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Assessment Mirrors the Curriculum

Two years from now, students across Wisconsin will experience something exciting in their classrooms. Their teachers will evaluate their progress in language arts, mathematics, and science, using new assessments that require them to develop arguments, perform analyses, formulate policies, and solve complex problems.

WCER researcher Norman Webb and his team are working with the Wisconsin Department of Public Instruction, with classroom teachers, and with curriculum experts to develop the new Wisconsin performance assessment system for elementary, middle school, and high school grades.

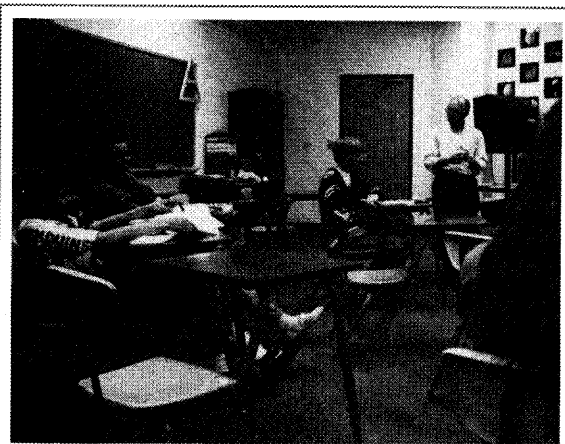
Performance assessment, unlike traditional testing methods, measures how well students apply the knowledge they have. And unlike superficial tests that take time away from normal classroom activities, performance assessment activities align closely with the curriculum.

A year ago, 2,000 students participated in the field testing of the language arts and mathematics instruments for grades 8 and 10. In the past year and a half, more than 75 teachers have helped write assessment instruments, and another 70 have field-tested them and scored student responses.

Students will have a greater opportunity to perform well now because the new assessments are designed to be appropriate for all students in terms of range and depth of activities to be performed, clarity

and level of directions, and range of topical choices.

The teacher-writers serve a variety of students and work in diverse educational settings. They are trained to reliably score student responses to the assessment instruments. The researchers make sure the instruments meet rigorous psychometric criteria, so they will pro-



The new assessments measure how students apply what they know.

vide a valid basis for evaluating student performances.

New directions in math

Traditional mathematics assessments score how well students compute, manipulate symbols, and find the answers to contrived word problems. Unfortunately, these tests don't measure how students actually apply mathematical knowledge, and word problems don't always reflect the way things work in the real world.

Judy Bassett leads a team of teacher-writers who develop instruments designed to reveal how stu-

dents use the mathematics they know. Last year Bassett and the teachers wrote instruments for eighth and tenth graders, and this year they've added instruments for elementary students. A sample tenth-grade level task asks students to predict how much money consumers will spend on radio and TV receivers, records, and musical instruments in the year 2000. Students work with information about spending in prior years and must explain how they arrived at their answers.

Diane Masarik, who teaches at West High School in West Bend, says developing tasks for tenth graders was difficult, because students entering the tenth grade have varying degrees of mathematics preparation. "The teacher-writers can't predict what kind of preparation each student has had," Masarik says, "so we try to keep the content level high, while writing the task so that all students can be engaged in the work at some level."

Unifying language arts

Like traditional mathematics assessments, the old way of evaluating kids' language arts achievement reveals too little. Rather than just measuring vocabulary, spelling, and writing skills, the new assessments measure how well students use all the language arts—writing, reading, speaking, and listening. "You can't test all of what students know, but you can test how they apply some of what they know," says language arts assessment coordina-

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tor Patricia Garber. "These instruments require kids to connect with their prior knowledge, to apply it and extend it." By Autumn 1996, language arts instruments for three grade levels will have been developed with help from more than 300 language arts teachers.

Milwaukee Public Schools curriculum specialist Ron Szymanski coached teacher-writers as they developed the tasks, a new experience for many of them. "In the first year the teachers were struggling, trying to discover a framework for curriculum units," Szymanski says.

"It was a laborious process, trying to decide what the units should look like. Then during the second year, they had an easier time, because they had some context."

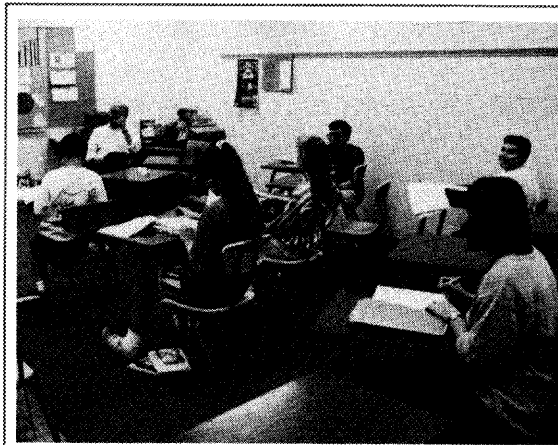
Garber says it's fine to develop new instruments, but they're of limited value unless teachers know how to administer them. The procedures and materials needed to administer each instrument are clearly specified. A training document, which guides field testing, includes model instruments, scoring rubrics, scoring categories, and examples of student writing that illustrate each score category.

Teachers say they like the new language arts instruments because they fit well into the curriculum, involving the students in subjects such as censorship, heroism, or family life. One task, for example, requires students to read passages about family life and to take notes and answer questions. Then they discuss ideas with their classmates in groups. Oral presentations follow, and as they listen to their peers, they answer written questions as guides for comments and feedback.

Exploring science

Science assessment aims to measure students' abilities to do the kinds of

things scientists do in their work. Students must develop explanations and interpretations of natural phenomena, design and conduct scientific inquiries, demonstrate



The assessment instruments reflect the best current classroom practices.

complex science problem solving, and communicate their conclusions in a clear and convincing way.

Tami Malcore, who teaches sixth grade at Lakeview Elementary School, Neenah, wrote some of the science tasks and tried them out in her classroom, watching for her students' responses. "If they couldn't begin, or if they weren't sure about how to answer, that signaled to me that some instructions need to be revised."

Participating in the project has led Malcore not only to appreciate

the work involved in producing assessment instruments but also to modify the way she teaches. She now gives the students more hands-on exercises, and she asks them to explain their approaches to solving problems.

Science assessment coordinator Patricia Freitag says that, after the units are field tested, it's important to also get feedback from teachers not involved in writing them. Their objectivity helps them determine whether the instructions make sense, for example, or where students need better cues about the context of the problem.

"We're trying to make the relevant knowledge, science context, and needed science processes obvious to the field test teachers and students," says Freitag. "We want students to do their best and show how they use science knowledge and processes to solve problems."

Students get involved

The instruments in all content areas reflect the best current classroom practices. They provide opportunities for teachers to reflect on student outcomes and to inform students about their progress. They will provide information to the public and to policymakers, too, about the quality of education in Wisconsin.

Diane Masarik says the field testing has already caused a difference in her students' attitudes. "A few days ago I was collecting papers," Masarik says, "and the students were arguing about the correct answer. They were arguing about whether there was one correct answer."

You don't know what that means unless you're a teacher. I could have hugged them."

For more information, contact Norman Webb at WCER, (608) 263-4287, 1025 W. Johnson St., Madison, WI 53706. ☐

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The Pros and Cons of Peer Crowds

Our high school days were a time of new found freedoms and blossoming talents. As we faced new academic pressures and new social expectations, we found a sense of belonging by socializing with friends. Those friends shaped our attitudes toward authority, toward other kids, and toward school. For better or for worse, the crowd we ran with made powerful impressions on us.

By understanding the social distances that define and separate peer crowds, school staff can help students cope with peer pressures, develop their own identities, and succeed academically, says WCER researcher B. Bradford Brown. The Spencer Foundation funded Brown's recent 16-month study of peer crowds in public high schools. The students tag them with colorful names, including "populars," "preps," "jocks," "loners," "brains," and "nerds," or with ethnic names including "blacks" and "Mexicans."

More than 250 sixth-, eighth-, ninth-, and eleventh-graders talked about their experiences with their peer groups. They painted a portrait of the "social distance" that separates different crowds, confirming our memories that high school crowds differ dramatically in their values and behavior. "Social distance" means that any two peer groups with extremely different values are unlikely to attract or accept the same students as members.

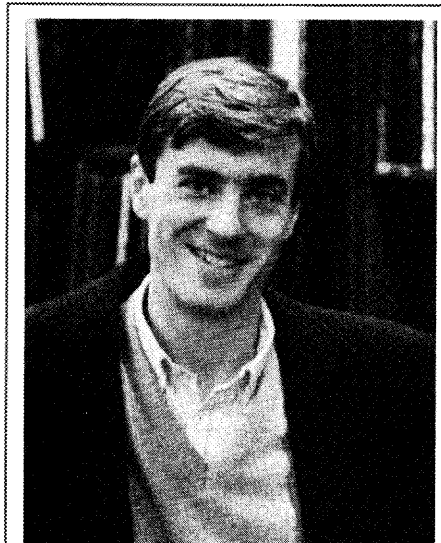
Few if any "nerds," for example, would be accepted by the "popular" students, because a considerable social distance separates the groups. But "brains" and "nerds" tend to remain outside the popular cliques, and a "brain" would likely be accepted by the "nerds," and vice versa.

Crowd membership can benefit students by providing friends and by enhancing academic performance. Some crowds practice behaviors attractive to adults, and these

groups will influence the students' school performance in a positive way. But crowd membership can have costs, too.

Peer group stereotypes

The middle school students surveyed said they would not want to be known as "brains," because students who do well and receive teachers' praise often receive kidding from other students. Many academically capable students are just not willing to risk that. So they clam up or stop trying so hard. Joan Hallingstad, a teacher at Madison's Velma Hamilton Middle School who participated in



Brown says most schools have at least one crowd that's at risk for dropping out.

Brown's study, says that peer groups that scoff at academic values or practice antisocial behavior create serious problems for their members.

While ethnic crowds can celebrate the pride that certain students have in their ethnic heritage, they suffer too often from segregation and racial tensions. But teachers can help unravel such tensions. Brown says the first step is to learn about the peer crowd structure in the schools—what the major crowds are, and how they relate to each other.

The second step is to treat students as individuals, rather than as

crowd members, and to help students discover the limitations of crowds. Because students may have little opportunity outside of class to relate to peers in different crowds, teachers can help students develop a more mature level of self-awareness by fostering cross-crowd acquaintanceships.

One way to accomplish this, Brown suggests, is to consider crowd affiliation in forming small groups to work together on class projects. LaFollette High's Judith Smith says her most successful classes have involved mixed crowd groups. The absence of a strong peer group identity lets students become more their own person.

Including everyone

Most schools have at least one crowd that's at risk for dropping out. That risk, Brown says, can be reduced if the school creates a positive role for members of these crowds. A shop class that rebuilds a dragster, for example, should be praised as highly as a soccer team that wins a conference championship or a debate team that wins citywide honors.

Members of at-risk crowds can also serve as effective peer counselors or peer tutors. At LaFollette, for example, student mediators meet with and advise disputing parties. A fight erupted recently at LaFollette between two students when one accused another of "stealing" her boyfriend. The student mediators asked each student to tell her side of the story, and eventually they reached a compromise. Brown says that the more teachers know about peer group differences and values, the more they'll be able to help kids learn to work together. Teachers in the schools studied are working with Brown's findings, applying them to their teaching. They're helping more students feel that they belong in the school and are likely to succeed.

For more information, contact Brown at WCER, 1025 W. Johnson St., Madison, WI 53706. ☐

Collaboratives Support Youth

One million teens drop out of high school every year. Most face bleak lives with few prospects for mobility and with dead-end jobs. Many become parents before they're ready to face such responsibility. Their academic careers are cut short by crushing poverty, drug abuse, crime, and violence in the home and neighborhoods. Many never feel a sense of belonging in school.

Schools alone cannot solve these fundamental problems, but by working collaboratively with community agencies that serve youth, they are beginning to make differences.

In an effort to encourage such collaborative efforts, the Annie E. Casey Foundation committed \$45 million in 1989 to a five-year project known as The New Futures Initiative. Dayton, OH, Bridgeport, CT, Little Rock, AR, Pittsburgh, PA, and Savannah, GA, each received from \$5 million to \$12.5 million to help at-risk youth stay in school, discourage teen pregnancy, and create more youth employment.

The matter is considered urgent because of frightening trends. The Casey Foundation reports that, of children whose parents did not finish high school, did not marry, and had children before reaching age 20, 80 percent live in poverty. By contrast, of children whose parents do finish high school, do marry, and wait until after age 20 to have children, only eight percent live in poverty.

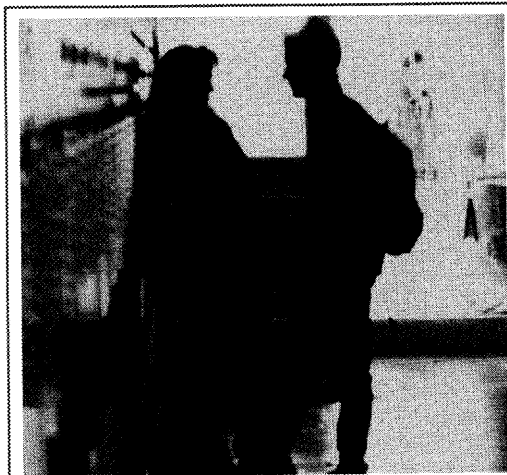
The above-named cities formed collaboratives as an umbrella under which the major local youth-serving agencies nestle. Social service programs, businesses, and schools came together for the first time to identify community problems, gather data, and lay out long-term policies directed at improving conditions for youth.

A good first step

Months of planning and years of effort led to some improvements,

says WCER researcher Gary Wehlage, who led a team that is evaluating the New Futures Initiative. Wehlage is completing a book that documents the development of the collaboratives.

School restructuring and curriculum innovations are beginning to emerge. For example, schools in Savannah, Little Rock, and Dayton have developed a number of programs and innovations. Clustering students around four core subject



Wehlage says that initiating effective programs for at-risk youth requires not only money but also political savvy.

teachers has created a more personalized school environment. Self-paced, individualized instructional programs have allowed previously retained students to catch up with their cohorts.

But Wehlage says that, despite some promising beginnings, much of the Foundation's goal of five years ago has not been met. Achieving meaningful improvements for at-risk youth is more difficult than was originally thought. Deep-seated social issues, including poverty and the decay of neighborhoods, are interfering with kids' schooling.

Strange bedfellows

Initiating effective programs requires not only money but political savvy and diplomacy, says

Wehlage. Organizations that were not comfortable talking together had to learn to cooperate. Right-of-center church leaders had to sit at the same table with Planned Parenthood workers, for example. And Wehlage says each collaborative found it difficult to involve ordinary working people from neighborhoods on its board of directors, because they had no prior board experience and felt qualms. Because of limited grass roots participation, some of the programs the collaboratives developed did not match the community's needs, and they succeeded only partially, Wehlage says.

Challenges remain

The collaboratives have helped some students, but they have not managed to achieve fundamental improvement for all, Wehlage says. Schools should implement decentralizing efforts, such as site-based management and shared decision making that involve teachers and principals. Wehlage considers these steps important in making meaningful change; the Foundation called for long-term structural reforms to reduce the dropout rate and to improve academic achievement.

Wehlage says three lessons learned stand as guideposts for others wishing to establish successful collaborative service organizations.

1. Helping youth requires organizations with legitimate political leadership and governance.

2. To build consensus and to establish legitimacy for their policy initiatives, collaboratives need broad support and participation from all segments of the community.

3. A strategy of institutional change, including school restructuring, is important, but collaboratives need to more directly address the underlying social and economic causes of youth problems.

For more information, contact Wehlage at WCER, (608) 263-4769, 1025 W. Johnson St., Madison, WI 53706. ☐

Learning to Teach Science

A high school student stares at an electrolysis apparatus as gas collects in two vertical tubes. She wonders why one tube has twice as much gas as the other, although they look identical.

This student is doing more than just absorbing facts. She is creating new concepts for herself. In the process, she compares new ideas with her preconceptions. When she becomes dissatisfied with her old way of thinking, the new concept becomes plausible and useful.

With funding from the National Science Foundation, WCER researchers Peter Hewson, B. Robert Tabachnick, and Kenneth Zeichner are teaching prospective science teachers how to help their students go through the process of challenging one idea with another.

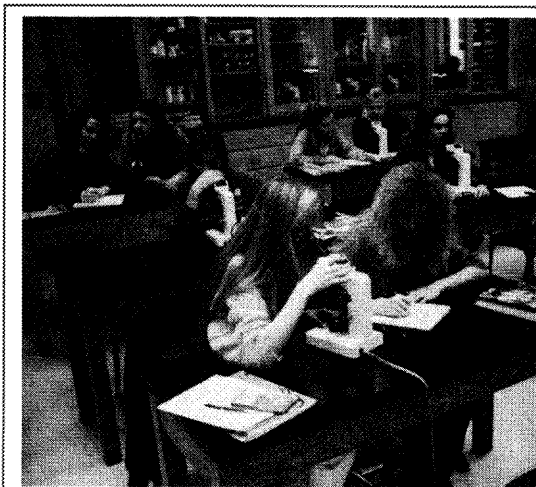
Conceptual change models

Learning involves changing one's conceptions in addition to adding new knowledge to what's already there, says Hewson. Learning involves an interaction between new and existing conceptions, and the outcome depends on the nature of the interaction. Students who believe that the moon's phases result from the earth's shadow, for example, need better models of the Sun-Earth-Moon system to help them think about what they see. The new information has to be seen as directly challenging old beliefs. Then they can change their conceptions accordingly.

In the conceptual change model, teachers use a range of diagnostic techniques to discover what their students' existing conceptions are, and why they hold them. Teachers then use this information to help students find new conceptions intelligible, plausible, and fruitful, says Hewson.

Highlights interviewed some recent graduates of the science education project who are now in their first year of teaching. Carolyn Dunkel teaches at McNair Middle School in Winnebago, IL. "If my kids hold misconceptions, my goal

is to help them to see for themselves why their concepts are wrong and to show them how to find the better answers," she says. Learning to test one concept against another is "something the kids have to internalize and see for themselves," says first-year teacher Kathryn Kozich, of Streamwood (IL) High School. "I could stand in front of the class and say whatever I want, but they won't believe it un-



Science teachers are learning how to help their students challenge one idea with another.

til they see it for themselves."

Don Jones, who teaches at Austin (MN) High School, says the conceptual change model has helped him shift his teaching emphasis. He spends less time teaching isolated facts now; he's more concerned that his students understand what science theories are and how they evolve.

Researching their teaching

Prospective science teachers participating in the project also learn how to critique their own teaching. Each cohort of teachers meets with Hewson, Tabachnick, and Zeichner to discuss and analyze the problems they encounter during student teaching.

The action research component of the program helps them develop habits of mind they will use later on, says Zeichner. "They learn to raise questions about their teaching, and they'll continue to analyze their strategies. Self-critique is an

organic part of the teaching process.

Kathryn Kozich recalls how her cohort met monthly to share their teaching experiences. "We discussed problems we were having in the classroom and shared our strategies. My group helped me learn to define a teaching problem and make plans to solve it." She says she appreciated the small size of her cohort—a dozen students. It was a close class, she says, and there was lots of discussion. "We were open, and we helped each other become better professionals."

Jones says he learned to make his science classroom instruction more concrete. "We used models in the methods course, and I could see how much easier they made it for me to grasp abstract principles."

Science is problem-solving

High school students studying with the graduates of the Hewson, Tabachnick, and Zeichner program learn science differently from the way their parents learned it. Carolyn Dunkel recalls that her high school science teacher required her to memorize a lot of facts. She, by contrast, guides her students at a more conceptual level, presenting science not only as content to be mastered, but also as a process of solving problems.

The ideas underlying the conceptual change approach extend far beyond the classroom, and beyond the discipline of science itself, Tabachnick says. They address equity issues as well. "Learning how to contest ideas, how to develop persuasive evidence for the efficacy of one explanation over another, is every child's right in a democracy," Tabachnick says. "Reserving such opportunities for only some students violates moral tenets of democratic commitment."

For more information, contact Hewson at WCER, (608) 263-9250, 1025 W. Johnson St., Madison, WI 53706. ☐

Literacy Survey Shows Gaps

The average person living in the information age needs higher-than-ever literacy skills. We must not only be able to read well, but also to *apply* information. Every day we're confronted with information in the form of instructions, contracts, periodicals, maps, financial documents, and application forms. We must continually use information to master new tasks and function in different tasks.

But a large number of people find it difficult if not impossible to do these things, because they lack crucial literacy skills. And one's race, gender, and family environment are predictive factors. This conclusion comes from the just-completed four-year National Adult Literacy Survey (NALS). WCER researcher Carl Kaestle served on the advisory board of the Congressionally mandated survey of 15,000 households across the U.S., which measured adults' ability to read and understand a variety of written materials and perform basic arithmetic operations.

Kaestle is Vilas Professor of educational policy studies and history at the UW – Madison. He says a chasm separates the requirements of a functioning literacy in the real world and of those of school language arts programs.

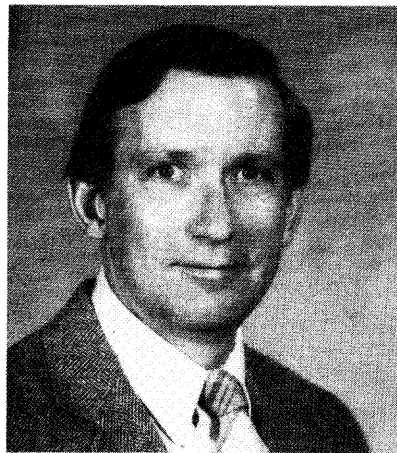
The gap results not from bad teaching, or from a great decline in literacy skills, as popular myth and back-to-basics proponents claim. Rather, Kaestle says, it's because the demands of a changing economy and a more complex information-laden society have outpaced the expectations built into our educational system.

Factors affecting literacy

Whether or not one has high literacy skills can be predicted not only from the number of years spent in school, the study shows. Literacy can also be predicted from a number of factors, including age, gender, race, and family income. Another important factor is the par-

ents' literacy level. Someone with well-educated parents will likely score higher on literacy scales.

As they mature, adults continue to improve literacy proficiency,



Kaestle says a chasm separates the requirements of a functioning literacy in the real world and those of school language arts programs.

even at a given level of education, until sometime in their 40s. They also tend to acquire more formal schooling, which correlates with the higher literacy proficiencies.

The survey identifies a gender-based gap in quantitative literacy that grows wider in older cohorts. Kaestle says the gap suggests that schools and the workplace may have, in the past, given females less encouragement, opportunity, training, and responsibility in tasks that require quantitative literacy.

A racial gap

A major literacy gap occurs along racial lines. White adults scored 50 points higher on prose proficiency on the NALS survey than did Black adults (287 vs. 237). In turn, Black adults scored 21 points higher than Hispanic respondents (237 vs. 216). While differences in educational attainment account for some of these differences, Kaestle says, the gap between Black and White adults remains substantial, even when controlling for education. "This suggests that problems of racial and ethnic disparities aren't limited to schooling," Kaestle

says. "It would seem that efforts to improve the literacy abilities of minorities face uphill challenges in terms of quantity and the effectiveness of education."

The study shows that non-Whites, including Native Americans and Hispanics, tend to receive less education than Whites. But even with identical years of schooling, literacy rates aren't equitable. That's because White schools tend to be better than non-White schools, and because other factors, including discrimination, militate against equitable literacy training.

Kaestle advocates the value of adult literacy programs. They can give adults a second chance and can help parents with inadequate literacy skills who want to help their children read better. Despite some interest and investment by the Federal government, most adult literacy programs are funded by local and state governments. Because these budgets are stretched thin, Kaestle believes that most funding for literacy programs will be flat for the foreseeable future.

More critical thinking skills

Short of more funding for adult literacy training, changes in the K-12 curriculum might play a role in improving literacy. "I'd like to see kids being geared sooner and better toward critical reading," Kaestle says. "The language arts curriculum should have kids reading and thinking about more different kinds of prose. They should also be learning more critical thinking skills."

But schools can only do so much, he acknowledges. "Schools alone cannot do much about the problem of pathological environments with high unemployment, violence, and racial prejudice," Kaestle says. "Nonetheless, the NALS survey is useful in moving toward a theory of the skills underlying effective literacy."

For more information about the NALS survey, contact Kaestle at WCER, (608) 263-3452, 1025 W. Johnson St., Madison, WI 53706. ☐

Teachers Pilot Math Units

Imagine a mathematics curriculum that students enjoy because it relates to real life. Each exercise places the students in a believable and potentially interesting situation. The kids get to work together in groups as they try many different strategies to solve problems.

Students in classrooms in some Wisconsin communities are fortunate, because their teachers are pilot testing just such a curriculum. The National Science Foundation funds the project "Mathematics in Context: A Connected Curriculum for Grades 5-8," directed by Thomas Romberg.

Project coordinators are proud of how this curriculum improves on traditional mathematics teaching. "We're helping teachers understand what their students really know about mathematics," says field test coordinator Jim Middleton. "Teachers are learning to match their students' classroom experiences with where students are cognitively."

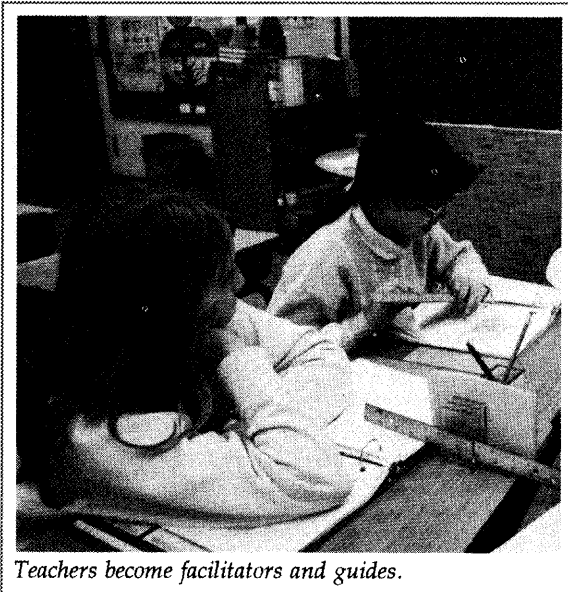
Staff development coordinator Meg Meyer says the new curriculum invites students to participate in the discovery of mathematical processes. "The teacher guides their construction of mathematical knowledge and encourages collaboration and conversation," she says.

Polly Goepfert, who teaches at Stoughton Middle School, has been helping test the curriculum units for three years. She says the new curriculum emphasizes problem-solving strategies, and it helps her students determine whether a given answer seems reasonable. They're learning to step back and consider whether their answers are in the ballpark," she says.

Without teacher participation, the project would never succeed, says Middleton. "They're helping us test and develop this curriculum because they feel dissatisfied with the traditional curriculum. They want to create a more dynamic,

learner-centered classroom."

Meyer agrees. "For so long the middle school curriculum has been a wasteland. Teachers have known



Teachers become facilitators and guides.

that it doesn't work, but they have not had the time, resources, or energy to find something better. Now they're just ready to go."

Polly Goepfert says she likes Mathematics in Context materials because they "give meaning to math" and because they move the center of knowledge from the teacher to the students. Teachers learn a new role as they become facilitators and guides. They invite the students to experiment with a variety of approaches and to learn at their own pace. Teaching strategies include more questioning and more discussion of problems.

Adapting to change

Steve Sprague, who teaches sixth grade at Madison's Jefferson Middle School, says he has outgrown the idea that the teacher must have all the right answers. "Sometimes a kid will reach a correct solution in a way I hadn't considered. That's not comforting if you don't like surprises. But I enjoy it." Teaching the new units requires more preparation time than

did standard textbook exercises, he admits. "You have to think about it all the time. And I need to work through the units with other adults first. Until I did, I didn't understand what the kids were going through."

The teachers are enthusiastic and their students generally enjoy the new challenge. Some parents express concern, however, because they don't know how to help their children with homework. "Mathematics in Context" is not the way they learned mathematics. Teachers piloting the units are meeting with parents to discuss the new curriculum.

Testing and revision

Mathematics in Context staff ask for detailed feedback from the teachers who try out the curriculum units in their classrooms. They want to

know about any problems teachers have had with the units, about any solutions and innovations they have developed, and any examples of related activities they have designed on their own.

Teachers return the units to the development team with comments and suggestions, sometimes written on the units themselves. They provide in-person suggestions at project-sponsored inservice meetings, always scenes of spirited discussion.

As the units are revised, project staff fill any gaps in the curriculum, making its four strands (number, algebra, geometry, and statistics) connect with, and build on, each other. Teachers' guides and support material accompany the units.

A better assessment

Assessing students' progress will be as interesting and realistic as the units themselves. Imagine a music school that never required students to perform a complete piece of music, but instead re-

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stricted them to playing mere scales. Traditional mathematics tests are like that, says Middleton. Kids parrot what they've heard the teacher say. They apply algorithms and repeat routines, but don't learn to do mathematics with understanding. Assessing the rote kind of learning has been easy for teachers; they add up the number of correct answers and assign a numeric score.

More personalized attention

The new assessment instruments developed for this curriculum allow kids to show more of what they know; they move be-

yond scales to symphonies. Describing the new assessment, Steve Sprague says the students do a lot of writing. They record the processes they go through to achieve their answers. More work for the teacher? Yes, but Sprague says it allows him to give each student a more personalized evaluation, and he says he now thinks more about the kids' solution processes.

"For the first time, the assessments we do really tell us something about the way the kid thinks," he says. What students think, what they say, and what they write down can be three very different things. Teachers need to

know what students really mean when they write down their answers.

The project will continue to involve teachers as collaborators. "To make this curriculum work," says Meyer, "we focus on staff support. These materials are different enough that you can't just hand them to teachers and expect them to implement them using traditional methods. So we make ourselves available; we're only a phone call away."

For more information, write to Mathematics in Context, WCER, (608) 263-3406, 1025 W. Johnson St., Madison, WI 53706. ☐

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