

The Rice University School Mathematics Project's
Urban Program in the Houston Independent School
District's North District

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Presenters

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- Elaine Eaves, Support Teacher, Houston
Independent School District (HISD)



Houston
Independent School District

- Seventh largest school district in the United States with 210,000 students and 32,000 employees in 286 schools
- Ethnically diverse: 56% Hispanic, 31% African-American, 10% Anglo, 3% Asian and American Indian
- 79% Economically Disadvantaged

Houston ISD awarded the Broad Prize for Urban Education

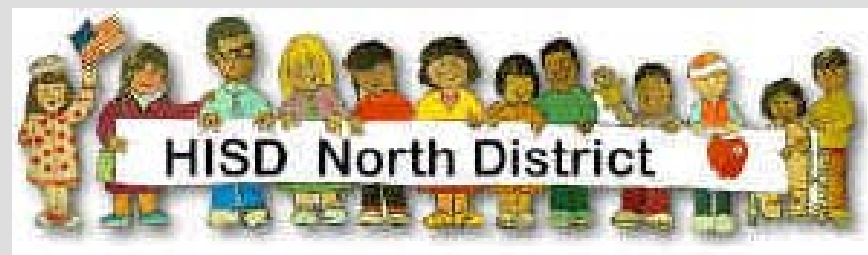
- The largest in public education, the Broad Prize was created to reward educational innovation and improvement.
- HISD was awarded the inaugural prize for showing the greatest overall improvement in student achievement while at the same time reducing the achievement gap across ethnic lines and between high- and low-income students.



the**broad**foundation

North District of HISD

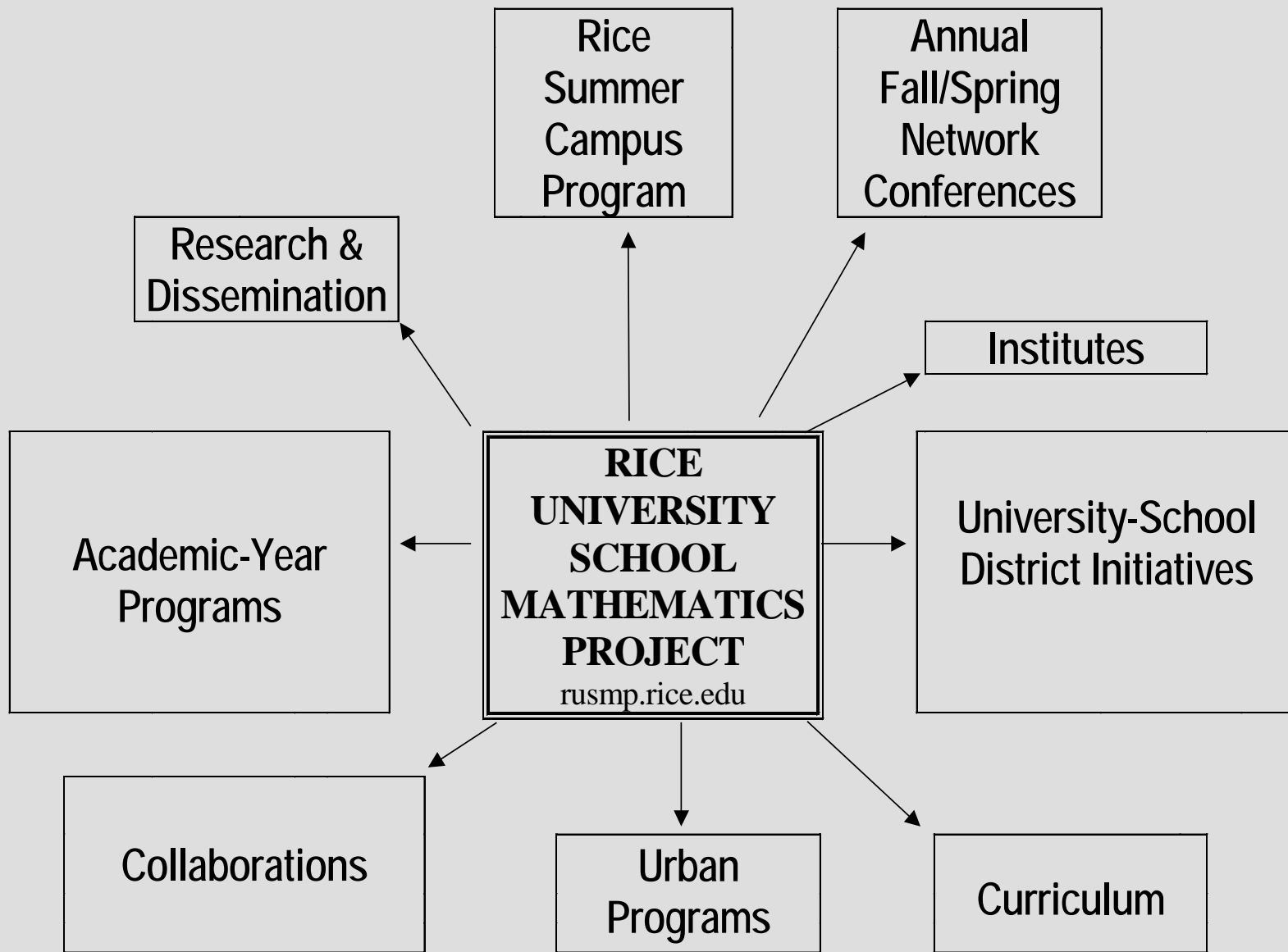
- One of fourteen administrative districts in HISD
- 1 high school, 3 middle schools, 14 elementary schools
- 16,600 students
- 89% Hispanic, 6% African American, 4% Anglo
- 93% Economically Disadvantaged





Rice University School Mathematics Project

What is the Rice University School Mathematics Project?





RUSMP Major Goals

- Work with Houston-area teachers of mathematics to improve their mathematical knowledge.
- Promote and model more effective teaching of mathematics that involves greater student involvement in the learning process.
- Encourage the use of technology and manipulatives in the teaching of mathematics.



RUSMP Teaching Goals

- Develop important mathematical concepts.
- Emphasize student thinking, activities, creativity, and products.
- Make connections with the real world, with other disciplines, and in particular, with science.
- Integrate manipulatives, calculators, and computers.
- Foster discovery and group activities.



RUSMP's Urban Program

The *Urban Program* is driven by a central premise -- that effective professional development is best implemented over a full three-year period with students and teachers at targeted schools. This ensures that adequate time, attention, and support are invested to make teaching and learning meet the needs of all students in the school.



RUSMP's Urban Program

The *Urban Program* delivers to the entire mathematics faculty of a school a model for teaching mathematics from a problem-solving approach based on the major strands in the National Council of Teachers of Mathematics *Standards*.

RUSMP Urban Program

Teaching Goals

- Improve teachers' mathematics knowledge;
- Assist teachers in transferring knowledge gained to their classroom teaching;
- Model and promote teaching and assessment techniques that increase student involvement;



RUSMP Urban Program

Student Goals

- Foster an increased sense of confidence in students' abilities to learn mathematics;
- Develop a positive attitude towards learning and using mathematics; and
- Increase students' knowledge of mathematical content.



Urban Program Components

- Participation in the annual RUSMP four-week teacher enhancement program to improve the mathematical knowledge and pedagogy of teachers in the targeted schools;

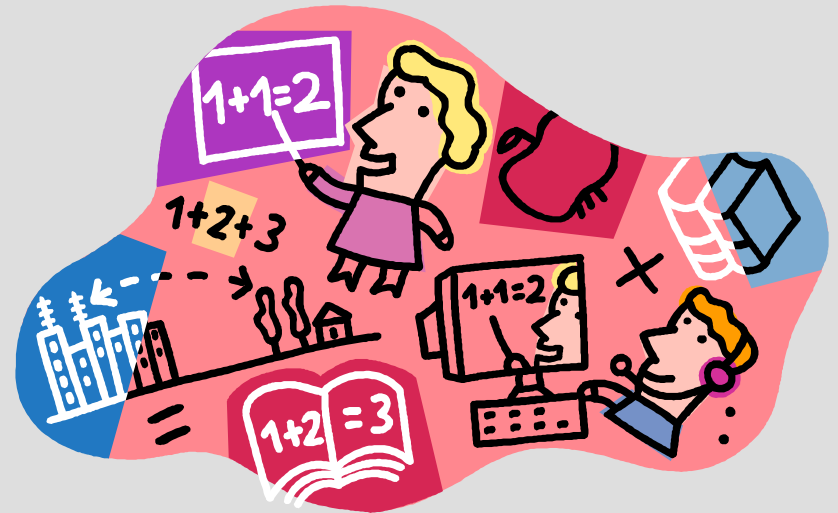


Urban Program Components

- Creation of a teacher support program in the targeted schools consisting of:
 - RUSMP Support Teachers on-site to facilitate teacher implementation of mathematical reform in their own classrooms during the summer and academic year;
 - an on-site summer school program with participating teachers and their at-risk students during two consecutive summers;
 - an academic-year program with participating teachers and all their students which includes planning time for teachers to work with the Support Teachers during three consecutive academic years;

Urban Program Components

- Building of a school infrastructure for institutionalization of mathematics reform on the campuses involving teachers, administrators, parents, counselors, and RUSMP staff.





Collaborative Planning

- Collaboration at many levels
 - Collaboration within a school-- common planning time during the summer and academic year
 - Collaboration between schools--monthly meetings of Support Teachers to ensure a common vision



RUSMP's Urban Program in HISD's North District

- Funded by the Toyota USA Foundation for three years at \$400,000 (their largest grant to an organization to date); and
- Targeted the three middle schools in the HISD North District- Burbank, Fonville and Patrick Henry.

LEARNING PLAN

Exploratory Activities	Concept
Concept Development Activities	Materials and Resources
Basic Facts and Standard Algorithms Formalized	Originality and Creativity <i>Student Products</i> Written
Assessment	Verbal Kinesthetic
Related TEKS	Visual

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Role of the Support Teachers

- Led the development of the classroom curriculum as it related to the Texas Essential Knowledge and Skills (TEKS);
- Interpreted the TEKS
 - Created HISD 6th-, 7th-, & 8th- grade scope and sequences; and
 - Developed classroom curriculum (6th-, 7th- and 8th- grade learning plans).



Role of the Support Teachers

- Developed North District's benchmark testing;
- Led the schools' mathematics teachers in planning sessions;
- Facilitated and monitored staff development;
- Served as a resource person for classroom teachers.

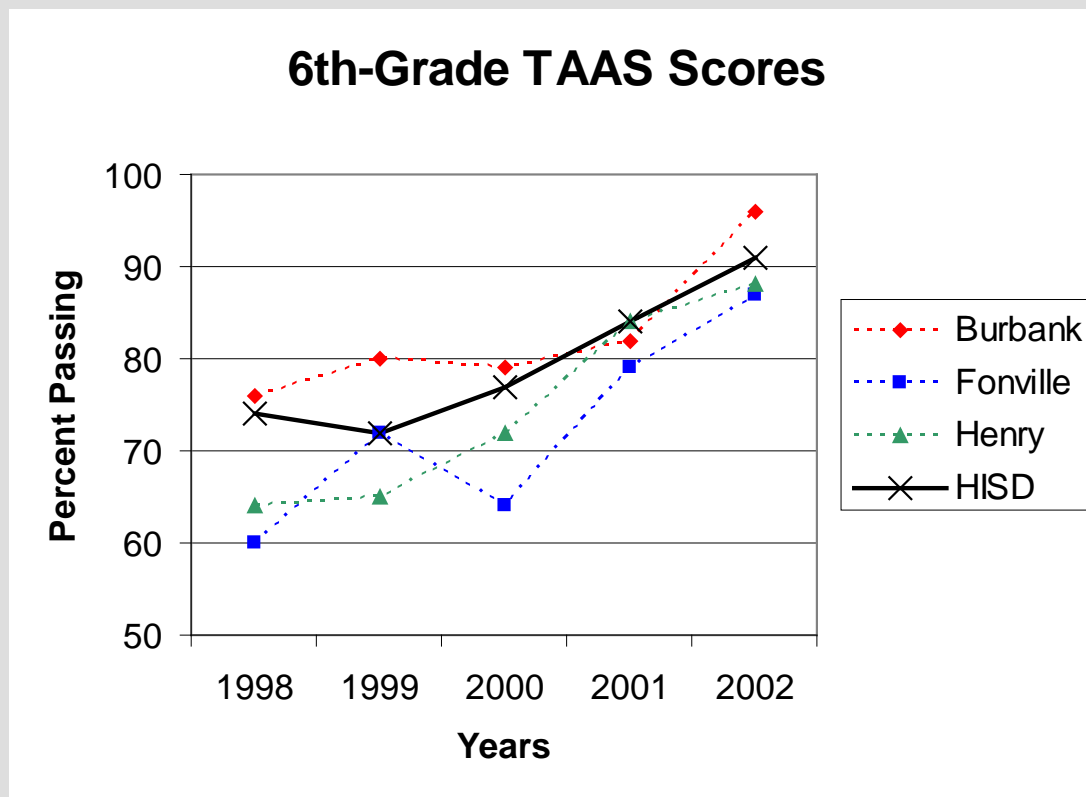


Role of the Support Teachers

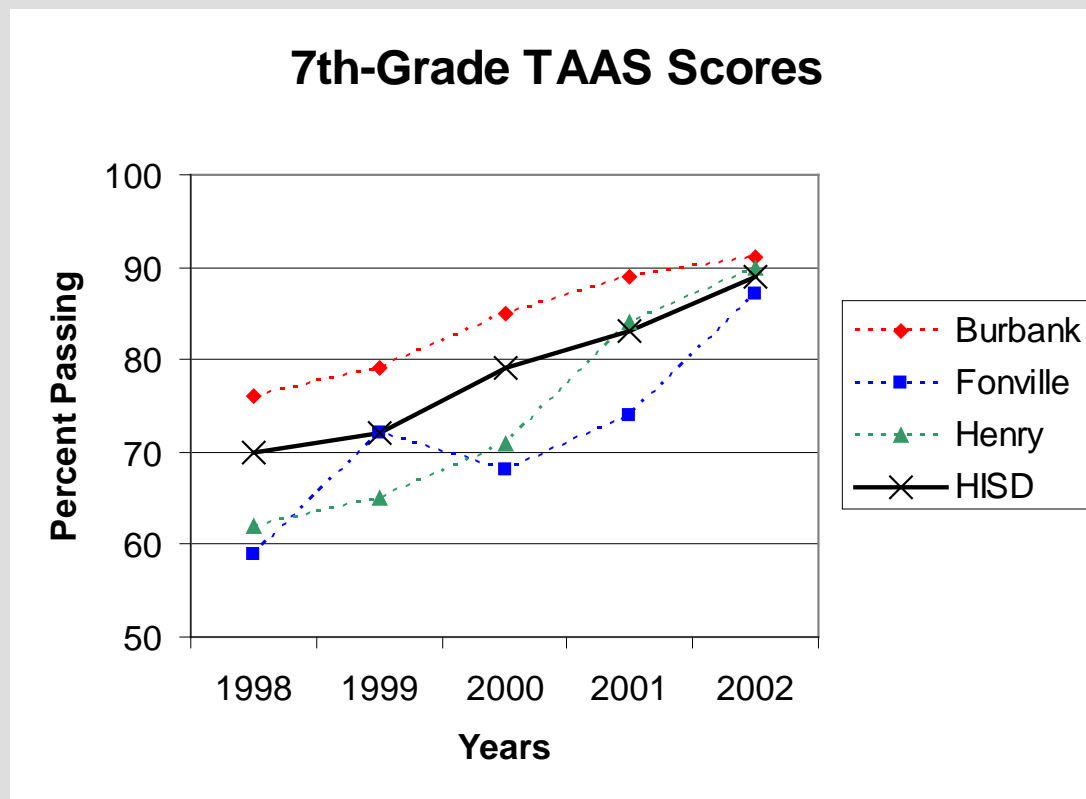
- Provided demonstration lessons for 6th-, 7th- and 8th-grade teachers;
- Developed related summer school curriculum; and
- Operated the summer math program.

<p>Exploratory Activities Algebra Thinking 1st Experience: Tables 9-13</p>	<p>CONCEPT Ratio and Proportion (8th Grade)</p>
<p>Concept Development Activities <i>Rethinking Middle School Mathematics: Proportionality Across the TEKS: “Unit Rates”</i></p> <p><i>Comparing and Scaling: Investigation 4</i> <i>Algebra Problems and Puzzles Grade 6: “In the Jar”: A-D</i> <i>Rethinking Middle School Mathematics: Proportionality Across the TEKS: “One Size Fits All”</i></p> <p><i>Stretching and Shrinking: Investigation 1 –5</i> <i>Rethinking Middle School Mathematics: Proportionality Across the TEKS: “Jet Ski Rental”</i></p>	<p>Materials and Resources</p> <ul style="list-style-type: none"> •Creative Publications: <i>Algebra Thinking:1st Experience</i> •Creative Publications: <i>Algebra Problems and Puzzles Grade 6</i> •Connected Math: <i>Stretching and Shrinking</i> •Connected Math: <i>Comparing and Scaling</i> •TEXTEAMS: <i>Rethinking Middle School Mathematics: Proportionality Across the TEKS</i> •Colored cubes •Graph paper, dots, meter sticks, markers •Rubber bands •Pattern blocks •McDougal Littell: <i>Passport to Mathematics Book 3</i>
<p>Basic Facts and Standard Algorithms Formalized <i>Comparing and Scaling: Application Problems pp. 44-50</i> <i>Comparing and Scaling: Additional Practice p.156</i> <i>Passport pp. 542-545, 350-353; 378-379</i> <i>Stretching and Shrinking: Application Problems pp. 9-12; 22-25; 33-3747-57</i> <i>Stretching and Shrinking: Additional Practice pp. 172-180</i></p>	<p>Originality and Creativity Student Products Written Write a letter to the editor of the school yearbook explaining why doubling the size of student pictures will require more than double the space on a page.</p>
<p>Assessment <i>Algebra Problems and Puzzles Grade 6: “In the Jar”: E and F</i> Create problems to illustrate both proportional and non-proportional relationships. Project CLEAR <i>Task</i>: pp. 1-16, 11-2, 11-4, 11-6, 11-7, 11-10</p>	<p>Verbal Explain to your group how to enlarge a cartoon drawing.</p> <p>Kinesthetic Make a scale model of the school.</p>
<p>Related TEKS 8.2.D, 8.3.A, 8.3.B, 8.5.A, 8.4.A, 8.5.B, 8.6.A.</p>	<p>Visual Make a scale drawing of a room in your house.</p>

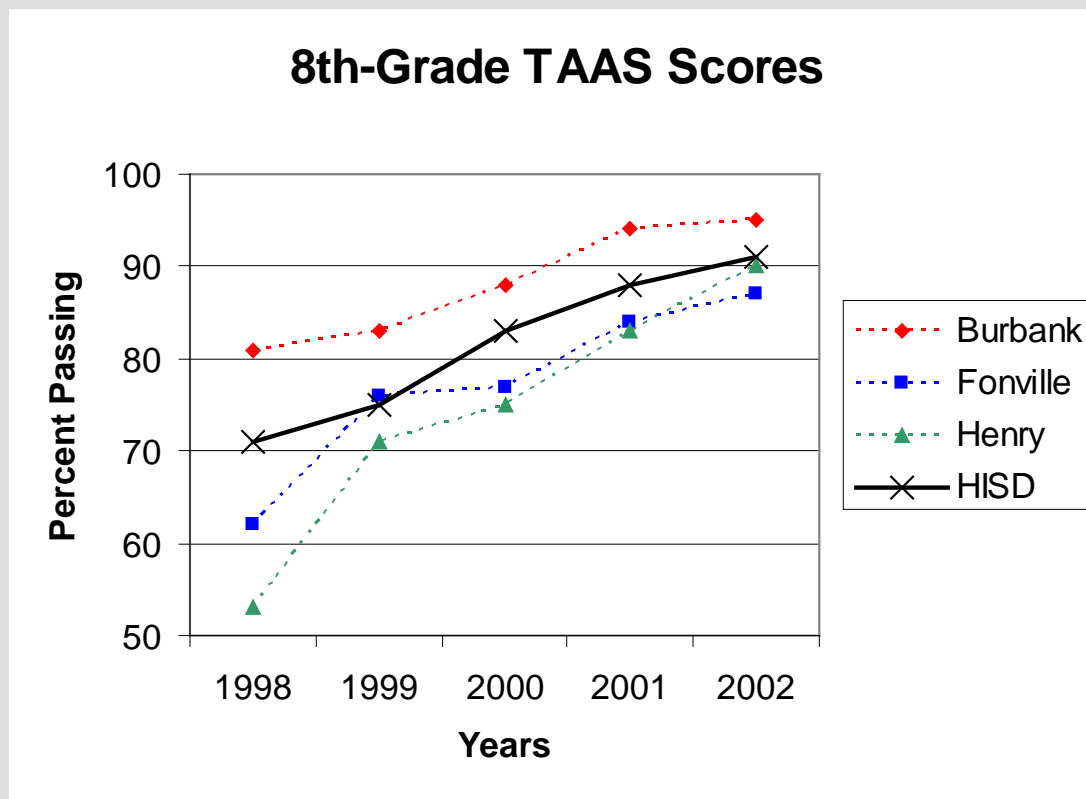
Results of the North District Urban Program



Results of the North District Urban Program



Results of the North District Urban Program





Students' Motivation and Attitudes

- Developed better attitudes towards mathematics;
- Increased positive motivation for learning mathematics;
- Increased self-confidence in mathematics; and
- Decreased likelihood of work avoidance in mathematics class.



Students' Motivation and Attitudes

- Perceived their teachers to have higher expectations for their mathematics performance; and
- Felt their teachers placed a greater emphasis on understanding mathematics concepts.



Teachers' Experiences

- Reacted positively to the program;
- Gained valuable approaches to classroom instruction; and
- Increased their collaboration with other teachers.



Impact on Instruction

- Employed reform-based teaching strategies;
- Used learning plans developed for the program;
- Focused on a problem-solving approach with students;



Impact on Instruction

- Developed, for the first time, a consistency in middle school mathematics instruction throughout the North District; and
- Provided the high school that most of the three middle schools' students attended a clear understanding of the mathematics taught at the middle school level.



Urban Program Recognition

RUSMP's Urban Program was cited in *What Works in the Middle: Results-Based Staff Development* as one of the top seven mathematics professional development programs in the United States for its impact on student achievement in the middle grades (Killion, 1999).