WCER Highlights

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Culturally relevant approaches to teacher assessment

Teacher assessments should recognize the creative ways some teachers push students to higher intellectual levels.

Students of color historically have been underserved by public schooling. Teacher assessments need to do a better job of identifying teacher strengths that can be translated into real classroom practices that meet the needs of urban students of color.

One of the most urgent issues facing this era and the teachers who serve in it is that of being able to more accurately measure what teachers know and are able to do. Much attention has been paid to new, ostensibly more "authentic" forms of teacher assessment. However, communities of color, which historically have raised questions about the potential biases built into traditional test measures, have challenged the purpose and design of many of the new assessment, concerned that they are having an adverse impact on the already shrinking pool of African American teachers.

UW–Madison education professor Gloria Ladson-Billings considers three aspects of these assessments to discern the ways in which taken-for-granted notions of authenticity may reproduce inequity. Those aspects are (a) teaching contexts, (b) use of videotaping, and (c) portfolio assessments.

Teaching contexts. Many of the new teacher assessments presently being used or considered (for example, the National Board for Professional Teaching Standards and the

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From the Director

A mix of stories for back-to-school

JEFF MILLER

A wide range of education research is conducted at WCER. This issue of *Highlights* reflects that diversity, and should be of particular interest to three groups of readers: those working with children in urban school districts, those teaching mathematics and science, and those who work with students with disabilities.

Gloria Ladson-Billings discusses how teacher assessments might better identify teacher strengths that can translate into meeting the needs of urban students of color. Deborah Vandell discusses how high-risk neighborhoods contribute to, or detract from, children's academic achievement.

Richard Lehrer discusses how teacher orchestration of classroom talk can boost student achievement in mathematics classrooms, and Jennifer Cartier and colleagues discuss how science teachers help students learn by developing models of scientific phenomena.

And finally, Cheryl Hanley-Maxwell discusses inclusion of children with disabilities in child care programs.

For more news about research results, check our web site at *www.wcer.wisc.edu*.

Andy Porter

Ladson-Billings

Interstate New Teacher Assessment and Support Consortium [INTASC]) fail to take into consideration the very different contexts in which teachers find themselves. Teachers of color are more likely to find themselves in poor, urban school communities than are White teachers. When these teachers walk into their district's, state's, or professional organization's assessment centers for certification testing, the context in which they carry out their teaching may not be given any weight.

If new assessments continue to discount the inequities already built into schools by virtue of unequal funding and other material resources, they will continue to discount the creative ways some teachers deal with scarcity and push students to higher intellectual heights.

Use of videotaping. Recent examinations of teaching have made extensive use of videotaping to document teaching performances. Schools and districts with resources and personnel equipped to produce high-quality videotapes can make mediocre teaching appear much better than it really is. Conversely, excellent teachers with limited access to good equipment and videographic skills may be left with poor-quality tapes that fail to illuminate any of the magic that transpires in their classrooms.

Portfolio assessment. The use of teaching portfolios has been hailed as one of the best ways to assess teaching performance. On the surface, this seems a fair and equitable way to assess teaching: allow teachers to show what they believe is their best work and/or the products of that work and judge it. But closer examination reveals potential inequities in the training, mentoring, and resources available to teachers required to create teaching portfolios.

A culturally relevant approach to teacher assessment

Education researchers and scholars of color have long suspected that traditional teacher assessment techniques systematically screen out teachers of color from the teaching field. If the proposed new teacher assessment techniques continue in this vein, do alternative assessments need to be formulated? If so, what proficiency or skill areas must these assessments address? Ladson-Billings's previous work suggests that considerations of teachers' abilities to engender academic achievement, cultural competence, and sociopolitical consciousness among their students may be a way to rethink teacher performance. Additionally, assessments that consider aspects of teachers' culture might prove more equitable for teachers of color.

Student academic achievement. The bottom line in teaching is always how much learning takes place. One way to determine teachers' ability to enhance students' academic achievement is to collect baseline data on students' knowledge and skills at the beginning of the school year and compare those findings to end-of-year data. A teacher who moves a low-income student of color from below grade-level to grade-level performance over the course of a year is fostering more academic achievement than a teacher of students who begin the year performing above grade level and simply maintain that same level of achievement.

Cultural competence. Making cultural competence a teacher assessment measure would serve to ensure that teachers support the home and community cultures of students while helping them become proficient in the cultures of schooling and education. Culturally relevant teachers know when to introduce relevant examples from their students' backgrounds and experiences to make learning more meaningful. For example, the African American students in one class indicated that the only females who could be princesses were White, blond, and blue-eyed. The teacher brought out a copy of John Steptoe's (1987) *Mufaro's Beautiful Daughters* for them to read, providing them with counter-knowledge to

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Risk and resilience in urban neighborhoods

How do children's neighborhood environments contribute to, or detract from, their academic achievement?

School-age children become socialized in community mores, play, make friends, and obtain support in their neighborhoods. Historically, neighborhoods functioned as a social center for children and families. Central to the study of neighborhoods is the notion that the individuals and families within a neighborhood setting create a context that influences child development. The resources, role models, and safety of a neighborhood combine to define that context. A critical developmental and social policy issue is to determine what processes contribute to better development among children growing up in low-income neighborhoods.

UW–Madison education professor Deborah Vandell and colleagues Lee Shumow and Jill Posner investigated whether certain neighborhood characteristics pose a risk for the academic performance of children at two points during elementary school—third grade and fifth grade. A second purpose of their study was to identify psychological and social resources that are associated with academic performance within high-risk neighborhoods. The study's main question was whether living in high-risk neighborhoods is associated with problematic academic performance in third and fifth grades once individual familial factors are controlled.

The study extended prior work by incorporating several neighborhood characteristics (income, percentage of single-parent families, median adult education, and violent crime rate) into a composite measure, an approach consistent with cumulative risk analyses of families.

The children participating in the study lived in a variety of urban neighborhoods that included working-class and low-income families. This variation allowed Vandell and colleagues to tell whether school outcomes were systematically associated with neighborhood characteristics in these typical urban settings, controlling for family income, race, parent education, family structure, and child gender.

The researchers suspected that the influence of neighborhood characteristics on children's school adjustment would appear by the fifth grade. One strength of this study is that it was conducted in a city (Milwaukee, Wisconsin), where a school choice plan was operating. Many children did not attend their neighborhood schools, meaning that researchers had little chance of confusing neighborhood characteristics and school characteristics.

Parents model expectations

Vandell and colleagues found that children's academic performance in fifth grade was negatively associated with neighborhood risk even after controlling for demographic markers of familial risk. This relation was not evident in third grade. The finding that the residential neighborhood was a risk factor for these children during fifth but not third grade highlights the possible importance of this childhood period. Taken together with studies of children's home range and neighborhood usage, it appears that this neighborhood influence corresponds to children's increasing exposure to the social fabric of the neighborhood.

Social cognitive theory predicts that children learn by observing models of what they can expect to achieve and how to behave in ways to attain these expectations. Future research will need to address whether, during elementary school, children become more aware of what neighborhood adults have attained, and whether their expectations do mediate the relationships between neighborhood characteristics and school adjustment.

The study also considered factors that may offset neighborhood risk. Both individual and familial factors were found to relate to better academic performance among the children studied. For example, children with better impulse control and better academic self-competence demonstrated better academic performance in fifth grade.

Parents' involvement in schooling (as reported by teachers) was a factor that appeared to help offset the negative impact of neighborhood risk on academic performance and school adjustment. This mirrors findings with adolescents. Parents who visit the school, provide children with enrichment experiences, and supervise homework make important contributions to children's academic performance. There are probably several mechanisms operating here. For one, children have more opportunity to learn when they spend time doing educational activities outside of school. For another, parents are modeling interest and the value of school work when they visit the school and spend time outside of school extending children's learning, which is likely to motivate children toward academic goals.

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Vandell

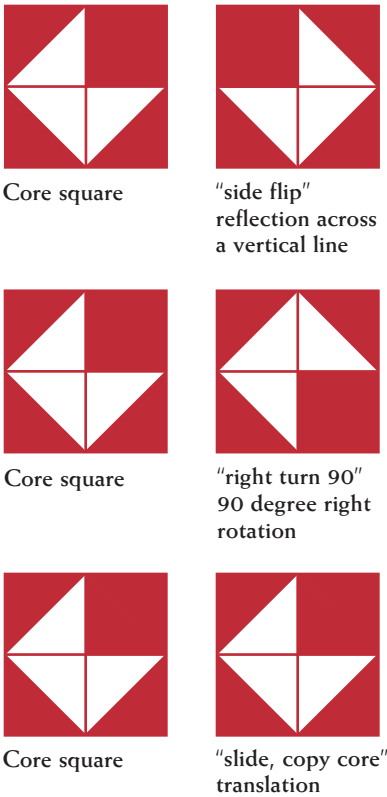
Learning geometry through design

Successful classroom implementation of curriculum is governed by many factors, but one of the most significant is the teacher's knowledge of students' thinking.

UW–Madison education professor Richard Lehrer advocates providing opportunities for ongoing professional development that is attuned to specific benchmarks and indicators of students' reasoning about mathematics and science. Such specificity sets the stage for teachers' construction of models of students' thinking.

Lehrer and colleague Cathy Jacobson conducted case studies of four elementary school teachers as they implemented the unit *Geometry in Design*. This unit was developed by Dan Watt and his associates at Education Development Center to help young children learn transformational geometry and symmetry as they design colorful quilts (see illustration). The teachers were experienced second-grade teachers participating in Cognitively Guided Instruction (CGI), an approach to teaching in which teachers make instructional decisions based on their knowledge of individual children's thinking.

Sample core square and three possible transformations.



At the outset of the study, Lehrer and colleagues detected little difference among the four classrooms with respect to children's arithmetic problem solving. All four teachers elicited students' strategies for solving a wide range of arithmetic word problems and made instructional decisions based on their knowledge of typical trajectories of change in these strategies. However, two of the four teachers (*A* and *B*) had participated not only in CGI, but also in other forms of professional development that emphasized the growth and development of children's thinking about the mathematics of space and geometry. Specifically, *A* and *B* had participated in workshops portraying student reasoning about space and geometry, collaborated in the design of instruction, and helped author accounts of children's "ways of thinking." These forms of professional development set the stage for Jacobson and Lehrer's study contrasting how attunement to different aspects of children's thinking might influence classroom implementation of the same curriculum.

Jacobson and Lehrer observed how the four teachers implemented *Geometry in Design*. Students engaged in designing quilts through hands-on construction of paper quilts, use of computer software, and discussion of a video that depicts quilt designs and computer animation of pattern transformations (see illustration at left). Although the researchers observed very similar sequences of tasks and activities in the four classrooms, there were nonetheless striking differences in classroom conversations about design.

Teachers *A* and *B*, with their knowledge of and experience in listening to student talk about geometry, orchestrated classroom conversations in ways that amplified and refined the mathematical meanings of quilt designs. For example, one of them often invited student conjectures about the mathematical practices and intentions of quilts designed by artists and other quilters. These conversations had the cumulative effect of building a network of relationships among units of design (the fundamental cell or "core square"), transformations, and symmetries. The other two teachers (*C* and *D*) were also avid listeners, but they did not orchestrate classroom conversations in such a way as to draw out relationships among the ideas that children advanced.

At the end of instruction and again a month later, all children responded to measures of their understanding of transformations and compositions of transformations. Students in Classes *A* and *B* not only learned more about transformations than students in Classes *C* and *D* but also retained their knowledge over time.

The nature of discourse

In the two classes (*A* and *B*) in which teachers were more knowledgeable about students' thinking about space and geometry, not only did students learn more than did their counterparts, but this difference in learning was maintained over time. This finding suggests the benefits of teachers' having

knowledge attuned to nuances of student thinking within a mathematical domain.

Jacobson and Lehrer attribute these differing profiles of student achievement partly to teacher orchestration of classroom talk. Although all four teachers elicited students' thinking, Teachers *A* and *B* orchestrated classroom talk in ways that refined, elaborated, and extended students' thinking, albeit in different ways. By posing questions and repeating students' comments that focused, refined, or "lifted out" important ideas, Teacher *A* orchestrated children's talk about what they saw in the quilt video. Teacher *B* posed questions that promoted students' conjectures about causes of observed patterns.

Teacher *C* used some of the same questioning techniques as Teachers *A* and *B*, although she employed them less often and dealt with qualitatively different issues (content instead of function). Her students scored lower on an initial assessment, but demonstrated long-term retention of what they did learn. The students in Class *D* also learned much about transformational geometry, but their knowledge displayed the decay found in most studies of long-term memory. One reason for the decay may be that Teacher *D*'s style of mediating classroom talk did not include either of the revoicing techniques noted in the other classroom.

Students benefit when their teachers have developed clear models of their student thinking. These models must be sufficiently flexible to encompass the ebb and flow of students' reasoning within the dynamic of classroom discourse. Jacobson and Lehrer's findings further underscore that curriculum includes more than tasks and activity; curriculum includes the interaction between the nature of mathematical discourse and the teacher's understanding of student thought.

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Lehrer

Teacher assessment

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challenge their misguided notions about nobility and people of African descent. Unfortunately, nothing in the current teacher assessment battery addresses how well teachers foster cultural competence within their students. Perhaps this is because few test constructors have ever considered the importance of cultural competence for students, nor would they even recognize it when it is being demonstrated by teachers.

Sociopolitical consciousness. Culturally relevant teachers also develop a sociopolitical consciousness in their students. Involvement with real community problems raises students' sociopolitical consciousness and can make academic subjects more meaningful activities for the students. It also makes teaching more challenging, but it can enable a teacher to help students understand that what happened in school had relevance for their everyday lives.

Assessment measures that value and reward culturally relevant teaching have not yet been constructed. The most sophisticated teaching tasks, documentation, and scoring rubrics developed to date have not even begun to capture the complexities of such teaching. There are, however, a few promising practices that may allow for a fundamental rethinking of what it means to assess culturally relevant teaching. These include considerations and demonstrations of situated pedagogies, teaching cases, and reflective practice.

Situated pedagogies. What form must teacher assessment take to consider the situated nature of teaching? This is one question that must be addressed in the development of culturally relevant teacher assessments. The situations in which teachers (and students) find themselves define the pedagogical possibilities. The teacher who exhibits exemplary practices in an affluent suburban community may be a miserable failure in a poor urban community. Even what is thought of as the "same" setting can vary from year to year and class to class.

Teaching cases. Teachers can develop more powerful ways to analyze and improve their practice when they are asked to detail the dilemmas they face in the classroom and to think critically about those dilemmas. As an assessment tool, developing and analyzing teaching cases might serve to unpack some of the nested and complex aspects of teaching.

Reflective practice. A culturally relevant teacher assessment could engage teachers in reflection about the ethical and sociocultural nature of their work. Accordingly, teachers should be able to articulate their dilemmas, successes, and failures to support their professional development in working with students of color.

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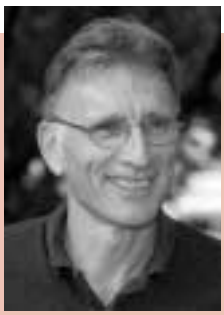
Use of models enhances students' understanding


Cartier


Rudolph


Stewart

Models are a central topic of discussion in contemporary science education. Debates center on the benefits and drawbacks of including a modeling perspective in science curricula and on pragmatic strategies for designing classrooms that enable students to learn about science as a modeling endeavor.

Although the term *model* can be used in several ways, researcher Jennifer Cartier, John Rudolph, and Jim Stewart at WCER's National Center for Improving Student Learning and Achievement in Mathematics and Science (NCISLA) are most interested in models as they are actually used by scientists. The most important goal of scientists is to develop an understanding of how the natural world works. In all scientific disciplines, this understanding is most often accomplished by conceptualizing models of various natural processes. It is this broad goal of science—the conceptualization of process models—that Cartier and colleagues feel is most important to convey to students.

The term *model* is often used to describe physical replicas of objects or systems. Examples of physical models include a 3-dimensional plastic model of a molecule as well as the material globes and light bulb that make up a *model* of the solar system. But Cartier says, "In our view, a scientific model is a set of ideas that describes a natural *process*." For example, high school biology students learn about the meiotic model, which describes the process by which alleles segregate and independently assort during gamete formation. The set of objects in this model includes chromosomes, genes, alleles, mother and daughter cells, and so on. The principal processes are segregation and independent assortment. A similar set of objects and processes forms the basis for the Mendelian model of simple dominance—a model that seeks to explain a particular pattern of trait inheritance.

A scientific model so conceived can be used to explain or predict natural phenomena. In this way, scientific models are both desirable *products* of scientific research and useful as *guides* to future research.

Models can explain and predict natural phenomena. One can use the simple dominance model to explain and predict inheritance phenomena in given organisms. One could explain why a true-breeding tall pea plant crossed with a true-breeding short pea plant always produces tall progeny and also why these tall progeny, when cross-bred with one another, produce tall and short progeny in a 3:1 ratio.

Models are consistently tested on the basis of empirical and conceptual criteria. Scientists assess whether a particular model can explain all of the data at hand and predict the results of future experiments (empirical assessment). They also evaluate how well a model fits with other accepted models and knowledge (conceptual assessment). Models that fail to satisfy some or all of the assessment criteria are discarded or (more commonly) revised until they are deemed acceptable.

Models are useful as guides to future research. Once constructed, models influence and constrain the kinds of questions scientists ask about the natural world and the types of evidence they seek in support of particular arguments. They guide a researcher's perception of what is involved in the natural processes of the world.

Implications for teaching science

Organizing curricula around sets of scientific models provides students with opportunities to learn about the conceptual subject matter of particular disciplines and also about the nature of scientific knowledge—how it is constructed and justified. Providing students with opportunities to work with models promotes their appreciation of the processes by which scientists construct such models in the first place.

In the Modeling for Understanding in Science Education (MUSE) project, high school science teachers, their students at Wisconsin's Monona Grove High School, and science educators from the University of Wisconsin–Madison have collaborated for over a decade to improve teaching, student learning, and student reasoning in a variety of scientific disciplines. The instructional materials found on NCISLA's MUSE web site (*http://www.wcer.wisc.edu/ncisla/muse/*) were developed to provide students with understanding of important models in diverse disciplines and the way in which scientific models are developed, used, revised, and assessed.

The MUSE team has shown that when models are a focus of classroom attention, students learn that such models are tentative constructions used to explain the natural world and that a model's utility depends on the kinds of questions it enables scientists to ask and answer. Moreover, students learn that models must be consistent with other scientific knowledge to be considered acceptable.

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Perspectives on inclusive child care

In a recent study, UW–Madison education professor Cheryl Hanley-Maxwell and graduate student Simone Devore determined how child care providers who include children with special needs in their programs are able to provide daily care. They wanted to know what factors contribute to the inclusion of children with disabilities in center-based and home-based child care programs.

Previous researchers have identified several factors that affect success in inclusive early childhood settings: (a) teacher beliefs, (b) child characteristics, (c) program characteristics, and (d) family-provider relationships. However, most studies investigating early childhood inclusion have been conducted in model schools or university laboratory programs. Few studies have focused on the concerns of child care providers working in community-based inclusive settings.

Hanley-Maxwell asked six child care providers to tell the story of their journey into inclusive child care. To be selected for the study, providers had to care for at least one child with a diagnosed disability. Three of the providers work in their homes and are licensed. Two others work at a center-based facility; the remaining one operates a home-based group center and works with two other adults in the downstairs space of her home.

The providers' stories revealed factors that contributed to their ability to include children with disabilities in their programs: (a) their commitment to making inclusion work, (b) their ability to find a balance between resources and needs, (c) their success in problem solving with parents, and (d) their access to emotional support and technical assistance.

Making inclusion work

When these providers were asked to include a child with special needs, they expressed a willingness to learn and were determined to make inclusion work. The sources of this willingness varied with provider experiences and setting requirements. Experiences that were reported to contribute included having been trained to work with children with disabilities, being aware of the need in the local community, and having grown up with a family member who was disabled. All these providers demonstrated strong commitment to the children and their parents with whom they work and a belief that their inclusion experiences have strengthened this commitment.

For the center-based providers, inclusion efforts are based in a more corporate sense than those of family-based care providers. For the centers, the acceptance of a child generally depended not so much on the individual caretaker's willingness but rather on classroom size guidelines, staff ratios, and the center's philosophy. For the family care providers, by contrast, inclusion was based solely on the provider's philosophy and willingness, and each such provider had to find all the resources to make inclusion work.

Hanley-Maxwell's research supports earlier findings from single-site studies showing that the successful placement of children with disabilities in child care depends primarily on the providers' commitment to inclusion. Her study extends this earlier research by examining providers from six different sites.

Balancing resources and needs. One factor that contributes to the successful placement of children with disabilities in child care is providers' evaluation of whether their resources match children's special needs. All of the providers in Hanley-Maxwell's study recognized the importance of balancing their available resources with the needs of the children they serve. Resources were broadly construed as time, staff, and physical plant. Child needs included age and developmental level, hours of care, and level of special need.

Problem solving with parents. All six providers in this study discussed the importance of developing a mutually supportive relationship with parents. In fact, the success of inclusion was related to how supportive the caregivers and parents were of each other. Further, how well the child's individual needs were met was related to the level of communication between parents and providers.

Gaining access to emotional support and technical assistance. All the providers discussed the need to rely on outside support from professionals such as therapists and special educators. They welcomed Early Intervention educators and therapists at their sites. One family provider stated, "They [the therapists] come to my house sometimes to work with the 2-year-old. They give me suggestions on how to work with the child and also give me written information about the special needs the child has." In fact, some of the providers expressed a desire for more access to services.

Finding other sources of support. Center-based and home-based providers sought support from a variety of other sources, such as other child care providers, respite care providers, and churches. Which sources of support providers

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Scientific models

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Students will come to understand the conceptual nature of scientific models when they are given opportunities to examine multiple models (including some of their own construction) that attempt to explain the same set of phenomena. Students might also develop a greater facility with models after revising such models to account for new data.

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Inclusive child care

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sought depended on the setting. The home-based providers all wished for respite care because their long work hours do not allow them to go out during the day to meetings, appointments, continuing education classes, or even to their own children's school events. The center-based providers, on the other hand, looked to other center staff members as their main source of support. Home providers had to be more creative and reach out for ongoing support.

One of the prerequisites for inclusive child care is that providers believe in and have a personal interest in providing inclusive services. It's important that new providers have opportunities to learn about inclusive practices. Local resources and referral agencies and family child care support groups must organize forums where providers who have experience in inclusive child care practices share their stories.

For more information about this study contact Cheryl Hanley-Maxwell at (608) 263–3415 or *cheryl@education.wisc.edu*. *This article appeared in different form in the journal* Exceptional Children*, Reston, Vol. 66 Issue 2 (Winter 2000).* The journal is published by the Council for Exceptional Children*;* its web site is *www.cec.sped.org*.

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