

Exemplars of Education Research



COLLEGE OF
EDUCATION



“Curiosity is one of the most permanent and certain characteristics of a vigorous intellect.”

—Samuel Johnson (1709–1784), *British author and lexicographer*

EDUCATIONAL RESEARCH IS NOT AN EXPENDABLE ENTERPRISE. RATHER, IT IS THE KEY ACTIVITY THAT MUST GUIDE AND EVALUATE POLICY, PRACTICE AND PROFESSIONAL PREPARATION. WITHOUT AN ADEQUATE RESEARCH FOUNDATION, SCHOOLS AND POLICY MAKERS OFTEN IMPLEMENT OR CONTINUE POLICIES OR PROGRAMS THAT ARE INEFFECTIVE FOR SOME OR ALL STUDENTS. THE RESULTING FAILURES WASTE TAXPAYERS' MONEY, COMPROMISE STUDENTS' FUTURES, AND LIMIT THE FUTURE ECONOMIC COMPETITIVENESS OF THE WORKFORCE. CRITICAL RESEARCH TO PREVENT SUCH FAILURES IS UNDER WAY AT THE UNIVERSITY OF MARYLAND'S COLLEGE OF EDUCATION.

Within the pages of this publication, *Exemplars of Education Research*, are stories that describe a dynamic and thriving research enterprise of the University of Maryland College of Education. These adjectives—thriving, dynamic—are not mere boastings of an enthusiastic college dean. Rather, they are my observations of the core excellence of the College of Education's successful



research enterprise. Of course, as a researcher, I look to a variety of indicators to test hypotheses generated by my observations. And various indicators demonstrate our excellence and success in the research enterprise. Support through sponsored research funding continues to grow; College of Education faculty are recognized for their research with prestigious national and international awards; and faculty hold key positions as editors of top academic journals.

Our growing expertise and reputation has required us to expand our partnerships with school districts, agencies and organizations that are eager to apply our findings in real-world settings. The goal of this publication is to describe the variety of projects under way at the College of Education and the impact our activities have on a wide array of pressing educational and societal concerns, for example, the minority achievement gap; literacy; social and emotional well-being of children; education reforms in Uganda; validity of test assessment; and international civics education. The stories contained here are examples of the much wider array of current research at the College of Education.

I have long believed that the role of research is to enable us to better understand and improve the world around us. We strive to advance theory and improve practice. We are able to do so because of our nationally and internationally known faculty who meld intellectual curiosity with a desire to make a difference. Samuel Johnson's observation speaks to the value of research, and the work of our faculty applies this research to improve educational practice. I am proud of our faculty and pleased to share their stories with you in *Exemplars of Education Research*.

Edna Mora Szymanski, Dean
University of Maryland, College of Education

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What do we want from education?

Students want to be engaged while in school and equipped to succeed in the “real world” after graduation. Teachers want to help students learn and succeed. Parents want the best and the latest for their children. Administrators want tangible results in the classroom and outstanding test scores. And federal and state governments want educated citizens and workers.

Through rigorous educational studies that work in real classrooms, researchers at the University of Maryland College of Education address these demands. The needs and wants of students, teachers, parents, administrators, and government are a mandate to continue the work we have always done and an affirmation of our research models.

Funding sources, among them the National Science Foundation, the U.S. Department of Education, the National Institutes of Health and The Spencer Foundation, concur with that assessment. The College of Education garnered nearly \$18 million in total awards in sponsored research funds for the fiscal year ending in June 2002.

Our research encompasses nearly every aspect of education. We study how policies foster or stymie equity, ways to accurately assess students and evaluate teacher quality, techniques that inspire the most difficult and troubled students, issues of literacy, achievement in minority and urban education, and the social and emotional stumbling blocks to success in school and adult life.

Results of this scholarship apply to many settings among many different kinds of students. Long-term projects offer longitudinal data useful over a broad landscape. Newly undertaken work promises tangible solutions to persistent problems. No matter what the research, the broad goals are the same: to be a dynamic part of the education conversation and education solutions.

In the following pages we discuss several critical issues in education that are informed by College of Education faculty research.







Improving Minority Education Is a Shared Imperative

Minority students face significant hurdles in education that contribute to lagging levels of academic achievement. But the seemingly insoluble nexus of lower achievement, behavioral and learning problems, hopelessness, apathy and preparing teachers who can meet those challenges day after day are subjects of intense research at the College of Education.

Two important initiatives speak to the college's commitment to narrowing the achievement gap. The Maryland Institute for Minority Achievement and Urban Education was founded in March 2001 to link faculty and resources of the College of Education to state and local educational needs.

"This effort will foster a unified, research-based approach to working with individual school districts to address the problem as it exists in their schools," says Martin L. Johnson, associate dean for urban and minority education and director of the institute. "By working with local administrators and teachers, we can target their problems and help devise the systemic reforms to make a significant impact on closing the minority achievement gap."

The institute is playing a major role in the design, approval and implementation of a new graduate program in minority and urban education. "We hope this program will attract students nationally and internationally who have aspirations to teach in urban schools or conduct research in urban and minority education," Johnson says.

Marvin Lynn, program director and assistant professor in the Department of Curriculum and Instruction, says, "We want to nurture scholars who have a deep commitment to utilizing their scholarship and their skills to help solve the multifaceted and complex problems encountered by minority students in urban schools. We want to prepare change agents in universities in or near urban centers, as staff developers or as school personnel in urban school districts."

Faculty engaged in a variety of projects that directly address minority achievement are found throughout this booklet. In this section, they include Patricia Campbell, Courtland Lee, Marvin Lynn, Sylvia Rosenfield, Peter Leone and Saundra Nettles. Their work to improve educational opportunities for minority and urban students at home and across America underscores the college's belief that improving achievement is an urgent educational mandate. The institute hosted its first national conference in June 2002, titled "Achievement—A Shared Imperative." The goal was to bring together those with a stake in improving minority achievement and urban schools. Scholars, corporate executives, school district administrators, and elected officials presented workshops on the critical issues affecting minority achievement while sharing success stories from school districts demonstrating tangible results.

Teaching for Understanding

For the past six years, Associate Professor Patricia Campbell, Department of Curriculum and Instruction, has worked with the state's largest urban school district, Baltimore City Public Schools System, to design, implement and evaluate a model for reform in elementary mathematics for K through 5. "The issue of differential math achievement in predominantly minority and/or poor schools is well documented," Campbell says. "The real focus of this project has been on professional development for the teachers. Unless you change the way teachers teach, you're not going to improve student achievement."

Campbell and her research team have addressed each step of the curriculum-instruction-assessment-policy continuum to keep the intended curriculum in math well defined and delivered in a revised instruction model. The operating theory was that by keeping these integral parts of the educational process in alignment, student achievement would increase.

That is exactly what happened in Baltimore, Campbell reports. Students in the 107 elementary schools where the program was in place took the Comprehensive Test of Basic Skills in 2001. The results showed gains of 17 to 24 percentile points over the 1998 scores across grades one through five. Similar improvements were also apparent in student scores from the recent Maryland Schools Performance Assessment Program.

Campbell is carrying out a more elaborate analysis focused on connections between increased student achievement and teachers' degree of involvement in professional development. "We think that professional development works to help achievement," says Campbell. "And we've shown that reform in large urban minority centers is possible. But we need to emphasize that such reform requires time, money, effort and commitment from teachers, students and administrations. It must be coordinated centrally but carried out locally." It is hoped the model established in Baltimore will be successful in other Maryland school districts.

The project was honored in 2001 with the Urban Impact Award from the Council of Great City Schools.

What Makes A Difference for Male Students?

In addition to challenges in the classroom, today's urban students—particularly African-American males—face formidable barriers to their educational development, including serious stifling of achievement, aspiration and pride in school systems throughout the country. According to a variety of sources—

- African-American males consistently lag behind their African-American female and white male peers in both school completion and employment rates.
- Nationally, one fifth of all African-American males drop out of high school. These young men are also more likely to be wrongly placed in classes for slow learners than their white male counterparts.
- African-American males tend to experience significant alienation from the educational process, often as early as the third grade. Many leave school before the seventh grade.

Professor Courtland Lee, Department of Counseling and Personnel Services, has achieved international prominence with his pioneering work on empowering African-American male youth. Lee says it is apparent that despite the success of some African-American males, many others become frustrated, lose hope and ultimately drop out or are pushed out of school. Consequences of those actions are significant limitations on socioeconomic mobility, ultimately leading to high rates of unemployment, crime and incarceration for scores of young African-American men.

Lee has developed two empowerment programs to promote educational achievement and social success among elementary and secondary school-aged African-American males. These models have been featured in two best-selling books Lee has written. School systems and community agencies around the country have adopted Lee's work and he has been invited to share his empowerment concepts with educators in the Netherlands and South Africa.

"The focus of my work has been to find ways to involve educators, parents and male role models from African-American communities in promoting an understanding and appreciation of the black man in history and culture, developing achievement motivation, fostering positive and responsible behavior, and modeling positive black male images in comprehensive group counseling programs for young males in grades 3 through 12," says Lee. "I am looking forward to using these programs to conduct research on changes in academic performance and social behavior among African-American male students in urban school systems throughout Maryland."

The Value of Self-Worth

Self-worth can be associated with one's willingness to make meaningful change in one's life and society. How teachers help students develop that willingness is the subject of research by Assistant Professor Marvin Lynn. Lynn is exploring emancipatory teaching practices of African-American teachers in Prince George's County and Baltimore City. The phrase "emancipatory teaching practices" can be thought of as having two parts. "On the one hand it means the way in which teachers teach so that students become more conscious of social inequities. But by doing so, they also encourage students to see themselves as change agents



with the ability to affect and effect change in society.” Lynn will examine this issue in all levels of education—elementary, middle and high schools.

“Becoming an agent for change and helping others to become change agents is a major thrust of my work,” says Lynn, who has helped structure the college’s new master’s and doctoral programs in urban and minority education. “I also want to understand teaching practices that are effective with African-American young people, males in particular,” he says.

Minorities in Special Education

Teachers are called upon to educate students of many different abilities within a class while maintaining discipline. Sometimes they opt to send students who are difficult to teach or manage to a different classroom environment, that is, special education. Department of Counseling and Personnel Services Professor Sylvia Rosenfield has found confirmation for research that suggests minority students, particularly minority males, are referred to special education out of proportion to their numbers in general education.

As part of her research, Rosenfield helps school systems develop instructional consultation teams, I-C Teams, to support classroom teachers who work with students experiencing problems of learning or behavior in the classroom. Through interviews, surveys and documentation of student outcomes, Rosenfield collects data on how well team members are trained, how well the teams work in schools, what changes occur in teacher behavior as a result of the team’s support, and how the team support affects student outcomes. “Our project has demonstrated reduced referrals to special education in general and minority referrals specifically,” Rosenfield says.

In discerning what helps students move academically and improve their behavior, Rosenfield has found that collaborative problem solving and classroom-based assessment help teachers learn to think and act in ways that facilitate student progress. Particularly satisfying, she says, is that “students make progress or achieve goals in more than 80 percent of the cases and teachers report learning new skills that benefit all their students.”

This fall, one I-C Team project will involve a consortium of school districts on Maryland’s Eastern Shore. Their work is part of an initiative to decrease minority overrepresentation in special education.

Troubling Trends in Juvenile Corrections

Rosenfield’s work, like Campbell’s, moves the debate away from a focus on student disability to one emphasizing improvement of teacher and staff quality. Quality education is also the focus of Professor Peter Leone’s research, but his investigations take place in another disproportionately minority male setting: juvenile correction centers. Although African-American juveniles make up only one third of the population, they represent two-thirds of the population of juvenile detention centers. What happens to those students educationally while imprisoned can send them on a path of achievement, put them right back where they started—or worse, observes Leone, a professor in the Department of Special Education.

Leone investigates the adequacy of education programs for youth with disabilities in correctional settings through site visits, review of the professional literature and the monitoring of class action litigation. His research is funded by the U.S. Department of Education’s Office of Special Programs and the U.S. Department of Justice’s Office of Juvenile Justice and Delinquency Prevention.

“We have found that education programs in juvenile corrections are shaped and maintained by the agency’s culture. If that culture places a high value on ensuring that their clients do not recidivate, the programs tend to be of higher quality.”

Leone observes that well-developed education programs that target students most vulnerable to involvement with juvenile delinquency can improve the odds significantly for some children. His research also raises a number of questions about the benefits of prevention and early intervention for children with incipient behavioral problems.

We All Are Teachers

All learning experiences don’t take place in school. But many urban students live within the confines of a few blocks, never visiting a museum, an amusement park or a beach. For these students, informal learning experiences such as after-school programs, summer camps and other enrichment activities play a vital role. Associate Professor Sandra Nettles, Department of Human Development, says that such experiences are especially critical to achievement of minority students as they often provide enrichment in the absence of school and parental resources.

Nettles is completing a multi-year examination of five different informal learning settings to develop a theory of how teaching and learning take place in them. She has found that informal educators untrained in pedagogy have a small set of teaching techniques and also experience difficulty managing large groups of students. But they also provide the skilled guidance that can make “hands-on” experiences successful. Nettles has found that programs in informal settings that feature narrative formats, such as storytelling and drama, contribute to students’ sense of self-worth and resilience in the face of challenges. In a study looking at data from a large national sample of high school students, Nettles and colleagues found that what students did outside of school had an impact on their academic experiences in school.

Before they enter school, students learn in other informal settings—at home and in their neighborhoods. Nettles and researchers from the Johns Hopkins University and the University of Texas are studying how neighborhood and family influence children’s adjustment to elementary school, with Baltimore as a base. “Given the importance of all informal settings to minority learning, we want to understand how they contribute to students’ interest in and excitement about learning, as well as how these settings influence what is learned. But we also want to improve the communication between formal and informal settings,” she says. ■





On the Frontier of Literacy

Researchers at the College of Education have discovered that reading predicts success in writing, social studies, science and—strongly—math. “Reading increases in importance as children go through school,” says Professor John Guthrie, director of Maryland’s Literacy Research Center, MLRC, “because the requirements for student independence increase.” Guthrie and 18 other faculty, including Peter Afflerbach, Patricia Alexander, Marilyn Chambliss, Steve Graham, Karen Harris and Allan Wigfield, founded the MLRC in 2000 to conduct cross-disciplinary research on literacy.

Focusing on Reading Comprehension

Guthrie, the former codirector of the National Reading Research Center, and faculty member in the Department of Human Development, says, “In my view, the research problem with reading in kindergarten through grade 2 has been solved well enough for immediate policy action. It is being addressed by the government’s massive \$900 million Reading First program.” He continues, “The frontier in reading is comprehension. In grade 3, students have to start learning content from books. That’s where comprehension comes in. Skill at recognizing words does not ensure comprehension.” Professor Patricia Alexander, Department of Human Development, agrees. “Decoding is a critical step, but it doesn’t ensure subsequent success. Children who can read in early elementary school may not necessarily understand what they read in middle school.”

Professor Mariam Jean Dreher of the Department of Curriculum and Instruction targets the comprehension shortfall at what she sees as its origin in the early grades. Dreher suspects that children may have difficulty comprehending information books because they have little practice reading them. “Teachers usually read children stories. Most direct reading instruction involves stories, and most of the books the children are given to read are fiction,” says Dreher. “Even the nonfiction children get tends to be biographies or books that convey information in story form.”

In one study, Dreher observed that fifth graders were so unfamiliar with information books that they found it difficult to look up the answers to simple factual questions. Simply jogging their memories by asking them if a table of contents or index might be useful seemed to help. This told Dreher that the students had learned about these basic reading tools, but hadn't internalized what they learned. "The instruction they had wasn't very effective. The kids didn't think about it when they got to the library," Dreher says.

Dreher and her colleagues think children's comprehension will increase once they get direct instruction in reading information books as well as more opportunity to read them. With a \$445,000 grant from The Spencer Foundation, they have launched a three-year study in which they are following students from third through fifth grade. While some teachers think children will read information books easily if they are available, Dreher's research indicates that they benefit from direct instruction.

Although many educators think that children in early elementary school can't handle information books, Dreher reports, "We're finding that young children can read these books and that they like them." In fact, Dreher thinks that introducing information books in the early grades may help maintain children's motivation as they move through elementary school. "As kids move through school, their motivation drops. I think that information books may help counteract that drop. Some of these students are glued to these books," she explains.

The Concept of Engaged Reading

Guthrie, who received the National Reading Conference's Oscar Causey Award in 1992 for outstanding contributions to reading research, is also concerned about the drop in students' motivation as they move through school. "Middle school students are disengaging from school and from reading. The crisis in middle school is that students don't read in spite of the fact that they have the skills to read," Guthrie says.

In response to this crisis, Guthrie has developed methods that foster engaged reading. "Reading is not a cold, mechanical skill. Reading involves a connection of the text to the person's interests and priorities as much as a connection to their mind," he explains. "Engaged readers create opportunities for their own future growth, knowledge and participation. Disengaged readers will not grow in knowledge, reading skills or school success," he continues. "The issue is not who can read, but who *does* read. Literate people who *don't* read are just as detached from society as illiterate people who *can't* read. For example, people who read the church bulletin are more likely to be active in their church. People who read the paper are more likely to vote."

Guthrie and Allan Wigfield, an expert in the motivation of students, especially those in late elementary school and middle school, have collaborated to develop a program that fosters engaged reading. Wigfield is also professor in the Department of Human Development. Concept-Oriented Reading Instruction, CORI, involves both direct instruction in comprehension strategies and motivational support. "The most successful readers are both strategically competent and highly motivated," Guthrie stresses.

CORI's reading comprehension strategies—questioning, using background knowledge, searching for information, summarizing, organizing graphically, structuring stories—are all presented in a context. The context features inquiry into "big" ideas in science, hands-on activities, choices for students, interesting trade books and structured collaboration among students.

With the support of a \$4.2 million grant from the National Science Foundation, Guthrie and Wigfield are implementing CORI at several schools in Frederick County, Maryland. Over the next three years, the Guthrie-Wigfield team will identify which parts of CORI are most beneficial for reading comprehension, how students' strategies and motivations spread to new areas of schooling and life outside of school, and how teachers sustain CORI in classrooms.

Creating a Developmental Model of Reading

Patricia Alexander investigates reading comprehension by profiling the different types of readers that develop and by describing the instruction each type needs. "There is not one path to reading success or reading difficulty," says Alexander, who is a faculty member in the Department of Human Development and who was the 2001 recipient of the Oscar Causey Award.

She has identified five types of readers: at the extremes, the highly competent and the seriously challenged; in the middle, effortful processors, nonstrategic readers and unmotivated readers. In all cases, Alexander says the development of reading has three components: knowledge, strategies and interest. "To be highly competent, you need a positive mixture of all three of these components," she says. "The highly competent reader has considerable knowledge of language, such as a large vocabulary, as well as sufficient knowledge of the topic and interest. By contrast, the seriously challenged reader has little language knowledge, few strategies and less interest in reading. Those in the middle have a deficit in one area more than the others," she observes.

Creating Textbooks for Learning

Marilyn Chambliss, associate professor in the Department of Curriculum and Instruction, is working to enhance students' comprehension by determining how to improve the textbooks they read. Her study of science textbooks indicates why students may be having difficulty reading them.

"The writing is not at all strong," Chambliss reports. These texts tend to be poorly organized, with paragraphs often determined by length, not meaning. "Paragraphs might have five or six unrelated sentences," she says. Texts for students in the lower grades tend to be worse. "In order to keep sentences short and readability low, the connecting words—the glue—are often taken out. This makes these books even more disconnected and disjointed," she explains. To meet each state's and school community's requirements for content, textbook authors tend to incorporate a myriad of details. But, since the states have not agreed on what the overarching principles should be, "there's nothing at the top holding things together," she says.

Some science curriculum planners have responded by putting textbooks aside in favor of hands-on, discovery learning. "This concerns me as a reading researcher. It is unrealistic to think that young students performing these activities will come

to understand things as a scientist does. I am also concerned that students are not learning how to read science. They are entering middle and high school unprepared for the heavy science reading they are expected to do," Chambliss says. She is investigating whether hands-on activities together with a strong, well-written text will enhance students' knowledge considerably beyond what students can figure out on their own.

Combining Reading and Writing

Steve Graham and Karen Harris, professors in the Department of Special Education, are conducting research that combines reading and writing. In an effort to prepare students for Maryland's writing competency test, Graham and Harris are asking them to study narrative and persuasive texts as they write their own narratives and persuasive arguments.

This work is part of a larger effort to improve students' writing that they have undertaken through the Center for Accelerating Student Learning, a collaborative research effort at Maryland, Columbia and Vanderbilt that is funded with a \$3.7 million grant from the U.S. Department of Education's Office of Special Education Programs. At the Maryland Literacy Research Center, Graham and Harris are investigating how skills in text transcription, planning, revising and other self-regulatory skills affect writing development. They are also looking at how classroom teachers nationwide instruct students in writing.

For the last two years, the researchers have been working to bring the self-regulatory skills required to compose narrative and persuasive text down into the second and third grades. Students are taught strategies for writing with the Self-Regulated Strategy Development model, a comprehensive program in which children set goals, monitor their own progress, talk themselves through frustrations and reinforce their own progress. Students write collaboratively until they are ready to work on their own.

Graham and Harris have found that simply explaining and modeling the strategy is not enough for students in the bottom 25 percent of their class. Students in this group need personal coaching. "We prompt them and slowly withdraw our support as they begin to do it on their own," says Harris. This individualized support usually requires only three 20-minute sessions a week for four weeks. "With this level of support, they're making great progress. Without it, they barely improve," she says.

But many teachers make few modifications for struggling writers in their classrooms. "Most teachers explain the strategy, sometimes they model it, and they may even offer a mnemonic that will help children use it on their own," he says. The problem is that they don't include the extra step—individual coaching.

Harris has found that the second graders have taken to the program faster than the third graders. "The main reason is that they don't have the negative attitude toward writing that the third graders have. By fourth and fifth grade, the majority of students dislike writing," she says.

In a related line of research Graham and Harris investigate whether students' skill at handwriting and mastery of spelling affect their writing ability. "A lot of kids plan and outline as they write," Graham says. He and Harris suspected that students who have to stop and think about how to form a letter or spell a word tend to lose their train of thought while composing. They con-

ducted a study and found that handwriting fluency and spelling accounted for up to 60 percent of students' writing output and 40 percent of its quality.

They decided to intervene. With seven hours of instruction, they were able to double the handwriting speed of students in the bottom 25 percent of their class. The output and sentence structure of these students increased appreciably. "We established a direct causal link between handwriting and writing development in children," says Graham. They obtained similar results when they taught spelling, with the added bonus of improving students' reading.

This work also has implications for prevention. "If teachers provide an additional seven hours of handwriting instruction and 12 hours of spelling instruction, they will both improve those skills and get transfer to writing and reading. So it's a good investment of time," Graham concludes.

Assessing the Assessment

As Graham and Harris prepare students for Maryland's high-stakes tests, Professor Peter Afflerbach assesses the quality and comprehensiveness of those instruments. He also serves on the reading committees of the National Assessment of Educational Progress and the National Assessment of Adult Literacy Skills, the tests most often used to describe reading achievement in the United States.

"What's typically driven assessment are psychometric standards of reliability and validity. But what we know about reading comprehension is continually evolving. We must incorporate this knowledge into current tests so they are valid," says Afflerbach, who is on the faculty in the Department of Curriculum and Instruction.

"In addition, we haven't paid as much attention to the consequences and usefulness of high-stakes assessment," he says. High-stakes tests take much time and other resources from schools, but these tests may be useful to politicians and not classroom teachers, in Afflerbach's view.

Moreover, there are several key stakeholders in the high-stakes testing game. "Teachers want information that is immediately useful in their classrooms. Parents need information that lets them link their efforts at home to those at school. The states want to know if their schools are meeting their standards. Taxpayers like assessments that reduce reading to a single score. And students want feedback that will guide them with respect to their strengths and weaknesses," Afflerbach says.

Afflerbach is widely known for his expertise in the methodology he uses in his research, in which he asks students to think aloud as they take these exams and then compares the student reports with what the tests are intended to measure.

Faculty affiliated with Maryland Literacy Research Center use many research tools and methods. "It would be narrow-minded to use only experiments, only case studies, only statistical modeling or only protocol analysis. We need all those tools," Guthrie maintains. "No single, isolated approach can 'solve' the reading comprehension challenge," he says. "None alone is strong enough to benefit lots of children in lots of classrooms. And that's our aspiration—to create a theory of reading that works in classroom practice." ■







New Assessment for Learning and Accountability

New federal requirements for more accountability in education have created a critical need for assessments that are far more sophisticated in scope, quality, frequency and accuracy than those currently available.

Researchers in the Department of Measurement, Statistics and Evaluation are at the forefront of helping teachers meet this new mandate. “Educators have goals, and they have often collected what they intuitively know is valuable data, but they do not have the library of off-the-shelf measurement techniques they need to achieve those goals and analyze their data,” says Professor Robert Mislevy.

Tests for a New Generation

Mislevy and his colleagues in the Department of Measurement, Statistics and Evaluation are working to support the development of not only the new test items that Maryland and other states need to meet new federal requirements but also a new generation of tests. These tests are based on breakthroughs in cognitive science, particularly new revelations about how experts think, Mislevy says. “The tests we administered as recently as 10 years ago were not much different from those we used in the 1930s. They were based on traditional behavioral and trait-based notions,” explains Mislevy.

“After 50 years, testing has become a brand new field. We now know that experts think differently than novices. They are good at things not just because they know more, but because of how they organize their thinking. That’s why tests need more complex and interactive tasks,” continues Mislevy, who worked for the Educational Testing Service for 16 years before coming to the College of Education. “It’s not your father’s SATs.”

Both principles and facts are important in these tests. “One of the misconceptions about this work is that we are emphasizing problem-solving instead of facts and content. Facts are still important, but in terms of the principled knowledge experts bring to problems,” he explains. For example, he says, a person who is unfamiliar with football only sees a group of guys running around the field when he watches a game. But broadcaster and former coach John Madden sees four or five higher-order patterns. “He sees a different game,” Mislevy stresses.

Mislevy has won the National Council of Measurement and Statistics’ coveted award for outstanding technical contributions to measurement in education an unprecedented three times. A member of the National Research Council’s standing board on testing and assessment, he is now collaborating with private companies that have the research dollars needed to develop more complex and interactive tests. Once the theory and technology are developed, subsequent generations of these tests will be affordable in classrooms, Mislevy says.

One of Mislevy’s projects is with the Cisco Learning Institute, an affiliate of Cisco Systems, to develop the tests Cisco needs to assess people learning to design and troubleshoot Cisco’s networks. Cisco had developed complex simulations and posted them on the Internet, allowing instructors across the nation to teach large groups of students without highly expensive hardware. But they still had low-tech assessments. “They had only standard multiple-choice questions to assess what their students learned. The problem is that students might be able to answer these questions correctly, but still not be able to create or troubleshoot Cisco’s networks,” Mislevy explains.

What Does “No Child Left Behind” Mean for Testing?

The Bush administration’s new education program calls for increased accountability in education through an unprecedented level of testing. Each state must develop its own educational standards and then write tests that measure progress toward those standards among all students in grades 3 through 8. This is a complex task. “It’s not a simple trick to take the things that kids are supposed to know and create items that get at them,” says Mislevy.

This also means that every state must prepare multiple versions of each of its tests. “If kids get the same items each year, they will be more likely to learn only those items and not the more general principles and content those items are designed to measure,” explains Mislevy. Further, adds Professor Robert Lissitz, chairman of the Department of Measurement, Statistics and Evaluation, “states will need mechanisms with which they can compare groups and assess achievement over time. If you have a group of kids taking different test items and tests of varying length, how do you compare their scores?” he asks.

The new federal guidelines require that states implement new science testing by 2008. To help Maryland and other states meet this deadline, Mislevy is working on a \$1.1 million grant with SRI International to study inquiry and problem solving in science. More specifically, he is developing general descriptions of entire classes of problems and various approaches to solving

them. Such work is difficult and expensive. But these protocols and specifications “can literally cut years off the time it would take to create assessment tasks from scratch,” Lissitz says.

Through the Maryland Assessment Research Center for Education Success (MARCES), which is housed in the department, faculty are investigating other key assessment issues. For example, MARCES’ Center for the Study of Assessment Validity and Evaluation, under the direction of Rebecca Kopriva, is developing fair tests for students who are not native speakers of English. Faculty are also exploring the possibility of scoring essay tests by computer and looking at whether the people who administer high stakes tests affects students’ scores.

The Next Generation of Statisticians

Federal deadlines for meeting these new standards are tight, Lissitz and Mislevy stress. “It takes big testing companies like Harcourt Brace five years to develop more modest tests,” says Mislevy. “The new law gives the states, which do not have large cadres of statisticians and measurement experts, only two years to implement testing in math and reading, the first two subject areas. Looking at it only as a matter of volume, it’s an order of magnitude more. There simply isn’t enough expertise and experience around to do this,” he says.

To develop some of the expertise that Maryland and other states so acutely need, Lissitz and his department have teamed up with the National Center for Education Statistics in Washington, D.C., to create a 15-credit training program for testing professionals across the country. Two cohorts of 15 to 20 students attend classes throughout the summer and fall semesters. Those who complete the program receive a certificate from the University of Maryland.

“We want people to come out with the right mix of theory and application, so the participants will not only understand key principles but be able to do something with what they’ve been taught,” Lissitz says. “The support of the department has been critical. Having our own department has allowed us to attract many strong faculty and provide much of the instruction for this program in house,” he continues.

The department is also making key resources in assessment and evaluation available to researchers, teachers and administrators via the Educational Resources Information Center’s (ERIC) Clearinghouse on Assessment and Evaluation, operated by affiliate professor Lawrence Rudner. They also helped the Maryland State Department of Education (MSDE) develop its Web site, which has been a model for other states’ on-line resource centers. ■



Powering Up a Five-Year Project

Beginning in 2001, College of Education faculty Linda Valli, Robert Croninger, Marilyn Chambliss, Jeremy Price, Anna Graeber and Patricia Alexander, representing three departments, and research collaborators from the Montgomery County Public School System began a five-year study of high quality teaching in the fourth and fifth grades, with an eye on how various education policies and practices influence the ability of teachers to scale up and sustain effective pedagogy over time. “We are especially interested in understanding the nature and consequences of high-quality teaching in classrooms and schools that serve large numbers of low-income students and families,” says Valli, the project’s principal investigator.

The Interagency Education Research Initiative, IERI, has already funded the first two years of a projected, five-year, \$4.5 million study. IERI is a combined effort of the National Science Foundation, the U.S. Department of Education and the National Institutes of Health.

The team is asking a number of research questions:

- What do fourth and fifth grade teachers do to help students acquire foundational skills in reading and mathematics?
- What do these teachers do to help close the achievement gap between high- and low-performing students in these subject areas?
- How do successful teachers change their pedagogical practices to respond to new educational challenges and priorities?
- How do various education policies and organizational factors influence the quality of teaching that occurs in fourth and fifth grade classrooms?
- What are the attributes of high-quality teaching as identified through collegial nominations, classroom observations and achievement gains?

THE PROTOCOL

The team developed a broad range of research instruments, including classroom observation protocols, individual interviews and daily teacher logs. They plan to analyze information gathered from those sources with student achievement and demographic records to investigate how specific classroom practices and instructional strategies are linked to student learning in different school contexts. Because the data are longitudinal, the team hopes to be able to also determine how teachers respond to different policies and pedagogical challenges across time, between subject areas, and in different classrooms.

In the first year, 11 elementary schools and approximately 60 teachers were involved in the study, a number the researchers plan to double in the study’s second year. The scope of data being collected requires a large team of University of Maryland graduate students and faculty, as well as Montgomery County Public Schools administrators and teachers.

THE INSTRUMENTS

In order to collect data without creating extra work for the teachers being studied, the team spent much of their first year developing instruments and field-testing data collection protocols. Valli and Croninger (the study’s co-principal investigator) say that these instruments themselves may be of interest to others in the field.

Based on software the team developed, the teachers’ daily log is simple and easy to complete. Each teacher is given a personal digital assistant, or PDA, programmed with a daily survey of curriculum coverage and class organization. A survey for two classes takes five to six minutes to complete.

When teachers hot sync their PDAs to their local desktop, the records for that week are sent to a server at the University of Maryland. “To our knowledge no one has used PDAs to collect daily teachers’ logs. We have found that it is possible to collect daily information about classroom lessons without burdening teachers with time-consuming data collection instruments,” says Croninger.

The team also developed new software for classroom observations. This time-sampling software queries observers about the lesson’s focus, classroom organization, teacher practices, and student responses every three minutes. Training materials under development link the software to digitized practice videos that observers can use to assure high levels of inter-rater reliability. “These innovations will provide us with rich data about teacher practices over time, far richer data than acquired in most studies of teaching quality,” Croninger says.

IMPLICATIONS FOR OTHER RESEARCH

Most of the implications that the team has drawn early in the process have to do with the complexity of studying teacher practices and the relationship of practices to learning.

Much past research has looked at teacher practices over relatively short periods of time, assuming constancy in teacher practices over the course of a year and between classrooms and subject areas. Many studies fail to link teachers to specific classrooms and students, relying instead on aggregate measures of student achievement to investigate effects of teacher practices within and between schools. Valli says, “We are hoping to provide a much better understanding of how teacher practices vary across time, subject areas, and individual classrooms, which is why we have spent so much effort on developing innovative data collection instruments.

“Understanding this variability is crucial to understanding how teacher practices and education policies can promote more positive and equitable outcomes for children.” ■





Social and Emotional Competence Breeds Success

Success in school is most often attributed to cognitive factors such as IQ, reading ability and mathematics skills. But researchers at the College of Education are revealing the importance of another aspect of school success—social and emotional competence.

“Children who are emotionally well adjusted are more likely to succeed at school. If kids are abusive, anxious, wary, emotionally distraught, emotionally unskilled or victimized at school or at home, they won’t learn a thing at school. They will disrupt school, or they won’t want to come,” explains Kenneth Rubin, professor in the Department of Human Development.

Rubin and other College of Education faculty, including Nathan Fox, Melanie Killen, Robert Lent, Hedwig Teglasi-Golubcow and Judith Torney-Purta are investigating aspects of social, emotional and moral development that affect school success, career choice, eventual civic engagement and overall social well-being.

Discovering the Biological Markers of Temperament

Temperament, an infant's or young child's style of emotionally and behaviorally responding to the world, is one of the earliest precursors of social competence and one of the fundamental building blocks of adult personality. "Children differ early on in terms of their temperament," says Nathan Fox, professor of human development and director of the College of Education's Child Development Laboratory. "These temperaments have a biological basis that we can measure during the first years of life."

Fox is known for his method of using electroencephalogram (EEG) and electrocardiogram (ECG) data to detect biological markers of temperament in children under age 2. Specifically, he has associated asymmetries in the right and left side of the prefrontal cortex to predispositions to either shyness or social exuberance.

With the help of a National Institutes of Health/National Institute of Child Health And Human Development grant of more than \$1.5 million, Fox is investigating early experiences that affect temperament. "Environmental and cognitive factors moderate early temperament in specific ways to create adaptive or maladaptive social competencies," he explains. On the basis of his findings, Fox encourages the mothers and teachers of shy children to help these children get involved with others. "Placing a shy child with a caregiver outside the home is beneficial," he says. "It's counterintuitive. You would think that keeping such a child at home would be protective of them. But encouraging them to be with others desensitizes them, if you will, to the physical environment," Fox says.

Fox has found that helping young children compensate for their temperamental tendencies not only helps them develop social competence, but also affects their basic biological markers. "If the temperament is moderated, then the biology seems to be moderated as well," he says. "Biology is not destiny. We all have dispositions, but they can be moderated by what happens to us in life," says Fox.

Associate Professor Hedwig Teglasi-Golubcow of the Department of Counseling and Personnel Services has developed a model of how this moderation of temperament occurs. One of the keys appears to be social cognition, the way a child interprets life events and people's behavior.

Teglasi-Golubcow's model maintains that a child's early reactions are rooted in temperament. This temperament shapes the child's social cognition, which then "has a life of its own," she says. "A child's early reactions arise out of his or her temperament, which includes intrinsic predispositions such as emotional

reactivity. The child's temperament influences how the child interacts with others, how others respond to the child and the kinds of experiences the child has. These interactions and experiences in turn influence the child's ideas about him- or herself and the world. The ideas that children develop about themselves tend to be stable and self-confirming, and remain even after the environment changes," she explains.

Teglasi-Golubcow's research has important implications for home, clinical and classroom interventions. "Early on, parents and teachers can intervene by helping the child to cope with his or her temperament. But by middle school, the child's internal conceptions may be more of a driving force," she maintains.

Establishing the Importance of Friendship and Social Inclusion

A child's close friendships also become more increasingly important as the child grows older. "The quality of children's best friendships is more strongly predictive of teacher ratings of school aggression and school anxiety or fearfulness than is the quality of the child's relationships with both his and her mother and father," says Kenneth Rubin, who also directs the Center for Children, Relationships and Culture. "Children without a best friend are more socially, emotionally and educationally difficult than those who do have a best friend. They are more rejected, more aggressive and have more school-related problems," he says.

Rubin, the recipient of the Canada Council's prestigious Killam Research Fellowship, has been investigating the friendships of children as they move from elementary school to middle school with the support of a \$1.4 million grant from the National Institute of Mental Health. Approximately 60 percent of the fifth graders in Rubin's study have a mutually chosen best friend. "This leaves 40 percent of the children without such a friend," Rubin emphasizes.

Rubin's research is changing and refining what we know about the friendships of aggressive and withdrawn children. "We have learned that aggressive as well as anxious and withdrawn children are just as likely to have and keep best friends throughout the school year as socially competent children, with the exception of aggressive boys. Only 20 percent of the aggressive boys in our study were able to maintain their best friendships over the school year," he says. "Surprisingly, and in contrast to what researchers have reported, the best friends of aggressive children are no more aggressive than 'average' children. However, the best friendships of aggressive children are marked by mistrust and insecurity. This may be why they are less stable," he continues.

Rubin is especially concerned about children who are rejected. "Rejection is the best predictor of school dropout," Rubin reports. "Peer rejection accompanied by aggression is the best predictor of delinquency, and peer rejection accompanied by anxious withdrawal is the best predictor of anxiety disorders and depression in early adolescence," he says. Rubin is the author of a new critically acclaimed book, *The Friendship Factor: Helping Our Children Navigate Their Social World—And Why It Matters for Their Success and Happiness* (Viking Press: 2002).

With the support of the National Science Foundation and a \$1.08 million grant from the National Institute of Child Health and Development, Melanie Killen, professor of human develop-



ment and associate director of the Center for Children, Relationships and Culture, is studying how children reason about excluding others from social groups. Killen's research on the development of moral reasoning in children has shown that they develop a strong sense of justice when they are as young as three-and-a-half-years old. When asked for their opinions of straightforward cases of exclusion, children consistently argue for fairness, even if an adult researcher suggests a compelling reason for exclusion, Killen found.

"People suspect that the kids will say whatever the researcher wants them to say, but they don't," Killen stresses.

She has begun to investigate whether children make the same decisions when dealing with people unlike themselves. She has been struck by another line of research demonstrating that children develop social stereotypes at the same age that they develop their sense of justice and fairness. Killen set out to discover what children do when their sense of fairness collides with their stereotypes.

Young children continue to favor fairness, she found. "Young kids usually say 'it's not fair,' and that's it," Killen says. "With age, they still focus on fairness, but elaborate on what's wrong with exclusion and unfairness. They also develop an awareness of what makes a group work. This awareness will sometimes lead them to exclude for the sake of the group's functioning," she explains. "It also looks as if kids from heterogeneous school environments have a stronger sense of the wrongfulness of exclusion than kids from homogeneous school environments," she says.

Killen suggests that principals and teachers intervene to promote social inclusion early. "Once people reach adulthood, their stereotypes are hard to change," she says. She suggests that teachers and principals help children see the different issues that go into judgments of fairness and how these judgments might differ from their cultural traditions. Fortunately, generalizations about fairness in dealing with one group transfers to judgments about other groups, making it worthwhile to discuss the fairness of exclusion even in relatively homogeneous schools, according to Killen. Both Killen and Rubin, the director of the International Consortium for the Study of Social and Emotional Development, are now working with researchers in other countries to study the effects of culture on friendship and exclusion.

Leading Discussions for Democracy

Professor Judith Torney-Purta of the Department of Human Development also stresses the importance of open discussion in school. Torney-Purta is chair of the International Steering Committee of the Civic Education Study of the IEA, the International Association for the Evaluation of Educational Achievement. About 140,000 14-year-olds and 17- to 19-year-olds in 29 countries participated in the study. Torney-Purta's main interest was civic engagement, which involves the work one does in one's community as well as one's knowledge about democracy and more conventional types of political involvement.

Torney-Purta says, "My research has three important implications for schools. First, the most effective kind of social studies education is not drill-and-kill efforts to teach facts such as the number of judges on the tax court." The students surveyed reported that they benefited more from opportunities to discuss their own views with other students. "These discussions must

occur in an atmosphere of respect, and they must be grounded in an understanding of history and the democratic process," she says. Students who participated in these discussions said that they learned more and they were more likely to think they will vote and become engaged in civic activities as adults.

"Teachers need to be prepared to foster civic participation," Torney-Purta argues. "They need to learn how to promote the types of discussions that stimulate civic engagement and understanding. Teachers also need to work consciously to make their communities aware of the importance of these discussions. Many teachers stick to their textbooks because they are concerned that the people in their communities will see discussion as either frivolous 'shooting the breeze' or attempts to indoctrinate their children. In the hands of a skilled teacher, discussion is a very effective teaching method," she says.

"Second, in the United States, many of the problems we found were most serious in schools serving children living in poverty. Most important is the gap in both civic engagement and knowledge between students who are poor and those who are better off," she reports. Students from homes with few resources were both considerably less knowledgeable about democratic principles and much less likely to say they will vote when they become adults.

"Third, schools should model democracy, both in discussion and governance," she advises. Students who thought they could make a difference in their schools were more likely to think they will be able to make a difference as adults.

Discovering the Origins of Choices

One's confidence in one's ability to perform specific activities well, or self-efficacy, is also critical to one's choice of educational options and career, according to Robert Lent, professor of counseling psychology in the Department of Counseling and Personnel Services. "We're like 'the little engine that could.' What we think we can do has a lot to do with what we attempt and actually achieve," says Lent. "People tend to become interested in activities they believe they can do well and at which they expect to receive positive outcomes. These interests, in turn, are good predictors of the educational and career choices that people make," he explains.

Self-efficacy is at the heart of the Social Cognitive Career Theory Lent has developed with two of his colleagues, Steven Brown from Arizona State University and Gail Hackett of Chicago's Loyola University. The theory attempts to explain how people develop their academic and career interests, how they translate those interests into career choices and what additional influences, such as cultural and environmental factors, contribute to their choices and achievement at school and work.

Lent is now extending his research to consider subjective well-being and positive psychological adjustment processes. One recent finding is that people's perception of how much progress they are making toward goals in the areas of their lives that they value is strongly related to their feeling of well-being, or satisfaction, in those life domains. "Satisfaction in valued life domains is a good predictor of satisfaction with life overall," says Lent. ■





Schools as Places to Create a World

Policies that underlie practice can make the difference between educational institutions that foster learning, achievement and citizenship and those that thwart student growth and accomplishment. Administrators, boards of education and legislators have important roles in formulating policy and ensuring equity. College of Education faculty Kenneth Strike, Meredith Honig, Jeffrey Milem, Sharon Fries-Britt, Jennifer King Rice, Barbara Finkelstein and Steven Klees discover how schools and students work together, what makes them fall apart, and how policies can help rather than hinder success.

Schools as Communities

Large impersonal schools can alienate many at-risk students, so school reformers have begun to experiment with smaller “schools within schools” that function like communities in which students have a stake.

In research underwritten by The Spencer Foundation, Professor Kenneth Strike, chair of the Department of Education Policy and Leadership, explores schools as communities. To understand elements common among communities, he analyzes characteristics of communities that are not schools but that serve educational functions, such as guilds, congregations and polities, or states. This research has revealed commonalities that he calls “the five Cs of community: Coherence, Cohesiveness, Contact, Care, and Communication.”

Strike, a member of the National Academy of Education, says coherence and cohesiveness require a shared commitment to a vision of a good education, “a common purpose.” Communities require regular interaction and shared activities—that’s contact. Care means a community fosters a sense of trust, belonging and loyalty among its members so that they feel that they are all “in this together.” Finally, communication through dialogue about shared projects is vital to maintaining commitment to a community.

Strike also looks at the negative aspects of communities, such as parochialism, exclusion and intolerance. “I want to balance a discussion of ideal educational communities with a discussion of how a sense of community can develop in current public schools, particularly large urban schools that poor and minority students may experience as impersonal,” he says.

Creating powerful small learning communities poses special challenges for school district central offices and schools. These implementation challenges are a focus for Meredith Honig, assistant professor in Education Policy and Leadership. Previous research has shown that nontraditional school improvement approaches such as small school initiatives may be essential to school success, particularly in urban areas. But Honig notes that these reforms place significant demands on schools to innovate for school improvement. “Research teaches little about whether and how schools can innovate and what it takes for school district central offices to foster that innovation.” Honig is addressing these questions in a multi-year study of small school implementation in two urban districts.

Honig also has observed that school communities are disrupted by the barrage of external demands that urban public schools are forced to juggle. In research with broad implications for public sector organizations beyond schools, Honig and co-principal investigator Thomas Hatch of the Carnegie Foundation for the Advancement of Teaching study what activities and conditions enable public schools to manage multiple demands. “When various school reform approaches converge on schools, they paradoxically curb school capacity for improvement. Schools may always face multiple and conflicting external demands. We want to help schools develop the capacity necessary to use these demands to strengthen school performance.”

“Community” also matters to school performance in another sense: community resources such as neighborhood youth organizations and health and human services agencies. These can have a significant impact on students’ school experiences and their achievement. “This interdependency of ‘school’ and ‘neighborhood’ or ‘community’ presents significant challenges for educational leaders in part because ‘community’ falls under jurisdictions outside the education system,” she says.

Potentially promising for urban schools is the increased involvement in education of city governments—mayors’ and city managers’ offices—for the first time in more than 70 years. “Much has been written about mayoral takeovers and the effectiveness of city-sponsored after-school programs but we don’t know how many cities participate in education, or whether or how different forms of participation matter to school improvement.” Honig is developing a national scan of city involvement in education and examining impacts of various forms of involvement on educational systems.

Students Acting on Experience

As the population of America becomes more diverse, colleges and workplaces do too. However, racial segregation in schools remains. This is not surprising to Associate Professor Jeffrey Milem, who observes, “We live in a society that is more racially segregated now than it was 20 years ago.”

To gauge the experiences University of Maryland students have with people different from themselves, Milem surveyed the incoming class at the University of Maryland. Data were collected on engagement with different kinds of people prior to college, and on attitudes, beliefs and skills that Milem considers “essential to citizens in an increasingly diverse democracy.”

He discovered that the first opportunity for undergraduates at Maryland to meaningfully engage diversity is likely to occur when they arrive on campus, particularly for white students, nearly 80 percent of whom reported that they had few opportunities to do so prior to college. Students of color were more likely to have had opportunities to engage people from other racial and ethnic groups prior to college.

Milem recently sent a second survey to the students to determine whether their experiences during the first two years of college changed the beliefs, attitudes and skills they had when they entered school. “As the United States moves closer to becoming a ‘minority-majority’ nation, students must engage diversity across the education system so that they can develop the skills they need to participate effectively as citizens in an increasingly diverse democracy. We hope this research will contribute to achieving that goal,” says Milem, of the Department of Education Policy and Leadership.

High-achieving students don’t attract as much research attention as underachievers because they seem to do well on their own. Assistant Professor Sharon Fries-Britt says, “We can’t assume that because high achievers do well academically that they don’t encounter real problems that impede their success.”

Fries-Britt seeks to identify and understand experiences that high-achieving African-American students on college campuses have with peers and faculty and what factors impede or enhance their success. She has found that those who attend predominantly white institutions can experience a particular type of isolation. “Because of their interest in academics, high-achieving blacks are sometimes accused by their black peers as ‘acting white,’” she says. Her research has shown that African-American high achievers who successfully balance their racial and academic identities remain connected to the black community and with other high achievers who are black. Fries-Britt also studies the effects of subtle stereotypes high-achieving black students encounter from white peers and faculty about their academic ability relative to other groups.

Fries-Britt has recently expanded her research. “I’m interested in seeing where the experiences of high-achieving white and black students are different and where they are the same and in expanding the scope to include ethnic groups other than those. We may find that indeed high achievers across all groups have some very similar issues they encounter while other issues remain unique to specific groups.”

Scholars, policy makers, education planners, and even teachers have a relatively limited understanding of the ways in which schools and teachers filter experience for young people, inform their aspirations, shape their sense of inter-group loyalty, mold their sense of community, cultivate their approach to work, or even shape what students are willing to learn and become. Through oral histories of students in schools over several generations, Barbara Finkelstein, professor in the Education Policy and Leadership department, has found that characterizations of less privileged young people as victims, underachievers, and/or social and cultural rebels are too often stereotypical, oversimplified and without nuances.

“They don’t recognize that students filter knowledge, create communities, organize social life, shape aspirations, practice politics, and make use of educators, fellow students and others as role models,” says Finkelstein.

Her work suggests that fundamental to fueling reform initiatives and teacher education programs is a base of knowledge about students’ traditions of belief, social habit, political association and cultural mores. She posits that for schools to become cultivators of civic intelligence, moral sensitivity, cultural sophistication and intellectual capacity “policies governing education must be formulated with attention to the ways in which young people perceive and act in the world and the ways in which teachers can effectively ply their craft.” Finkelstein regards the study of tradition, culture and community as basic for students and for teachers.

Teachers Are Key to Change

Teachers represent a sizeable investment in public education and receive a great deal of attention. But current policy emphases, says Associate Professor Jennifer King Rice, point in seemingly divergent directions. On the one hand, policies on teacher quality require teachers to meet more rigorous standards and thereby limit the supply of qualified teachers available to schools. On the other hand, an emphasis on decreasing class sizes increases the demand for teachers.



“Class-size reduction policies tend to have a negative effect on efforts to increase or maintain standards of teacher quality because of the need for so many additional teachers,” says Rice, from the Department of Education Policy and Leadership. A National Academy of Education/Spencer Foundation Fellow, she is working to discover the appropriate balance. “How much emphasis should we place on each of these policy directions and under what circumstances?”

Rice also analyzes the economic trade-offs of choosing teacher quantity over teacher quality. “My goal is to shed light on the ways in which quantity and quality each contribute to student achievement and at what cost.” Her findings will have important implications in how schools hire, reward and distribute teachers across schools and classrooms. She also seeks to estimate the costs of efforts by the low-performing schools that need them most to recruit and retain quality teachers. Substantial resources will be needed to staff every classroom in every school with such teachers, who are an essential component for an adequate education system for all. This focus is part of Rice’s ongoing research agenda on the equitable and efficient use of limited education resources.

Challenges to Equity in International Education

American students and teachers face inequity and economic disparities. In many other countries, however, hurdles to attending even primary school can be overwhelming. Education Policy and Leadership Professor Steven Klees and a colleague from The Ohio State University work in Uganda on research aimed at helping to better understand the barriers to good quality universal primary education and analyzing policies to overcome those barriers.

Uganda is considered educationally successful in Africa, with more than 80 percent of 6- to 12-year-olds in primary school. That leaves, however, 1.5 million children not in school. This number includes children with special needs, street children, refugees, children orphaned due to HIV/AIDS and civil conflict, and children of nomadic peoples. Ugandan teachers are often insufficiently educated and poorly paid. Books and materials are in short supply and school facilities minimal. Girls suffer sexual harassment and assault in an environment that stereotypes women. Education may be very difficult to afford because there are often fees or other expenses that must be covered by the family.

Not only that but, “Many families need even their very young children to do work, such as gathering firewood, hauling water or tending animals,” Klees says.

UNICEF approached Klees to work with local educators, international agencies, Ministry of Education officials and local nongovernmental organizations to help them act in concert to achieve 100 percent enrollment of children ages 6 to 12 in and graduation from primary school by 2015. Says Klees, “Our analysis will look at the costs and impact of alternative policy choices to expand and improve Ugandan education.” ■

Early NSF Career Awards Support Innovation

Learning is a complex phenomenon. Research on ways to measure the effects of cognition and attitudes on learning and achievement is under way at the College of Education with the support of two prestigious Early Career Award grants from the National Science Foundation.

ROGER AZEVEDO, Human Development, will use his award of nearly \$616,000 over the next five years to explore “The Role of Self-Regulated Learning in Students’ Understanding of Science with Hypermedia.” He will conduct research on self-regulated learning and use the results to inform the design of adaptive Web-based hypermedia environments to foster students’ learning.

“My research cuts across different levels of students—middle and high school students, and undergraduate students,” says Assistant Professor Azevedo. “Working in both classrooms and our lab, we investigate how students learn about complex science topics, like environmental or biological sciences.”

In high school classes, Azevedo uses a sophisticated, Web-based science program called River Web, developed as part of the Maryland Virtual High School initiative, to study how students learn about the environment. A recent topic relates to the properties of and relationships between phosphates and nitrates in environmental settings such as forests, agricultural and commercial areas.

The NSF grant allows Azevedo to expand his work to include several classes at nearby Montgomery Blair High School. Up to 200 high school students will be involved, working with science teachers, graduate students and Web programmers. He will soon be working with a group of middle school students to conduct additional research on cognition and motivation differences between age groups.

“In self-regulated learning, we are looking at how students regulate several aspects of their learning—cognition, motivation and context—when working alone or with peers using computer-based learning environments to learn about complex systems. We also look at how the teachers support the learning process,” Azevedo explains.

Azevedo uses several methods to investigate different cognitive and motivational processes of learning by measuring the emerging conceptual understanding of complex subject matter presented in a variety of ways: text, video, audio and Web-based animations. Data is derived from written pre- and post-tests, direct observation, and videotapes of the classroom discussions, student interactions with computers and think-aloud protocols.

One of the goals of the research is to enhance student learning, Azevedo says. “Cognition, motivation and understanding are part of the learning process. We want to develop the ‘conceptual scaffolding’ needed to support student learning and build a computer-based learning environment in support of self-regulated learning in science.”

JAMES ROBERTS, Measurement, Statistics and Evaluation,

will use his National Science Foundation award of \$350,000 over five years to increase the applicability and utility of item response theory models for unfolding in practical measurement situations.

“It is often assumed that one’s attitude affects learning or vice versa,” says Assistant Professor Roberts. “But to rigorously explore the relationships between attitudes and learning, we need precise and valid measures of those attitudes.” Roberts is developing new psychometric models and software tools to better measure attitudes, preferences and individual progression through developmental processes that occur in stages.

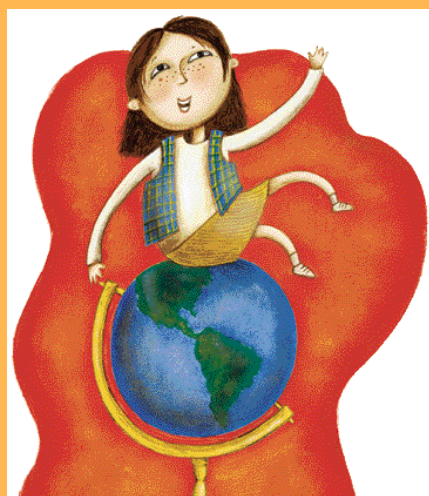
“Suppose you ask a student for a response to a statement like, ‘Math is okay, I guess,’ and the student disagrees with the statement. An unfolding model implies that there are two possible attitudes associated with that ‘disagree’ response. An individual might disagree with the statement because they dislike mathematics quite a bit,” Roberts says.

“Conversely, a person might disagree with the statement because they truly like mathematics very much. We want to determine which of these two possible attitudes the individual possesses given that there is generally some degree of measurement error in these types of responses,” he adds.

Using mathematical foundations for these models, Roberts can investigate the characteristics of the response process through computer simulations and selected analyses of real data. This information will, in turn, help devise more valid and precise estimates of individual attitudes.

Roberts is devoting much of his research to developing software that will enable measurement practitioners and researchers to apply these new models. He believes that the models will lead to innovative applications such as computerized adaptive attitude testing and systematic assessments of how attitude statements function differently for alternative subgroups of individuals. In a broader sense, developing a sophisticated model for measuring attitudes can have an impact on our understanding of the learning process.

“Attitudes might be related to learning,” Roberts says. “However, we must improve our measures of attitudes in order to understand the nature of that relationship.” ■








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