Houston Independent School District

Third Annual
Summer Program
Evaluation Research Series
“What Works”

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Rice University
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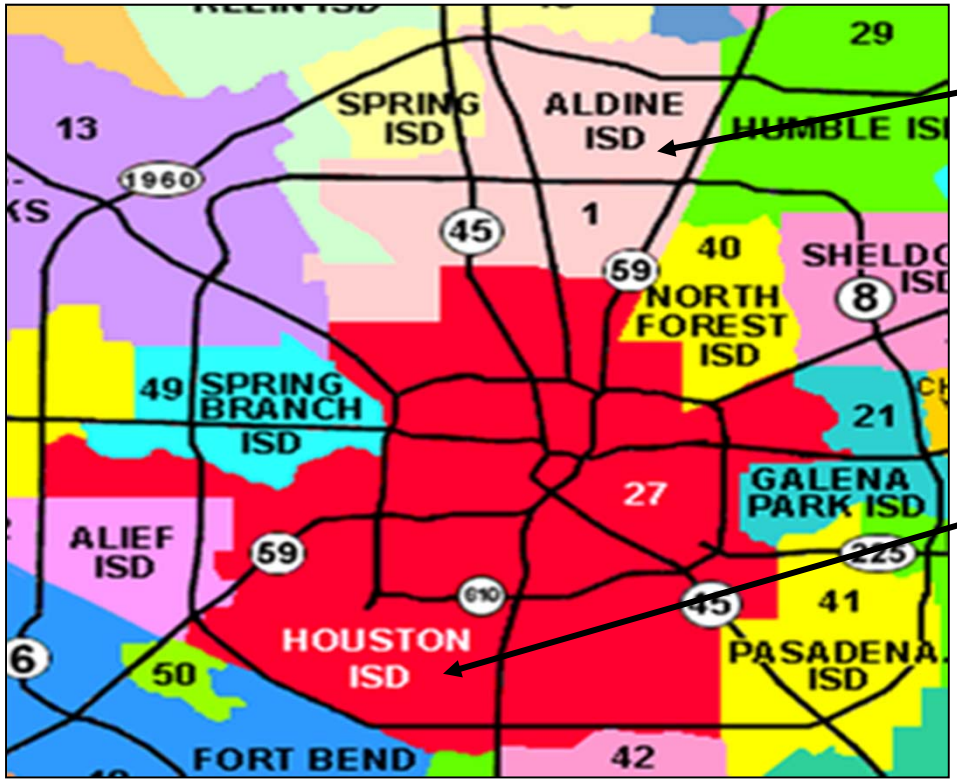
Teachers' Professionalism
Students' Success
Systemic Change

Ngozi J. Kamau, Ph.D.
Rice University School Mathematics Project
Associate Director for Research and Evaluation

2004-05 to 2009-10
Aldine and Houston ISDs



Aldine ISD

From: 56,255 students
Texas' 12th largest school district

To: 62,532 students
Texas' 11th largest school district

Houston ISD

From: 208,454 students
To: 200,944 students

Texas' largest and the nation's 7th largest public school district

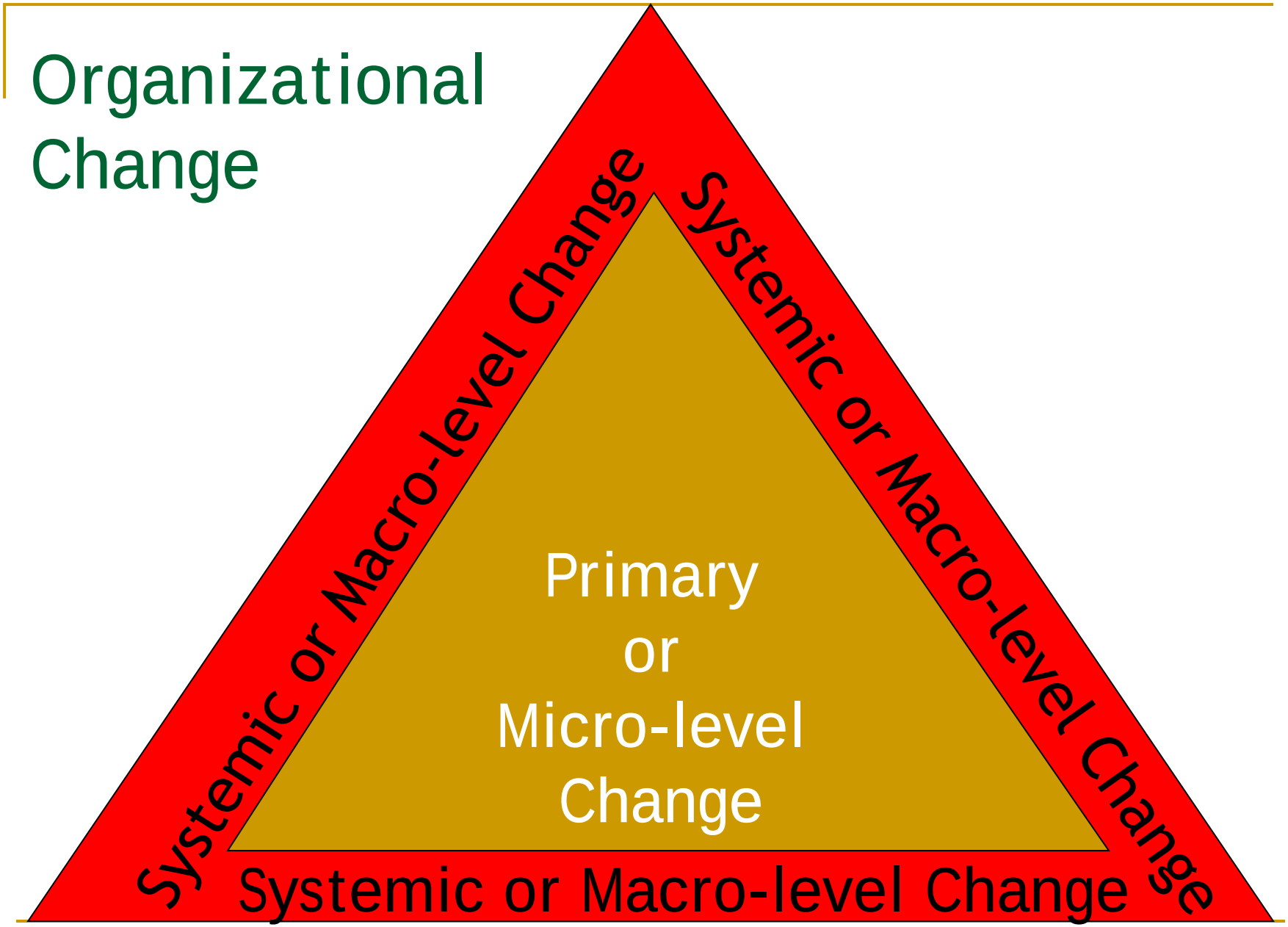
MLI Purpose

Meet the demand for mathematics instructional support and leadership by developing the professionalism of high school lead teachers to improve teaching and learning.

MLI intended to serve as a catalyst to…

- initiate change at the grassroots level;
- influence the type and direction of mathematics instruction in participating schools and school districts; and
- increase student achievement.

Organizational Change



Watzlawick, P., Weakland, J., & Fisch, J. (1974). Change: Principles of Problem Formation & Problem Resolution, NY: W.W. Norton.

MLI lead teachers served as change agents to…

advance the type and direction of mathematics instruction and learning to increase student success.

MLI's Definition of Student Success

- Conceptual understanding
- Problem-solving skills
- Confidence

for

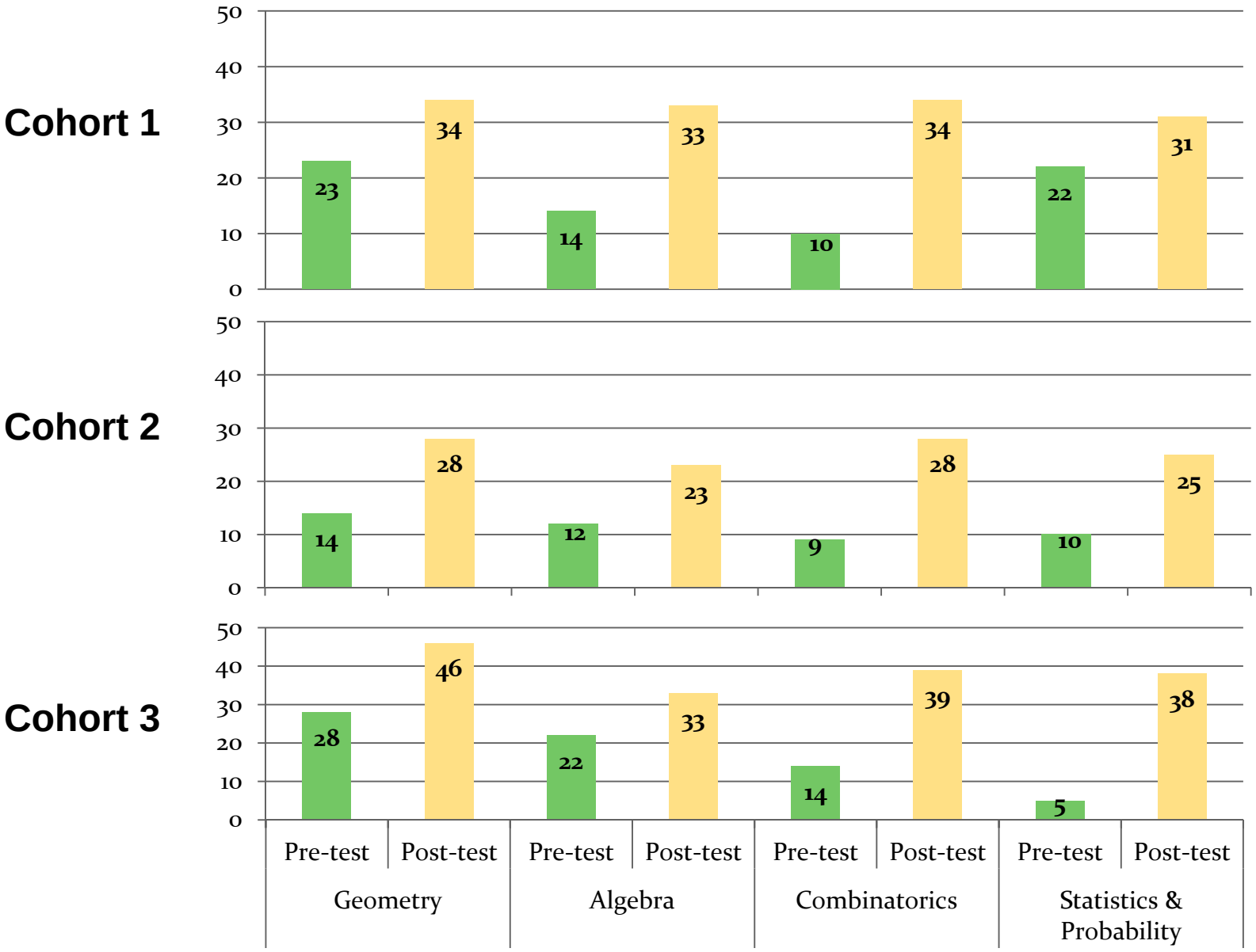
- Success on state-mandated high-stakes assessment
- Desire to enroll and succeed in higher-level mathematics courses

MLI's Definition of Student Success

- Multi-faceted
- Grounded in theories of learning as a social, student-centered experience that engages students in strong mathematics explorations that are aligned with students' learning styles

MLI's Summer Leadership Institutes focused on…

- development of lead teachers' translation skills necessary for quality instruction; and
- connections between lead teachers' MLI mathematics experiences and the secondary mathematics curriculum they were expected to teach.



All raw score gains were statistically significant at p = 0.000.

Effective Instructional Practice

Active student engagement in rigorous, student-centered mathematical experiences is understood by MLI lead teachers to be an important precursor to and aspect of student success.

Lead Teachers' Instructional Practices

Propositional Knowledge	Percent
Teacher had a solid grasp of the subject-matter content inherent in the lesson.	99.0
Lesson involved fundamental concepts of the subject.	99.5
Connections with other content disciplines or real world phenomena were explored and valued	65.1

Total MLI observations (n=192)

Lead Teachers' Instructional Practices

Procedural Knowledge	Percent
Students were actively engaged in thought-provoking activities that often involved the critical assessment of procedures.	76.4
Intellectual rigor, constructive criticism, and challenging ideas were valued.	75.6
Students used a variety of means to represent concepts	73.1
Students made predictions, estimations, or hypotheses and devised means for testing them.	57.8

Total MLI observations (n=192)

Lead Teachers' Instructional Practices

Lesson Implementation	Percent
Students appeared to be engaged in the lesson.	92.2
Students worked independently.	89.5
Teacher presented a lesson that was designed to engage students as members of a learning community	85.2
Teacher incorporated technology.	71.4
Teacher used hands-on, interactive activities to develop the concept.	58.8

Total MLI observations (n=192)

Texas Assessment of Knowledge and Skills (TAKS) - Mathematics

- *Each year, the mean scale scores for students of MLI lead teachers were higher than the mean scales scores of the same students on the previous year's assessment.*

- *The mean scale scores of students of MLI lead teachers were statistically significantly higher when compared with the mean scale scores of students of comparison teachers, except for sophomores in the 2006-2007 academic year.*

McCoy (2011). *The Rice University Mathematics Leadership Institute final report*. RUSMP DN:11-01, p. 29.

Primary Changes to Establish High-Quality Professional Learning Communities

- Common, collaborative planning time for teachers
- Peer mentoring
- Adequate class time and creative ways for students to discover and explore for the sake of learning

Teachers' Implementation Experiences

During the school year did you…	Yes		No	
	N	Percent	N	Percent
create a model classroom?	63	88.7	8	11.3
introduce new strategies into your instructional approaches?	72	98.6	1	1.4
encourage your mathematics colleagues to use teaching strategies you learned through MLI?	68	93.2	5	6.9
have all teachers discuss and agree on the teaching strategies that will be used to introduce and develop lessons?	45	63.4	26	36.6
build rapport with and among teachers?	71	98.6	1	1.4
validate other teachers' work?	66	91.7	6	8.3
ask faculty members on your campus for help?	61	84.7	11	15.3

Lessons Learned

Teachers would benefit from mathematics courses in:

- mathematical modeling
- number theory
- calculus
- probability
- linear algebra
- mathematical induction
- sequences and series

Systemic Changes to Establish High-Quality Professional Learning Communities

- Administrative support to improve student behavior, student learning, and student success
- Structure for accountability
- More remediation through meaningful, rigorous, and student-centered learning activities for struggling students

Lessons Learned

- The top-down structure and site-based management approach in the districts made it difficult for teachers to openly and effectively advocate for instructional changes on their campuses.

- Structures within schools permitting collaboration were necessary to develop collegial exchanges with other educators.

Rice University School Mathematics Project

http://rusmp.rice.edu/

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http://nsfmli.rice.edu/

Ngozi Kamau
nk5@rice.edu