

# Simon Says

## It's Time for a New Game in Mathematics

**by Jack Dieckmann, M.A.**

### Inside this Issue:

- ✦ **What research says about math learning**
- ✦ **Wildlife biologist tells her story of being a woman minority scientist**
- ✦ **Minority women's leadership**



In the United States, the majority of people report deep, haunting feelings of ineptitude about doing math. Are you one them? Many of us in the general public feel that we are simply not *gifted* in this area.

Ironically, even highly-accomplished professionals who work in analytic fields report their inability to “get” math, let alone pursue it as a career. In 2002, Stanford University, a leading institution of higher learning with more than 14,000 students, had only seven math majors.

What might account for such an abysmal interest in studying math? Finding the roots of this deep-seated and widespread feeling of inadequacy requires a trip down memory lane. By understanding and confronting some of these root causes, we will be able to give school children the societal purchasing power that knowing math provides and that so few of us have.

As children, most of us learned math in very much the same way we played particular games on the playground. And that is precisely the problem. Games such as Simon Says,

races and dodge ball may be innocent child's play, but they are harmful yet common blueprints for math learning. A closer look at the goals and rules of Simon Says, for example, reveals eerie similarities to most math classrooms, then and now.

As you will recall, to win at Simon Says, you have to do as the leader tells you. The trick is to obey *only* those commands prefaced with “Simon Says.” Simon's sole goal is to confuse you by firing commands in rapid succession in the hopes that you will mess up and be eliminated.

*What* Simon asked you to do is completely inconsequential. Simon says, “Pat your head while you read this article.” (Please humor me as your Simon.) OK, Stop.

Simon did not say, “Stop.” Hooray, you lose!

Now consider a slight switch of names. *Mrs. Math Teacher* says, “Borrow from the eight and it becomes a seven.” *Mr. Math Teacher* says, “When you multiply by two digit numbers, skip a space on the second row before you add.” Try it. Multiply 14 and 27 by hand. Did you put a zero or skip a space on the second line?

*Simon Says – continued on Page 2*

Implicit in this math instruction (sometimes math is literally reduced to a *set of instructions*) is to do exactly as the math teacher tells us and *only* what the math teacher tells us. How many of us could find good reasons for following these seemingly arbitrary rules? With fractions, why can the top numbers be added but *not* the bottom ones? What would happen to us if we did?

Sense-making is not valued in playing of this game, nor is it in this form of mathematics. One does not question what one is asked to do. The *why* is not important. In fact, it slows down the game. Imitation without comprehension and technical correctness (always listening for the “Simon says” preface) is what wins the game, i.e., earns both the grade and the approval of the teacher who then confers the status of “smart.” Total authority rests with teacher.

Currently, children learn a distorted form of mathematics that values docility and rote memorization where some people are winners in

## Our Simon is, in fact, a controlling collection of institutional and societal forces. Simon is a stiff and lifeless math curriculum that favors mechanical procedures at the cost of meaning.

math and others are losers. And Simon decides.

But, *who* exactly is the educational Simon and *why* do we follow him so blindly? Simon is not just the classroom teacher, who is usually very dedicated and caring, is, herself, a product of her own experiences with Simon.

Our Simon is, in fact, a controlling collection of institutional and societal forces. Simon is a stiff and lifeless math curriculum that favors mechanical procedures at the cost of meaning (though these are far from incompatible). He is the tradition of math elitism that operates from a zero-sum mentality where some must win and others must lose. He may even delight in the failure of others.

His most recent incarnation is in

the fetishizing of test scores and proclivity to *equate* measures of learning with learning itself. Simon derives his power from the masses who do not question or do not know how to question their impoverished and shaming math histories, or the price that their experience has exacted on their lives.

Although we hear rumblings of the new “new” math, the truth is, according to studies like the Third International Math and Science Survey (TIMSS), little has changed in a hundred years. Listen. Watch. Mimic. Could it be otherwise? Yes. Here is how.

First, each of us, whatever our station in life, must reflect on the ways in which we have been silent

*Simon Says – continued on Page 15*

## In This Issue...

**3** Challenging the Math Box

**5** Esther Nelson's Story

**7** Six Principles for School Mathematics

**9** Review of Literature on Leadership

**11** Highlights of Recent IDRA Activities

**12** Tools for Action

*The Intercultural Development Research Association (IDRA)* is a non-profit organization with a 501(c)(3) tax exempt status. The purpose of the organization is to disseminate information concerning equality of educational opportunity.

The *IDRA Newsletter* (ISSN 1069-5672, © 2005) serves as a vehicle for communication with educators, school board members, decision-makers, parents, and the general public concerning the educational needs of all children in Texas and across the United States.

Permission to reproduce material contained herein is granted provided the article or item is reprinted in its entirety and proper credit is given to IDRA and the author. Please send a copy of the material in its reprinted form to the *IDRA Newsletter* production offices. Editorial submissions, news releases, subscription requests, and change-of-address data should be submitted in writing to the *IDRA Newsletter* production editor. The *IDRA Newsletter* staff welcomes your comments on editorial material.

Portions of the contents of this newsletter were developed under a grant from the U.S. Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and endorsement by the federal government should not be assumed.

Publication offices:

5835 Callaghan Road, Suite 350  
San Antonio, Texas 78228-1190  
210/444-1710; Fax 210/444-1714  
www.idra.org contact@idra.org

**María Robledo Montecel, Ph.D.**  
*IDRA Executive Director*  
*Newsletter Executive Editor*

**Christie L. Goodman, APR**  
*IDRA Communications Manager*  
*Newsletter Production Editor*

**Sarah H. Aleman**  
*IDRA Data Entry Clerk*  
*Newsletter Typesetter*



# Challenging the Math Box

**Bradley Scott, Ph.D.**

Dieckmann and Montemayor posed the question: *Can everyone master mathematics?* They commented: “If we hope to develop students as mathematical thinkers, we must abandon the prevailing deficit view that many students cannot master math. Schools can rethink how math is learned and taught to the benefit of all students” (Dieckmann and Montemayor, 2004).

This question also embodies a broader conversation about girls, minorities, and low-income students’ inclusion in rigorous math and science courses and more challenging aspects of technology. The literature reveals a continued achievement gap between these student populations and their counterparts. In spite of the *No Child Left Behind Act* (NCLB), a force driving public education reform since 2001, this achievement gap has yet to be significantly improved.

Dieckmann and Montemayor further draw attention to questions that must be asked that abandon a student deficit perspective and focus on enriching assets that students already bring and are ready to be mined (2004). They say, “The question

**These researchers have clearly shown in their work that the goals of equity can be achieved when that is the expectation... It is possible.**

for schools changes from ‘Why do *they* not learn math?’ to ‘How do *we* teach math?’”

It is noted here that what has been learned about all students’ ability to perform to high standards in math is no less true across other content areas given the right supports for learning. It is possible that an even greater shift in the Dieckmann and Montemayor question is needed. Another question is: *How do we teach math and what do we expect?* This article addresses that question.

## **Expectations Drive Results**

According to several researchers, we still do not teach math in a way that attracts and sustains minorities and girls in math and science. Low expectations for the success of these students in these disciplines are prevalent.

Haycock and the Education Trust noted that they were “stunned” to find in their research “how little is expected of students in high-poverty, high-minority schools” (Haycock, 2001). These students were not given challenging curriculum, they were not given assignments to reinforce learning, and when they were given assignments, they were low-level assignments involving low-level skills. In short, students in high-poverty and high-minority schools, including secondary schools, were neither challenged nor expected to learn.

Grossman and Ancess found similarities, even for middle-class minority students who are at the low end of the achievement gap in comparison to their non-minority counterparts. African American and Latino students reported in interviews, “They were not encouraged to excel and to take honors [higher-level mathematics] classes” (2004). In fact, in one of the districts, the research team found, “Every student [identified as having trouble in math] told a story of a teacher who told them they were not good in math... Researchers concluded that these students had subsequently lived out a self-fulfilling prophecy” (2004).

*Challenging the Box – continued on Page 4*

## Equity-based Approach Yields Good Results

Andrews and Wilkins are convinced that a new approach to teaching math and science is needed and that the approaches must be equity-based if more minorities and girls are going to enter and remain in the science, technology, engineering and math (STEM) pipeline (2001). They examine and report on two equity-based programs, the EAST Project and the Future Scientists and Engineers of America, that are making a difference in attracting and maintaining minorities and girls in STEM.

However, they comment on a larger concern: “The real problem is not with the females and under-represented minorities, but the educational and employment atmosphere that precludes equal access to the science, math, engineering and technology pipeline... The process of educating participating educators and business members while implementing the programs and beginning the dialogue on equity has even more value because it starts the process of systemic change” (Andrews and Wilkins, 2001).

In 2000 when the National Council of Teachers of Mathematics issued the *Principles and Standards for Mathematics*, it included an **equity principle** that acknowledged three critical aspects. Equity requires:

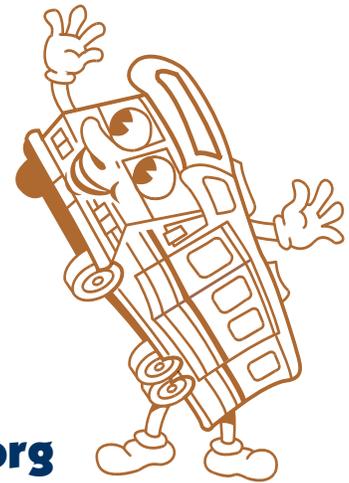
- high expectations and worthwhile opportunities;
- accommodating differences to help everyone learn mathematics;
- resources and support for all classrooms and all students (National Council of Teachers of Mathematics, 2000).

Jennings and Likis reported on one school district that embraced these principles as it met its own math achievement crisis (2005). Teachers

# Take the IDRA Newsletter Field Trip!

## On IDRA's Web Site

- ✧ Read related *IDRA Newsletter* articles from 1996 to the present
- ✧ Access statistics, definitions, etc.
- ✧ Learn about Internet resources
- ✧ Find extensive useful Internet links
- ✧ Use IDRA's topical index to find what you are looking for



[www.idra.org](http://www.idra.org)

and administrators in this urban school (grades four through eight) setting confronted a number of questions that helped them identify the real problem. They established three improvement objectives for all students: to become proficient and master grade-level skills and concepts, to improve reading and writing in math word problems and strengthen comprehension in math word problems, and to demonstrate a positive attitude toward math.

The staff undertook the following key strategies to improve math outcomes for students.

- They ensured that math reached beyond the classrooms by holding math contests outside of the classroom, sending math challenges home to be completed with parents.
- They hosted math family nights where parents and children did math together in schools in the evenings and on weekends.
- They created new staff roles, including parent academic liaisons, to solicit parent support for math improvement and to partner with parents on improvement activities.
- They organized math tutoring to improve data-driven math skills in

identified students.

- They created support for teachers through math coaches and math-focused professional development.
- They created changes by increasing math instructional time, organized flexible grouping for math skills proficiency development, integrated math across the curriculum, and created internal math assessment strategies to monitor math progress more pro-actively (Jennings and Likis, 2005).

When Scott described the **Six Goals of Educational Equity**, the issues of access and inclusion, treatment, opportunity to learn, and resources to support learning represented four of the six goals (Scott, 2000).

These researchers have clearly shown in their work that the goals of equity can be achieved when that is the expectation. They have provided examples of how school districts can create greater involvement of minorities and girls in math and science. It is possible. There are those who are doing it, and they are realizing impressive results. It does, however, require a



## **“Minority Women in Science: Forging the Way” Esther Nelson’s Story**

I was raised for the most part in Albuquerque, New Mexico. We had a ranch in Santa Rosa where we raised cattle to sell in a small meat market in Albuquerque. We spent a lot of time at the ranch, both for work and pleasure. We were always outside, riding horses, playing in the mud and hiking around the hills. I loved being at the ranch because it was so beautiful and fun. I loved riding horses and looking for pretty rocks. We were exposed to a lot of wildlife at a young age, and it made me appreciate how beautiful and diverse life is. I knew that I wanted to do something working with animals and wildlife.

My parents got divorced when I was in middle school, and that period of my life was very difficult. I had a hard time focusing on school, and my grades definitely suffered. I did not know how to deal with my family breaking up. My older brother was so supportive of me and really helped me get through junior high and deal with what was happening at home.

I went to public schools through the eighth grade, then attended a private high school in Albuquerque. I had a wonderful science teacher in eighth grade who made science really fun and exciting. In high school, however, the school encouraged its graduates to pursue careers in business or

**The most hurtful thing about discrimination is that it can make you doubt yourself. If I just keep working hard, not only do I prove to others that I can do it, but more importantly, I also prove it to myself.**

engineering, rather than science. By this time, some of the hurt from my parents’ divorce had gone away, and I enjoyed my life at school much more. I was doing better academically, but I was not interested in business, unlike many of my classmates. My high school prepared me to go to college, but I did not know at the time that I would pursue science.

I went to New Mexico State for my undergraduate program. I did not know at first what I wanted to study. I knew I wanted to work with animals, maybe as a veterinarian. A friend suggested that I take a biology course, and I was amazed that I could have a career doing what I love: working outdoors with animals and wildlife. I received my Bachelor of Science degree in wildlife science. I am currently in a graduate program to get

a master’s degree in wildlife science at New Mexico State University.

My brother and my father have always been supportive of my interest in and pursuit of science. My mother, on the other hand, has always thought that I should get married, stay home and have children. It was important to have the support of members of my family to challenge myself in school and to pursue science.

While my family and culture have supported my pursuit of science, it seems as though society assumes that only White men can become scientists, and that since I am neither White nor male, I should not even bother trying. I have to turn these negative prophecies into fuel to keep myself going. I am strong-willed, and when someone tells me I cannot do something, it is extra incentive to work twice as hard to prove them wrong.

These types of attitudes and barriers come up in school and at work. For example, many people are shocked at my interest in reptiles and amphibians. They do not believe a woman can handle picking up snakes and lizards. Sometimes others assume that I am not strong or intelligent, and these misguided assumptions have led them to look to other people, usually men, to get a certain job done. While

*Esther Nelson – continued on Page 6*

Esther Nelson – continued from Page 5

this discrimination is wrong and hurtful, I have learned just to work hard in order to prove them wrong.

The most hurtful thing about discrimination is that it can make you doubt yourself. If someone else tells me that I cannot do something, there is a small voice in the back of my mind that agrees. If I just keep working hard, not only do I prove to others that I can do it, but more importantly, I also prove it to myself.

Sometimes discrimination can be subtle as well as overt. Some people have told me that I got admitted into school and got a job in science as an affirmative action “let-in,” just because I am Hispanic and because I am a woman. I set them straight immediately and retort, “I’m sure it has nothing to do

with my 4.0 grade point average, four years of work experiences, and awesome references.” The important thing for me in combating discrimination or bias has been my conviction that I can succeed because of my talents and intelligence.

Sometimes it is helpful to have mentors along the way that provide guidance in terms of work or personal life. While my father and brother have been supporters, I have had mentors that I can go to for advice on my career or with questions about science in general. They taught me to be proud of who I am and helped me figure out how to attain my goals.

My mentor is an expert in the field of herpetology (the scientific study of reptiles and amphibians as a branch of zoology). I met him at a wildlife

society conference in Arizona and have worked with him and others in the field since then. He supported me in my interest in studying reptiles and amphibians. What makes him great is that he makes learning fun and interesting (Yes, I am still learning even outside of school). I never feel dumb asking him a question. Finding a mentor can happen just by chance as mine did, or it can be through more formally designed programs. Many colleges have mentoring programs for students interested in science or math or many other disciplines. A little help can make a big difference.

As a wildlife biologist, I spend the majority of my time outside doing incredibly interesting research on wildlife. It is amazingly fun and very

Esther Nelson – continued on Page 14

## Minority Women in Science Forging the Way

by Keiko E. Suda, Oanh H. Maroney, M.A., Bradley Scott, Ph.D.,  
and María Aurora Yáñez, M.A.

### A great student-centered tool to support equity in math and science education!

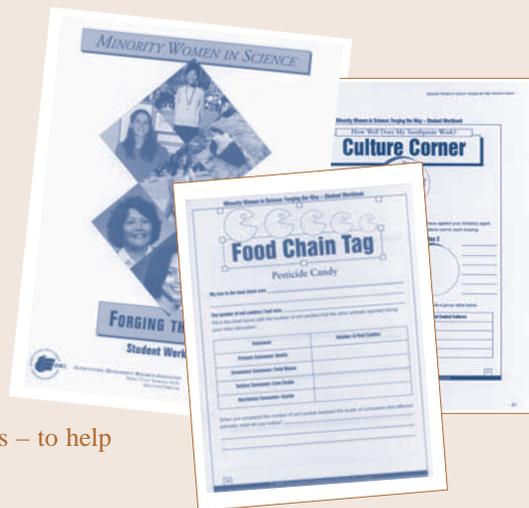
We must ensure that minority girls are not left behind as progress is made toward narrowing gender and racial gaps in math and science education. This is an innovative resource that can be used with all students – girls and boys – to help break down gender stereotypes about scientists.

#### Inside, you will find:

- ◆ **Profiles of seven minority women scientists** who have surmounted barriers to forge the way for themselves and future scientists. *See sample on Page 5.*
- ◆ **Science lessons** for the classroom that cover such topics as acid/base chemistry, earth science, wildlife and environmental science, and biology.
- ◆ **Life skills lessons** for the classroom that cover topics such as getting college information from the school counselor, identifying a support system, reaching goals, knowing self-worth, having community pride, overcoming stereotypes, and linking hobbies with career choices.

**Student Workbook \$6.50 • Teacher’s Guide \$25.00**

(Student Workbook ISBN 1-878550-67-5; 2000; 32 pgs; paperback; \$6.50) (Teacher’s Guide ISBN 1-878550-68-3; 2000; 94 pgs; paperback; \$25)  
Developed and distributed by the Intercultural Development Research Association. 5835 Callaghan Road, Suite 350, San Antonio, Texas 78228 •  
Phone 210-444-1710 • Fax 210-444-1714 • contact@idra.org • www.idra.org. Shipping and handling is 10 percent of the total price of the order.  
Orders must be prepaid. Purchase orders for orders totaling more than \$30 are accepted.



**“Being a scientist can open doors  
to opportunities that you may  
never have dreamt of or even  
considered.”**

– Patricia Hall, M.S., one of the  
scientists featured in *Minority Women  
in Science: Forging the Way*

# Six Principles for School Mathematics

**Equity.** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

All students, regardless of their personal characteristics, backgrounds or physical challenges, can learn mathematics when they have access to high-quality mathematics instruction. Equity does not mean that every student should receive identical instruction. Rather, it demands that reasonable and appropriate accommodations be made and appropriately challenging content be included to promote access and attainment for all students.

**Curriculum.** *A curriculum is more than a collection of activities; it must be coherent, focused on important mathematics, and well articulated across the grades.*

In a coherent curriculum, mathematical ideas are linked to and build on one another so that students' understanding and knowledge deepen and their ability to apply mathematics expands. An effective mathematics curriculum focuses on important mathematics that will prepare students for continued study and for solving problems in a variety of school, home and work settings. A well-articulated curriculum challenges students to learn increasingly more sophisticated mathematical ideas as they continue their studies.

**Teaching.** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

Students' understanding of mathematics, their ability to use it to solve problems and their confidence in doing mathematics are all shaped by the teaching they encounter improve in school. To be effective, teachers must understand and be committed to students as learners of mathematics. They must know and understand deeply the mathematics they are teaching and be able to draw on that knowledge with flexibility in their teaching tasks. Teachers must be supported with ample opportunities and resources to enhance and refresh their knowledge.

**Learning.** *Students must learn mathematics with understanding, actively building new knowledge from experience and previous knowledge.*

Research has solidly established the important role of conceptual understanding in the learning of mathematics. By aligning factual knowledge and procedural proficiency with conceptual knowledge, students can become effective learners. They will be able to recognize the importance of reflecting on their thinking and learning from their mistakes. Students become competent and confident in their ability to tackle difficult problems and willing to persevere when tasks are challenging.

**Assessment.** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

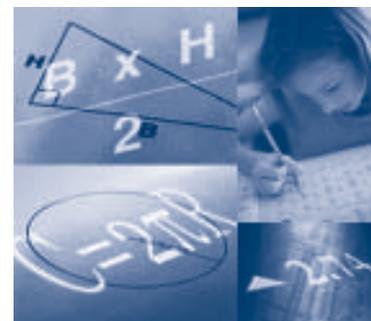
When assessment is an integral part of mathematics instruction, it contributes significantly to students' mathematics learning. Assessment should inform and guide teachers as they make instructional decisions. The tasks teachers select for assessment convey a message to students about what kinds of mathematical knowledge and performance are valued. Feedback from assessment tasks helps students in setting goals, assuming responsibility for their own learning and becoming more independent learners.

**Technology.** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Students can develop deeper understanding of mathematics with the appropriate use of technology. Technology can help support investigation by students in every area of under mathematics and allow them to focus on decision making, reflection, reasoning, and problem solving. The existence, versatility, and power of technology make it possible and necessary to reexamine what mathematics students should learn as well as how they can best learn it.

Reprinted with permission from: "Executive Summary - Principles and Standards for School Mathematics," copyright 2000 by the National Council of Teachers of Mathematics. All rights reserved.

# IDRA's **Math Smart!**



## **Mathematics Process to Maximize Student Learning in Mathematics**

In supporting equal access to challenging mathematical content, it is critical to implement instructional practices shown to be effective with linguistically diverse and economically disadvantaged students. Traditional secondary level practices simply are not enough in the instruction of heterogeneous populations.

To maximize mathematical proficiencies and impact student achievement, instructional and administrative staff must be prepared to address different needs in an age of increasing expectations and mandatory accountability for diverse students. It is no longer enough for students to simply “do well” on state-mandated exams. It is necessary to increase the understanding, complexities and applications of mathematical thinking and processes across all math courses in order to satisfy state and federal mandates and prepare our students for an ever competitive job market.

To address these issues IDRA's Math Smart! presents a shift in mathematical thinking for instructors, that develops the Five Dimensions of Mathematics using scientifically-based research strategies.

### **Math Smart! Objectives**

- ▶ **Strengthen the belief** that all students can increase their achievement in state-mandated exams and that students' understanding of mathematics can be deepened to levels of increasing complexity.
- ▶ **Value students' experiences** as a basis for strengthening their mathematics competency.
- ▶ Take advantage of a **safe environment to explore mathematical concepts** in new ways and to support peer collegiality among math teachers who are experiencing success.
- ▶ Move from a traditional math instruction approach to a broader paradigm that makes it possible to say that **all students really can learn mathematics**.

**Call IDRA today! 210-444-1710**

### **IDRA Support**

Math Smart! training uses a variety of ways to work with school staff who can include workshop training, video conferences, demonstration lessons, pre-classroom-observations, project listserv web casting, online discussions and reflections. The Intercultural Development Research Association provides the following support for face-to-face and online coaching and mentoring sessions:

- ▶ Implementing the five dimensions of mathematical proficiency in a standards based curricula,
- ▶ Using cognitively guided instruction: Questioning techniques, teacher strategies, and building the classroom environment,
- ▶ Ongoing assessments of instructional efforts,
- ▶ Differentiating instruction in the mathematics classroom,
- ▶ Developing literacy skills (writing, reading, and building language in mathematics),
- ▶ Implementing cognitively challenging TAKS/TEKS aligned strategies for student success in math, and
- ▶ Supporting teachers through mentoring and coaching strategies.

### **Math Smart! Will Address Your Specific Needs**

Cross-cutting themes that will be incorporated into each training session include:

- ▶ “Helping Second Language Learners Excel in Math”
- ▶ “Kicking the Door Open: Increasing Student Enrollment and Achievement in Higher Level Mathematics”
- ▶ “Directing Instruction to Guide and Empower Student Mathematical Thinking”
- ▶ “Creating a Hands-On, Problem-Solving Environment to Energize Student Learning in Mathematics”
- ▶ “Propelling Student Thinking in Math Using Technology”
- ▶ “Engaging Parents to Ensure Student Success in Math”

# Review of Literature on Leadership

## An Excerpt from the New IDRA Book, “The Ohtli Encuentro – Women of Color Share Pathways to Leadership” – Part II

by Pam McCollum, Ph.D.

### African American Women

Most of the information on African American leadership is situated within larger gender research on women in leadership and management in corporate, public or educational administration (Anzaldúa, 1990; Lather, 1991; Marshall, 1989). African American women began entering the “mainstream” professional ranks in the 1970s, and organizational studies of Black professional women began to appear in the next decade.

While studies on leadership in women of color are small in number, they are complex in that they encompass a range of sociological factors such as gender, racism, sexism and one’s identity (positioning of oneself within the minority and majority cultures) (Walters and Smith, 1999). Early studies (Denton, 1990; Ferguson and King, 1996; King and Ferguson, 1996) focused on issues in Black women leaders’ personal, professional and communal lives. King and Ferguson (2001) found that multiple role expectations between the family and work and between the minority and majority cultures were stressful and sometimes debilitating to the women’s health. Many of these studies were done within the Black feminist framework.

**“As an African American who happens to be a woman, I already had two strikes against me. It was never enough just to ‘get by.’ Through both word and deed, I learned the art of ‘wearing the mask’; mastering and embracing the culture which was not mine, all the while holding on to and never giving up on the one which welcomed my birth.”**

– Kenya Eddings, Ohtli participant

In a study of African American female college presidents, Waring (2003) focused on identity, which was posited to be comprised of four elements: gender, race, ethnicity and class. Twelve college presidents were interviewed using a modified version of a questionnaire developed by Astin and Leland (1991). The authors found that the majority of participants felt the *relationship dimension*, rather than the *task dimension*, of leadership was central to good leadership and was the centerpiece of their leadership; two felt they operated in the task dimension of leadership. They reported they often spent time thinking about their presentation of self and their ideas due to their race and gender. There was a feeling that as African Americans they had to work harder to let others know who they are and what they could do. The roles of race were very salient for most of these women, while social class was mentioned infrequently.

Black women’s and White women’s corporate identity was

studied by Bell Edmondson and Nkomo (2003) in an eight-year study that compared the career choices and career paths of Black women and White women in corporate America. Survey data from the study showed that not only were the career trajectories different for the two groups, with White women advancing more quickly and earning larger salaries, but also that Black women felt they encountered different types of barriers, such as: (a) stereotypes of incompetence due to race; (b) assimilation or loss of their “Blackness” for others to be comfortable with them; (c) limited access to informal and social networks within their organizations; and (d) a hollow commitment to the advancement of women and minorities within their organizations.

Bloom and Erlandson (2003) studied leadership in three African American principals in urban schools systems using an in-depth naturalistic advocacy approach. Analyses of

*Review of Literature – continued on Page 10*

interviews were used to paint “portraits” of these women as leaders of strength who fervently believed in engaging with the Black community to better urban schools. They all felt that their families, culture and spiritual experiences in their childhood influenced their leadership style by their promotion of education as inalienable right: “The women survived through a committed dependence on family, community and spirituality. Openly acknowledging God and their faith, the women felt empowered to the struggle for social justice” (Ibid, p. 364).

### Native American Women

Traditional Native American leadership is distinguished by several characteristics across Native American groups due to its organization around spirituality, which is the organizational frame for leadership. Strong leaders were elders who had a strong spiritual core, displayed care for future generations and honored cultural traditions. Native American leaders led by example rather than authority. Leaders emerged from their contributions to the community and were recognized and selected on their perceived ability to lead. Tribal decision-making was deliberate and considered questions from many perspectives. When making decisions, Native American leaders considered the welfare of the tribe and future generations, which required deliberation, patience and consensus of tribe. Johnson (1982) reported that decision making in the Ojibwe tribe could often take days, weeks or even months before a decision was reached due to importance of the word, which was considered a binding pledge.

Prindeville (2004) studied women officials from 21 Indian nations who hold key policymaking positions in the executive, judicial and legislative branches of their tribes in the Southwest to examine their roles in tribal political

## New Release!

# The Ohtli Encuentro

## Women of Color Share Pathways to Leadership

A unique book that shares the wisdom of African American, Latina and Native American leaders



**This beautiful book presents the voices of 30 African American, Latina and Native American women who share their leadership journeys. IDRA brought together these women leaders to capture, honor and share their inspiring stories of leadership. This book highlights their moving stories.**

**Four dimensions, or pathways, of leadership were shared by the women as they told their personal stories: (1) history, language and culture; (2) community engagement; (3) vision, spirit and values; and (4) social change and institutional transformation. The book is accompanied with analytic reflections that present a brief review of the literature on women’s leadership and discusses common themes that arose from the women’s interactions in a multicultural, multi-generational gathering designed to explore leadership in women of color.**

The word “ohtli” means “pathway” in the Nahuatl (Mexican indigenous) language.

(ISBN# 0-9740243-8-4; 112 Pages; Boerne, Texas: Sor Juana Press 2005) \$15

Developed with support from the W.K. Kellogg Foundation. Order from IDRA, 5835 Callaghan Road, Suite 350, San Antonio, Texas 78228 • Phone 210-444-1710 • Fax 210-444-1714 • [contact@idra.org](mailto:contact@idra.org) • [www.idra.org](http://www.idra.org). Shipping and handling is 10 percent of the total price of the order. Orders must be prepaid. Purchase orders for orders totaling more than \$30 are accepted.

leadership. There was great variation in women’s participation in tribal politics. While women of the Navajo, northwestern Shoshone, Pascua Yaqui, and Pyramid Lake Paiute nations have participated in tribal politics for more than 100 years, Pueblo women in Acoma, San Felipe, and Santa Ana cannot participate for religious reasons.

Tribes where women’s participation was allowed showed considerable similarity in leaders’ paths to leadership, policy priorities and political goals in their tribal governments. The leader’s reasons for becoming politically active in rank order were the following: (1) public service ethic; (2) improving the quality of life; (3) civic duty; (4) professionalizing tribal government; (5) political reform; and (6) building tribal unity. Other studies have found Indian women enter politics due to a sense of civic duty as well as

the fact that they were socialized to value public service and to improve the well-being of others and their communities (Jaimes Guerrero, 1992; Prindeville and Bretting, 1998).

Native American women emerged in the wider society outside of tribal politics in the 1960s with Red Power movements in which women were prominent activists as well as leaders in community organizations and education. Women worked in greater numbers outside the tribal system than men because they were much more likely to complete high school than males and were better prepared to assume leadership roles (Strauss and Valentino, 2003).

### Latina Women

Vásquez (1982) wrote that much of the social science literature on  
*Review of Literature – continued on Page 11*

*Review of Literature – continued from Page 10*

Latinos has been done within a cultural-deficit perspective that assumed Latinos lacked the necessary cultural traits for leadership. Unrecognized is the fact that Latinos have a long history of being activists in the labor movement, organizing for workers' rights, equitable pay, safe working conditions and fair treatment (Kingsolver, 1989; Marquez, 1995; Segura, 1994; Zavella, 1988).

Recent research documents that Latinas are leaders and participants in all aspects of community politics as agents of social change, seekers of improvements in neighborhood services and mobilizers in Latino election campaigns (de la Garza, Menchaca and DeSipio, 1994).

In reference to Chicanas' success in political organizing, Pardo (1998) concluded that they are able to transform traditional family networks and cultural resources for action. In a similar vein, Louque (2002) in her study of African American and Hispanic scholars, found that the influence of family and culture were viewed as strengths, rather than cultural deficits when it came to leadership. More recently, others have written about transformative leadership in Latino communities (Rodríguez and Villarreal, 2001; Chahín and Rodríguez, Winter 2005).

To read more about leadership in women of color, read the newly-released, *The Ohtli Encuentro* –

*Women of Color Share Pathways to Leadership*. This beautiful book presents the voices of 30 African American, Latina and Native American women who share their leadership journeys. IDRA brought together these women leaders to capture, honor and share their inspiring stories of leadership. This book highlights their moving stories. The book also discusses common themes that arose from the women's interactions in a multicultural, multi-generational gathering designed to explore leadership in women of color.

---

Pam McCollum, Ph.D., is a senior education associate in the IDRA Division of Professional Development. Comments and questions may be directed to her via e-mail at [comment@idra.org](mailto:comment@idra.org).

## Highlights of Recent IDRA Activities

In **June and July**, IDRA worked with **2,397** teachers, administrators, parents, and higher education personnel through **65** training and technical assistance activities and **134** program sites in **13** states and Brazil. Topics included:

- ◆ School Holding Power
- ◆ Leadership: Challenges and Charges
- ◆ Harassment and Its Affect on the Learning Environment
- ◆ Creating Equal Education Opportunity
- ◆ Title IX Training

Participating agencies and school districts included:

- ◇ African American Leadership Institute, Texas
- ◇ Crystal City Independent School District, Wisconsin
- ◇ University of Texas at San Antonio, Downtown Campus
- ◇ U.S. Department of Education, Washington, D.C.

### Activity Snapshot

Through a series of mathematics institutes, IDRA delivered professional development training to secondary teachers based on (1) adequate yearly progress reports and accountability ratings, (2) closing the gaps and (3) increasing student achievement in secondary mathematics. These institutes integrated real-time data collection devices such as Texas Instruments CBL2s, CBRs, graphing calculators and Pasco Probeware; dynamic learning tools such as Geometer's Sketchpad, Fathom, and online java applets; and computer laptops for demonstrating the integration of computers into mathematics curricula that makes content accessible to *all* students. Technology integration shifted from integrating technology on a periodic basis, as was often the case according to teacher surveys, to one of integration as an ongoing basis so that mathematics success and access, enrollment and completion of higher-level mathematics courses becomes a reality for *all* students.

Regularly, IDRA staff provides services to:

- ◆ public school teachers
- ◆ parents
- ◆ administrators
- ◆ other decision makers in public education

Services include:

- ◇ training and technical assistance
- ◇ evaluation
- ◇ serving as expert witnesses in policy settings and court cases
- ◇ publishing research and professional papers, books, videos and curricula

*For information on IDRA services for your school district or other group, contact IDRA at 210-444-1710.*

# Tools for

## Math Paves Path

The U.S. Department of Education succinctly stated in a 1997 white paper, “Mathematics equals opportunity” (<http://www.ed.gov/pubs/math/index.html>). Students who take rigorous math and science courses in high school are far more likely to go to college than those who do not. Algebra I is widely recognized as a gatekeeper course. For students at risk of failure in this course, high school success and higher education options hang in the balance. Students who lack math literacy are poorly prepared, not only for state assessment tests and college entrance exams, but also for the demands of 21<sup>st</sup> century jobs and citizenship. So alarm bells go off when we realize that while average math scores for fourth and eighth graders are on the rise, significant achievement gaps in math persist for minority and low-income students.

Grounded in the conviction that all children deserve a quality education, IDRA is developing and testing practices in math education, and engaging administrators and teachers in making math more meaningful and accessible to all students.

## A Snapshot of What IDRA is Doing

**Conducting Research** – In partnership with a school district in San Antonio, IDRA is evaluating how its Math Smart! institutes impact student achievement. IDRA has designed Math Smart! around scientifically-based research strategies, proven to improve math proficiency in a standards-based curricula (see Page 8). The evaluation will test a broader application of these principles as they are implemented across a school setting.

**Developing Leaders** – Through IDRA’s ExCELS (Educators x Communities = English Language Learners = Success) project, funded by the U.S. Department of Education, high school math, science and social studies teachers are involved in an ongoing program to support academic success for English language learners. Recently, a core leadership team of ExCELS secondary teachers co-planned and presented on effective strategies for

English language learner instruction at a districtwide institute for their peers, including accessing, interpreting and using student data for planning instruction; principles of second language acquisition; effective content-specific methods and approaches for effective English language learner instruction; application to content; and grade-specific classes.

**Informing Policy** – In collaboration with superintendents and district administrators, IDRA is assisting districts in adopting school policies that increase minority student enrollment in higher mathematics courses.

**Engaging Communities** – Through Math Smart!, a series of mathematics institutes funded by the U.S. Department of Education, IDRA is engaging secondary teachers, school administrators and families in building student math proficiency and making schools more math-friendly, for all students and, in particular, for linguistically-diverse and economically-disadvantaged students. To learn more about Math Smart! or to bring a Math Smart! institute to your district or school, see: <http://www.idra.org/Services/mathsmart.htm> (also see Page 8).

## What You Can Do

**Get informed.** Education leaders will find articles, books and discussion groups on mathematics and equity at the **National Coalition for Equity in Education (NCEE)** web site <http://ncee.education.ucsb.edu/> and, in particular, may want to review, “**Inequity in Mathematics Education: Questions for Educators,**” an article by Julian Weissglass at [http://ncee.education.ucsb.edu/articles/Inequity\\_in\\_Math\\_Ed.pdf](http://ncee.education.ucsb.edu/articles/Inequity_in_Math_Ed.pdf). A Spanish translation of this article is available online at <http://ncee.education.ucsb.edu/articles/MTE.traduccion.pdf>.

Through *Helping Children Learn Mathematics*, a book that describes five strands of mathematical proficiency, the major changes that need to be made in mathematics instruction, instructional materials, assessments, teacher education, and the broader educational system,

# Action

readers will find recommendations for community members, parents, administrators and policymakers (Jeremy Kilpatrick and Jane Swafford, editors, Mathematics Learning Study Committee, National Research Council, available for purchase online at <http://www.nap.edu/catalog/10434.html>). A suitcase-full of other math and equity resources can be found at these sites:

- **Calculating Change**, video (also available in Spanish): <http://www.learner.org/resources/series36.html#jump1>.
- **TODOS Mathematics for All**: <http://www.todos-math.org/>.
- The National Council of Teachers of Mathematics, in cooperation with the National Action Council for Minorities in Engineering, Widmeyer Communications, and the **Learning First Alliance, Figure This!**: <http://www.figurethis.org/>. The Spanish-language version is online at: <http://www.figurethis.org/espanol.htm>.

**Get involved.** For educators and parents, the **EQUALS and FAMILY MATH programs** at the Lawrence Hall of Science, University of California at Berkeley, provide workshops and curriculum materials in mathematics equity and online resources for fun math activities (see <http://www.lawrencehallofscience.org/equals/>). Following a link on this site, you will also find *Háganlo Juntos – Problemas de matemáticas para grupos, grados 4-12* – a collection of more than 100 math problems for small groups (<http://shop.store.yahoo.com/lawrencehallofscience/hrganlojuntos.html>).

Parents may also want to check out: “**A Parent’s Guide to Helping Your Child with Today’s Math**” (National Education Association). A short article is available online at: <http://www.nea.org/parents/math.html>.

PBS Teacher Source publishes *Classroom Tips and Resources for Math Teachers* at [http://www.pbs.org/teachersource/whats\\_new/math/archives.shtm](http://www.pbs.org/teachersource/whats_new/math/archives.shtm).

If you are in Texas, the **TAKS Math Student and Family Guides**, a set of study guides published by the Texas Education Agency help students strengthen the

TEKS-based skills taught in class and tested on the TAKS (<http://www.tea.state.tx.us/student.assessment/resources/guides/study/index.html>).

**Get results.** The power to transform math education and raise student math achievement is in all of our hands. Leaders, parents and educators can get results by taking action in their own classrooms and neighborhood public schools and joining networks and coalitions that advocate for excellent, inclusive math programming and policies.

The **National Coalition for Equity in Education** (NCEE) supports the achievement of equity in education (<http://ncee.education.ucsb.edu/>).

The **Benjamin Banneker Association** is a national non-profit organization dedicated to mathematics education advocacy, establishing a presence for leadership, and professional development to support teachers in leveling the playing field for mathematics learning of the highest quality for African American students (<http://www.bannekermath.org/>).

The **Society for Advancement of Chicanos and Native Americans in Science** (SACNAS) encourages Chicano/Latino and Native American students to pursue graduate education and obtain the advanced degrees necessary for science research, leadership and teaching careers at all levels (<http://www.sacnas.org/>).

The **Minority Student Achievement Network** is a national coalition of multiracial suburban school districts that study the disparity in achievement between White students and students of color through intensive research and to develop and implement ways to ensure high academic achievement of minority students (<http://www.msanetwork.org/>).

Educators can organize *Math Family Nights* at their own schools with resources from The National Science Foundation. For resources on setting up a *Math Night* event in your neighborhood or school visit <http://orion.math.iastate.edu/mathnight/>. *Family Math Night – A Success Story* by Eva Kubinski is published at: [http://ccvi.wceruw.org/ccvi/pub/newsletter/Fall1998\\_ParentsSchsWorkingTogether/Family\\_Math\\_Night.html](http://ccvi.wceruw.org/ccvi/pub/newsletter/Fall1998_ParentsSchsWorkingTogether/Family_Math_Night.html).

*Challenging the Box – continued from Page 4*

different kind of mind set and work – somewhere outside the proverbial box.

The IDRA South Central Collaborative for Equity and the IDRA STAR Center (the regional comprehensive center serving Texas) have created and implemented a Math Smart! professional development program that provides middle school and secondary school teachers with an exciting “out-of-the-box” approach to math instruction integrating technology as a major vehicle for instruction (see Page 8). The program has been presented and used by teachers and students in several school districts in Texas. Preliminary results are encouraging and will be explored further in research that is being planned for the Math Smart! institutes:

- Teachers are excited to try new strategies when they receive the support they need to implement innovations in math instruction.
- Students can easily integrate technology to manage their own mastery of high-level math concepts.
- Students can be an excellent resource for teachers to acquire computer and technology competence when teachers are open and receptive to learning from

students.

- Teachers can make better instructional decisions when they listen to students about how they learn best.
- Minority students can learn and achieve in math when they are expected to.

School districts interested in exploring the Math Smart! institutes as a way to answer their own local response to the question, *How do we teach math and what do we expect?*, can contact the IDRA South Central Collaborative for Equity (210-444-1710; contact@idra.org; www.idra.org).

## Resources

Andrews, C.L., and L. Wilkins. *Aiming at Systemic Change by Addressing Equity Head On* (Maui, Hawaii: Women in Technology Project, Maui Economic Development Board, Inc., 2001). [http://www.womenintech.com/about\\_research/WEPANJournal10.pdf](http://www.womenintech.com/about_research/WEPANJournal10.pdf).

Dieckmann, J., and A.M. Montemayor. “Can Everyone Master Mathematics?” *IDRA Newsletter* (San Antonio, Texas: Intercultural Development Research Association, September 2004).

Grossman, F.D., and J. Ancess. “Narrowing the Gap in Affluent Schools,” *Educational Leadership* (Washington, D.C.: Association for Supervision and Curriculum Development, 2004) Volume

62, No.3.

Hambrick, A. *Remembering the Child: On Equity and Inclusion in Mathematics and Science Classrooms* (Naperville, Ill.: North Central Regional Laboratory, 2004).

Haycock, K. “Closing the Achievement Gap,” *Educational Leadership* (Alexandria, Va.: Association for Supervision and Curriculum Development, March 2001).

Jennings, L., and L. Likis. “Meeting a Math Achievement Crisis,” *Educational Leadership* (Alexandria, Va.: Association for Supervision and Curriculum Development, March 2005).

National Council of Teachers of Mathematics. *Principles and Standards for Mathematics* (Reston, Va.: NCTM, 2000).

Scott, B. “We Should Not Kid Ourselves: Excellence Requires Equity,” *IDRA Newsletter* (San Antonio, Texas: Intercultural Development Research Association, February 2000).

Stigler, J.A., and J. Heibert. “Improving Mathematics Teaching,” *Educational Leadership* (Alexandria, Va.: Association for Supervision and Curriculum Development, February, 2004).

---

Bradley Scott, Ph.D., is a senior education associate in the IDRA Division of Professional Development. Comments and questions may be directed to him via e-mail at [comment@idra.org](mailto:comment@idra.org).

*Esther Nelson – continued from Page 6*

hard work. The bulk of my research centers on reptiles and amphibians, for example to determine population fluctuations. This means that we try to determine what makes the populations of certain species go up and down. We capture the animals, we measure, weigh and mark them, and then we release them in order to track their movements. Other research projects include detecting levels of contaminants (insecticides) in various mammals and conducting song bird surveys.

I have worked with endangered species such as the Mexican spotted owl, the Northern goshawk and the

Southwestern willow flycatcher (birds). When one animal or species is lost forever (extinction), it has a significant impact on the food chain. An animal that feeds on the species that has become extinct has to find another food source, and the food that the extinct animal used to eat becomes overabundant. This is in addition to other changes in the environment and ecosystem that result when animals or plants become extinct.

What I love best about my job is that I am always outside in the sun with interesting wildlife. My coworkers also enjoy being outside doing research, and it is invigorating to be around people

that love what they do.

While I love my work, I also enjoy traveling home to visit my family and friends. I like watching movies and hanging out with friends. In the spring and summer, I enjoy fly fishing. Most of my interests outside of work are related to work, since they involve being outdoors. How wonderful that my work life matches so perfectly with my personal interests.

---

This story was reprinted from an IDRA publication entitled, *Minority Women in Science: Forging the Way – Student Workbook* (see Page 6).

*Simon Says – continued from Page 2*

accomplices. Those of us in the field of education, and a few scholars in mathematics, have posed an alternative vision for what it means to know and do mathematics, one that approximates the work of mathematicians. Such a vision includes *students* posing real math problems (not just *solving* trivial ones) and understanding deeply. It would mean heated debates of interesting math ideas and near ecstasy at the formulating of elegant solutions!

Imagine children, adolescents, and eventually adults, using math, fluidly and with pleasure, in every aspect of their lives as if it were their birthright. What image of school mathematics would produce this?

If most of us cannot fathom what such mathematics classrooms would look like, it is only because we have so few examples. It is no small task to let go of traditions. Like bad habits, they cling to us and we to them, even when they are harmful to us.

It will take nothing less than the public will, informed by and in partnership with education and math leaders, to stop the hemorrhagic loss of math talent that results from current math instruction. Perhaps each of us as adults cannot re-experience our elementary math training in the way I am calling for here, but we still have generations who are depending on us.

Most children stop playing Simon Says when they realize that it is fundamentally unrewarding. They have the good sense to do so. So should we, especially when so much as at stake.

Together, we have the power to replace Simon Says as our template for math learning with perhaps another childhood activity. Finger painting, anyone?

---

Jack Dieckmann, M.A., was an education associate in the IDRA Division of Professional Development. He is now a doctoral student at Stanford University. Comments and questions may be directed to him via e-mail at [comment@idra.org](mailto:comment@idra.org).

## Online Math Sites and Tools

### Algebra Helper

<http://www.algebrahelp.com/index.jsp>

### Algebra Concepts (at MathDork.com)

<http://www.mathdork.com/lessons.html>

### Basic Math Skills (at AAA Math)

<http://www.aaamath.com/index.html>

### Calculus Interactive Lessons (at Calculus-Help.com)

<http://www.calculus-help.com/>

### Calculus - Surfing Man

<http://www.ies.co.jp/math/java/calc/doukan/doukan.html>

### Cool Math

<http://www.coolmath.com/>

### Creating a Graph

<http://nces.ed.gov/nceskids/graphing/>

### Discovering Motion – Interactive

<http://www.mste.uiuc.edu/murphy/MovingMan/MovingMan.html>

### Free Graphing Software

<http://www.mathgv.com/index.html>

### Go Math

<http://www.gomath.com/>

### Grapher (Digital Classroom Resources)

<http://www.mathdl.org/mathDL/3/>

### Interactive Math Applets

<http://illuminations.nctm.org/tools/index.aspx>

### Intercultural Development Research Association, “Diversity Bookmarks Collection”

<http://www.idra.org/scce/DACRsrc.htm>

### Inverse Functions

<http://www.uncwil.edu/courses/mat111hb/functions/inverse/inverse.html>

### Polynomial Grapher

<http://www.mathdl.org/mathDL/3/?pa=content&sa=viewDocument&nodeId=405>

### Quick Math

<http://www.quickmath.com/>

**See also Tools for Action on Pages 12-13.**

# School Reform Isn't Acceptable if It Isn't Equitable

Sometimes doing nothing is better than doing something, especially when “something” is the wrong thing to do. The Intercultural Development Association is committed to creating schools that work for all students. We were pleased that the Texas legislature has chosen to end the latest special session without acting on a proposed school finance plan that most agree would have been inequitable, inadequate and inappropriate.

Our assessment of the plans under consideration in the just-concluded special session indicate that neither the House nor the Senate proposals even came close to meeting the mandates outlined by the district court in *West Orange-Cove vs. Neeley*, which called for substantive increases in state funding, increased funding for bilingual and compensatory education, and expanded state efforts to fund facilities.

According to the Equity Center, the legislature's major proposal would have increased the funding gap by giving a “typical elementary school in a

property-rich district approximately half a million more a year for education than other elementary schools across the state.” And the lack of attention to facilities funding would have made inequities dramatically worse.

Our leaders must do what is needed to meet the state's constitutional requirement of making “suitable provisions for the establishment of an efficient system of public free schools.” While the state continues to complain about court “interference” in providing quality schools, it has yet to produce a plan that addresses the issues plaguing the current system.

As the Texas Legislature considers its next steps, it is time to worry less about providing tax swaps that only benefit the wealthiest schools in the state and to focus on equitable funding for all schools.

In order to provide meaningful school finance reform that will improve our school finance system, close the educational achievement gap and meet the standards set by the courts, the

legislature must:

- **Keep and improve equitable funding** between property rich and property poor school districts.
- **Substantially fund facilities** construction so that school districts can provide a nurturing and supportive learning environment for our school children.
- **Keep and increase funding “weights”** to meet the cost of educating school children who are English language learners, economically disadvantaged, gifted and talented, and/or who are disabled.

Texas cannot afford an excellent system for some and a minimally adequate system for the rest. We can have excellent education for all Texas school children! The future of Texas depends on it.

---

Statement by María “Cuca” Robledo Montecel, Ph.D., IDRA executive director, on the closing of the first 2005 Texas Legislative Special Session. For more information visit [www.texans4fairfunding.org](http://www.texans4fairfunding.org).



5835 Callaghan Road, Suite 350  
San Antonio, TX 78228-1190

Non-Profit Organization

U.S. POSTAGE PAID

Permit No. 3192  
San Antonio, TX 78228



Creating schools that work for all children,  
through research • materials development • training • technical assistance • evaluation • information dissemination