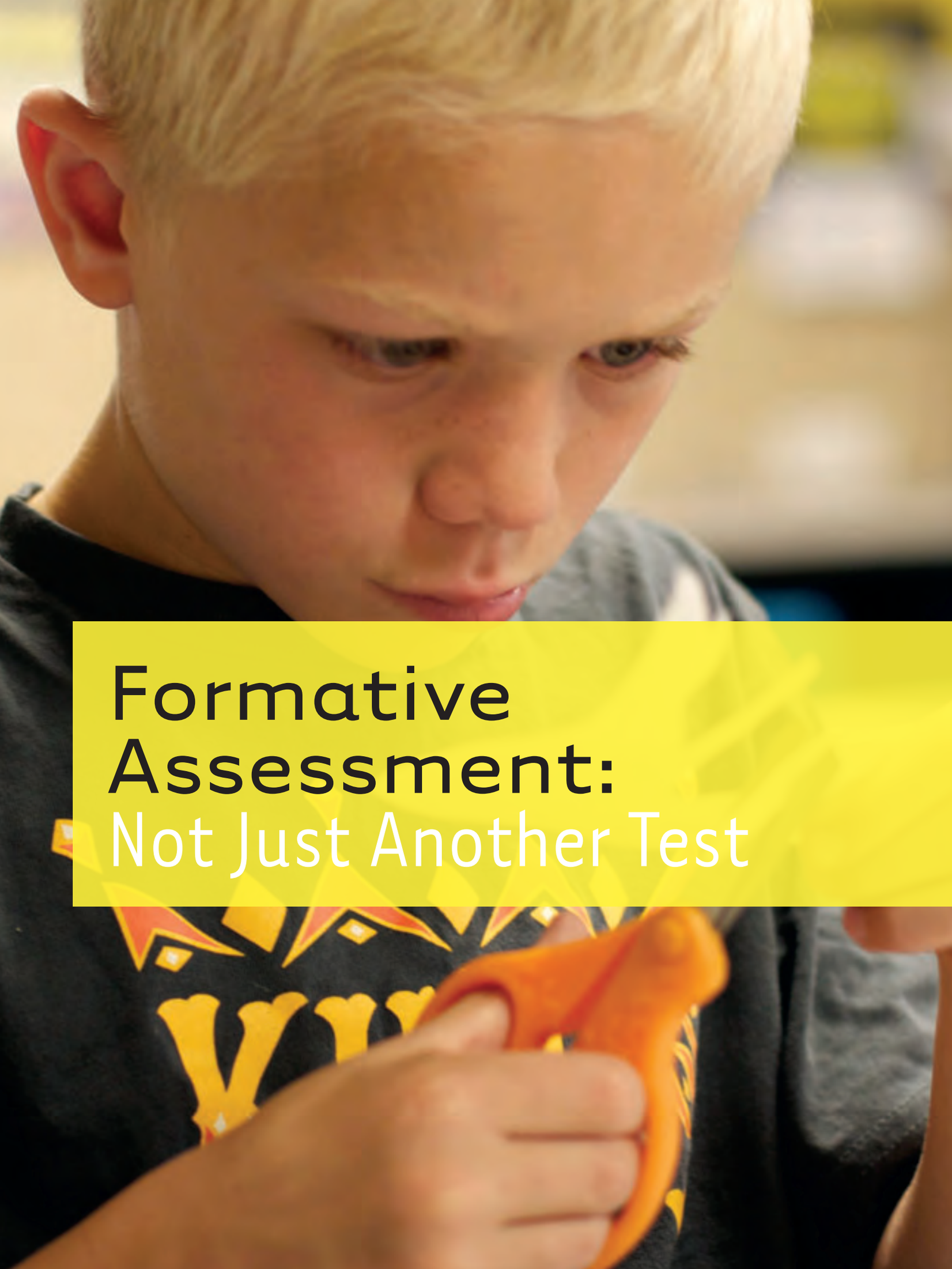
ELL students benefit, Sato says, when local school officials establish an environment in which the responsibility for educating this group is shared between English language and content area teachers. She suggests that schools support cross-disciplinary teams made up of ELD and content-area teachers who seek ways to systematically incorporate academic English language learning across the curriculum.

"We are not giving students opportunities to learn the language they need, while holding them accountable for knowledge they have no access to."

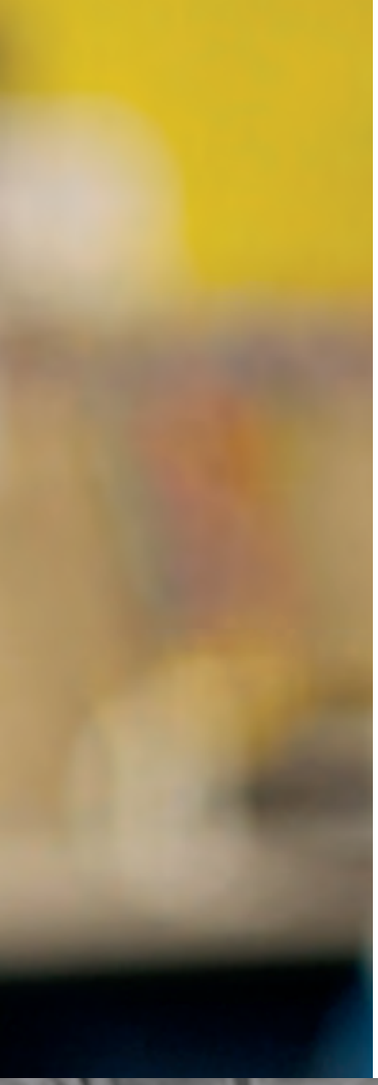
To ensure that happens, though, standards, instruction, and assessment need to be much more closely aligned. "At this point, the standards are not consistently articulating expectations for academic English language proficiency," says Sato. "And because standards are drivers of instruction and assessment, we are not only failing to give students opportunities to learn the language they need, but we're holding them accountable for knowledge to which they may not have access."

Funded by the U.S. Department of Education, the project's other principal investigators were from the Council of Chief State School Officers (CCSSO), the University of Wisconsin's Wisconsin Center for Education Research, and EdCount, LLC. The project was led by the Iowa State Department of Education. Heading up WestEd's research team was Peter Worth, Senior Research Associate. A final report on study findings is expected in 2010.

For more information about the study "Improving Methods of Aligning Instruction to Standards and Assessments for English Language Learners and Analyzing the Relationship of Alignment to Student Achievement" or the "Academic Language Demands and Language Complexity Taxonomy," contact Edynn Sato at 415.615.3226 or esato@WestEd.org.



Formative Assessment:
Not Just Another Test

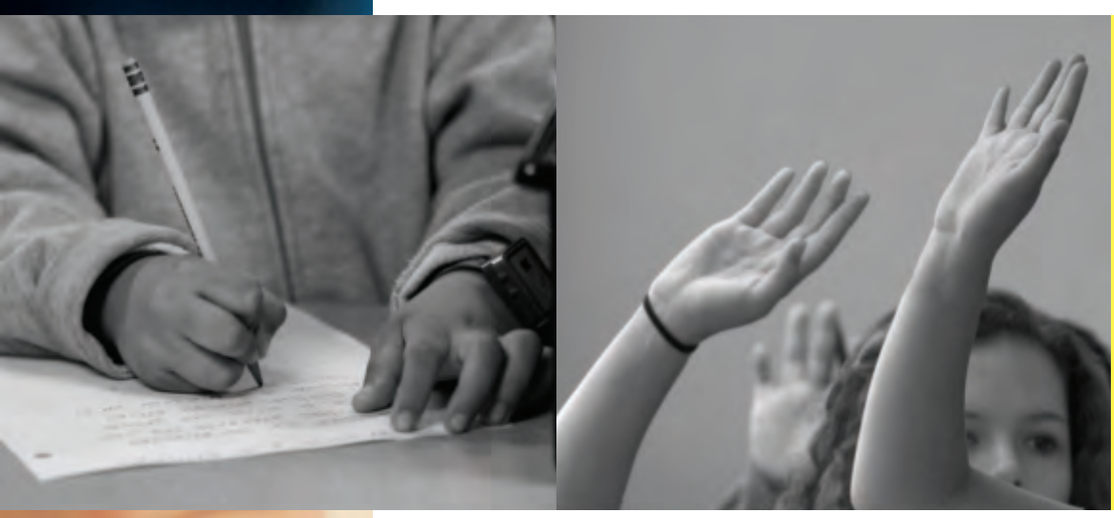


"Many educators think of formative assessment as another kind of test. Instead, it is a process to help instructors to understand their students' day-to-day learning and to develop appropriate interventions to improve that learning," says Nancy Gerzon, Senior Research Associate at WestEd. "We know from research that effective formative assessment has multiple components, but most educators use only one or two."

Gerzon directs the New York Formative Assessment Project, which aims to change how educators think about formative assessment. The three-year-old initiative is led by a New York Comprehensive Center (NYCC) Assessment Team, with support from the Assessment and Accountability Comprehensive Center at WestEd. The New York State Education Department and the Syracuse City School District also are partners in the project.

According to Gerzon, research shows that students make dramatic achievement gains when their teachers break instructional units into a progression of clear, well-defined learning targets; involve students in setting learning goals and assessing their own progress; give students immediate and corrective feedback; and set up peer collaboration activities to build content mastery.

Known as formative assessment, this comprehensive and interactive process is a model of mastery learning, in which a student progressively develops skills and confidence under the guidance of a seasoned professional.



"We know about other factors that can raise achievement — longer school days, better equipment and books. While all are important, research shows that teacher quality is key."

Laying a solid foundation

The New York project has been guided by a specific definition of formative assessment adopted in 2006 by the Council of Chief State School Officers: "Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes."

The project began with a pilot initiative in Syracuse to provide intensive professional development focused on showing 4th and 5th grade teachers in 10 elementary schools, their mathematics coaches, and school administrators how to design and integrate effective classroom assessment strategies on a broad scale.

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An outside review of the project by researchers from the University at Albany found "clear evidence" that the initiative had begun transforming instruction and learning.

The researchers noted that teachers who received at least 60 hours of targeted professional development had significantly expanded their use of specific formative assessment practices — including higher-level questioning, hands-on performance tasks, and flexible grouping. A majority of teachers were using some type of formative assessment on a daily basis. These practices were viewed by district leaders, Gerzon says, as a contributing factor in students' passing the state's mathematics tests at higher rates, with the achievement gains most noticeable among girls, English language learners, and students with disabilities.

Training district-level coaches in key strategies

Project implementation began with intensive training of district-level mathematics specialists in the theory and application of formative assessment strategies. In addition to learning the research behind basic formative assessment practices, coaches worked directly with teachers to help them understand the related diagnosis and intervention skills used in the classroom.

An important feature of the Syracuse project, Gerzon says, was giving faculty members ample time to work with one another and with mathematics coaches to create and implement effective formative assessment strategies based on real mathematics units. Through these collegial exchanges, educators discovered the value of anticipating and planning for students to experience common stumbling blocks in learning, instead of being surprised and unprepared to react to trouble spots.

During the training, district-level coaches practiced implementing key strategies. To learn firsthand about setting a progression of clear learning targets, for example, math coaches looked at all the ways that students might become confused when learning about measurement on a number line, a common weakness on the state math exams. By pulling instructional units apart to identify the critical junctures of learning and then designing effective strategies for re-teaching the concepts, educators gained a deeper understanding of the math content as well as how to move students towards mastery.

"What we're trying to do is frame clear, concrete learning goals," says Gerzon. "Teachers articulate clearly what they think the progression of skills will be before they start the lesson. We urge teachers to ask themselves: What are my criteria for success in this lesson? What will students do differently as a result of what I'm doing today or this week? As teachers get more skilled at identifying the learning goal for the unit and the steps needed to get there, they can also more readily identify students who need help and engage them in specific learning activities that will help them master next steps."

Cultivating an active role for students

Providing specific and prompt feedback to students is a vital part of formative assessment. In their 1998 comprehensive

"Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes."

review of research, Paul Black and Dylan Wiliam[1] found that most schools overemphasize grading, rather than making the goals and stages of learning explicit for students as instruction progresses.

"Feedback to any pupil should be about the particular qualities of his or her work, with advice on what he or she can do to improve, and should avoid comparisons with other pupils," Black and Wiliam explained in a 1998 article in *Phi Delta Kappan*. "Surprisingly, and sadly, many pupils do not have such a picture, and they appear to have become accustomed to receiving classroom teaching as an arbitrary sequence of exercises with no overarching rationale. When pupils do acquire such an overview, they then become more committed and more effective as learners."

As frequent formative assessment helps students become more involved in setting their own learning goals and assessing their progress, they become comfortable analyzing and discussing with teachers and peers how well they understand target knowledge and skills. According to Gerzon, such self-reflection enables students to develop the habits of lifelong learners who keep asking new questions about a topic and layering new information onto what they already know.

"Teachers who used to say, 'I taught it; they didn't learn it,' now say, 'I taught it and here's what I now need to reinforce.' They were really doing a lot to catch every student. Reinstruction does not mean that you say it louder or more slowly. It means teaching something differently to meet the needs of all the learners in your class."

Getting buy-in at state and district levels

From the beginning, the state department of education in New York was an active partner in the formative assessment project, viewing it as a research-based, proven means to improve student achievement. Howard J. Goldsmith, executive coordinator of the department's Office of Curriculum and Instructional Support, worked with Gerzon's team to lay important groundwork for the pilot project, such as adopting a working definition of "formative assessment" and determining how formative assessment theory would be put into practice at the district and classroom levels. "This is a tremendous opportunity for any district...to really invest in its teachers and its students," he says. "We know about other factors that can raise achievement — longer school days, better equipment and books. While all are important, research shows that teacher quality is key."

Developing a common definition of formative assessment — what is essential and what is not — is an important next step as New York seeks to spread the success in Syracuse to other school districts. "There's a lot of misinformation and misunderstanding" about formative assessment, Goldsmith says. "I think it's important to get that single definition statewide." Another valuable lesson from the Syracuse project, according to Goldsmith, is the importance of getting buy-in from people at all levels of the education system and understanding that there are no quick fixes for improving schools.

"Formative assessment is all about good teaching, and helping students learn about themselves and work together in an effective classroom setting. What we do to help teachers help students is what makes the difference."

For more information about the New York Formative Assessment Project, contact Nancy Gerzon at 781.481.1108 or ngerzon@WestEd.org.

1.Black, P., & Wiliam, D. (1998). Assesssment and classroom practice. Assessment in Education: Principles, Policy & Practice, *5, 7 — 74.*

What's New & Useful

Authors: Barbara L. Adams, Melissa Kagle, and Frederick George

Publisher: Detselig Enterprises Ltd., 2007

Pages: 156 / Price: $45.95

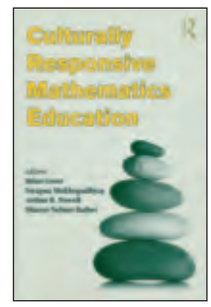
Product #: CLE-08-05RD / ISBN: 978-1-55059-337-2

Star Navigation: Explorations into Angles and Measurement

Designed for 6th graders, this teacher's module emphasizes both conceptual and applied understanding of angles and measurements by engaging students in activities that connect to everyday life. Each activity in this book contains a clear list of goals, materials list, detailed instructions, vocabulary list, illustrations, and black line masters. Teacher notes, math notes, and cultural notes appear throughout.

Culturally Responsive Mathematics Education

At a time of rapid demographic change and amidst the many educational challenges facing the United States, this critical new collection presents mathematics education from a culturally responsive perspective. It tackles the most crucial issues of teaching mathematics to an ethnically diverse school population, including the political dimension of mathematics education within the context of governmental efforts to improve achievement in school mathematics.



Edited by: Sharon Nelson-Barber, Brian Greer, Swapna Mukhopadhyay, and Arthur B. Powell

Publisher: Routledge, 2009

Pages: 400 / Price: $64.95

Product #: CLE-09-01RD

ISBN: 978-0-8058-6264-5

Authors: Aída Walqui and Leo van Lier

Publisher: WestEd, 2010

Pages: 232 / Price: $27.95

Product #: PD-09-01RD / ISBN: 978-0-914409-75-5

Scaffolding the Academic Success of Adolescent English Language Learners: A Pedagogy of Promise

Too often, the needs of English language learners are met with simplified curriculum and lowered expectations. What would happen if instead classrooms were organized to honor the promise of these students by increasing the intellectual challenge of instruction, the support such a challenge requires, and students' engagement with their own learning? This book is the result of a decade-long effort in school districts such as New York City, Austin, and San Diego to implement challenging instruction for classrooms that include English learners, raising the bar, and increasing engagement for all learners.

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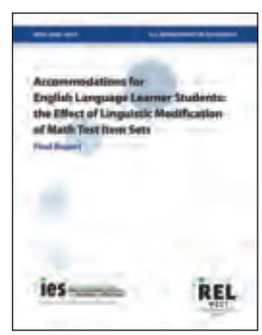

❷

❶ Framework for High-Quality English Language Proficiency Standards and Assessments

Produced by: Assessment and Accountability Comprehensive Center, 2009

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❷ Accommodations for English Language Learner Students: The Effect of Linguistic Modification of Math Test Item Sets

Authors: Edynn Sato, Stanley N. Rabinowitz, Carole Gallagher, and Chun-Wei Huang, 2010

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Assessing Science Learning: Perspectives From Research and Practice

The National Science Foundation-funded research projects described here show the strong link between assessment and improved student learning; the essays invite science teachers to reflect on their practices and priorities and to consider a variety of productive assessment strategies and frameworks. In addressing assessment as a central element of teaching practice, *Assessing Science Learning* explores the various forms assessment can take. Edys Quellmalz, Director of Technology Enhanced Assessments and Learning Systems at WestEd, coauthored a key chapter on technology-based simulations in science assessment.

Edited by: Janet Coffey, Rowena Douglas, and Carole Stearns

Publisher: National Science Teachers Association, 2010

Pages: 350 / Price: $34.95

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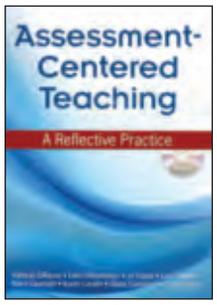

Assessment-Centered Teaching: A Reflective Practice

Because assessment and instruction are two sides of the same coin, it is critical for teachers to not only assess what students understand, but also use that information to adjust their teaching. Assessment-Centered Teaching (ACT) is a unique practice that allows teachers to gather information during instruction to uncover learning gaps and guide students toward deeper understandings of complex ideas.

Authors: Kathryn DiRanna, Jo Topps, Ellen Osmundson, Lynn Barakos, Maryl Gearhart, Karen Cerwin, Diane Carnahan, and Craig Strang

Publisher: Corwin Press, 2008

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