



Mathematics Coaching: Findings from a Program Showing Students' and Teachers' Mathematics Content Improvement

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Mathematics Coaching Program



The Journey

- Continued poor performance in mathematics.
- Tons of federal and state funding on curriculum and professional development.
- Mathematics Education Research and what captured our attention.



Traditional Professional Development

- Teach large groups of teachers good stuff.
- Use a train the trainers model.
- Go to conferences, read journal articles.
- Talk to experts.
- Lesson study, curriculum development.
- Hands-on, minds-on, calculators.
- High-quality professional development.



Results of Traditional PD

- Low scores still low.
- High scores still high.
- Not much teacher change.
- Not much use of research-based and standards-based ideas.
- Tons of funding with no major difference; (



Kindergarten

- See what 5-year-olds can do.
- What does the teacher do?
- What do you observe children doing?
- What does not happen as you might expect?



Student Thinking Fever

- Students are not learning mathematics the way we are teaching.
- We must learn how students can learn mathematics and how we need to teach so that learning can happen.
- Lowest performing schools.
- Lowest performing students.
- Lowest strand of mathematics.



The Mathematics Coaching Program (MCP)

- **The Guiding Question:**
 - How do we get research-based strategies into this classroom, with this teacher, with these students, with this curriculum, and with these materials?
- **The MCP Approach:**
 - Coaches are assigned to one elementary school to provide classroom-embedded professional development to teachers on research-based strategies.



MCP Coaches' work

- Focusing on student thinking and learning.
- Provides an informed and rigorous focus on the Ohio standards for mathematical processes.
- Data-based decision making.
- Professional development in content, pedagogy, and coaching (~300 hours of PD during academic year).
- Curriculum independent.

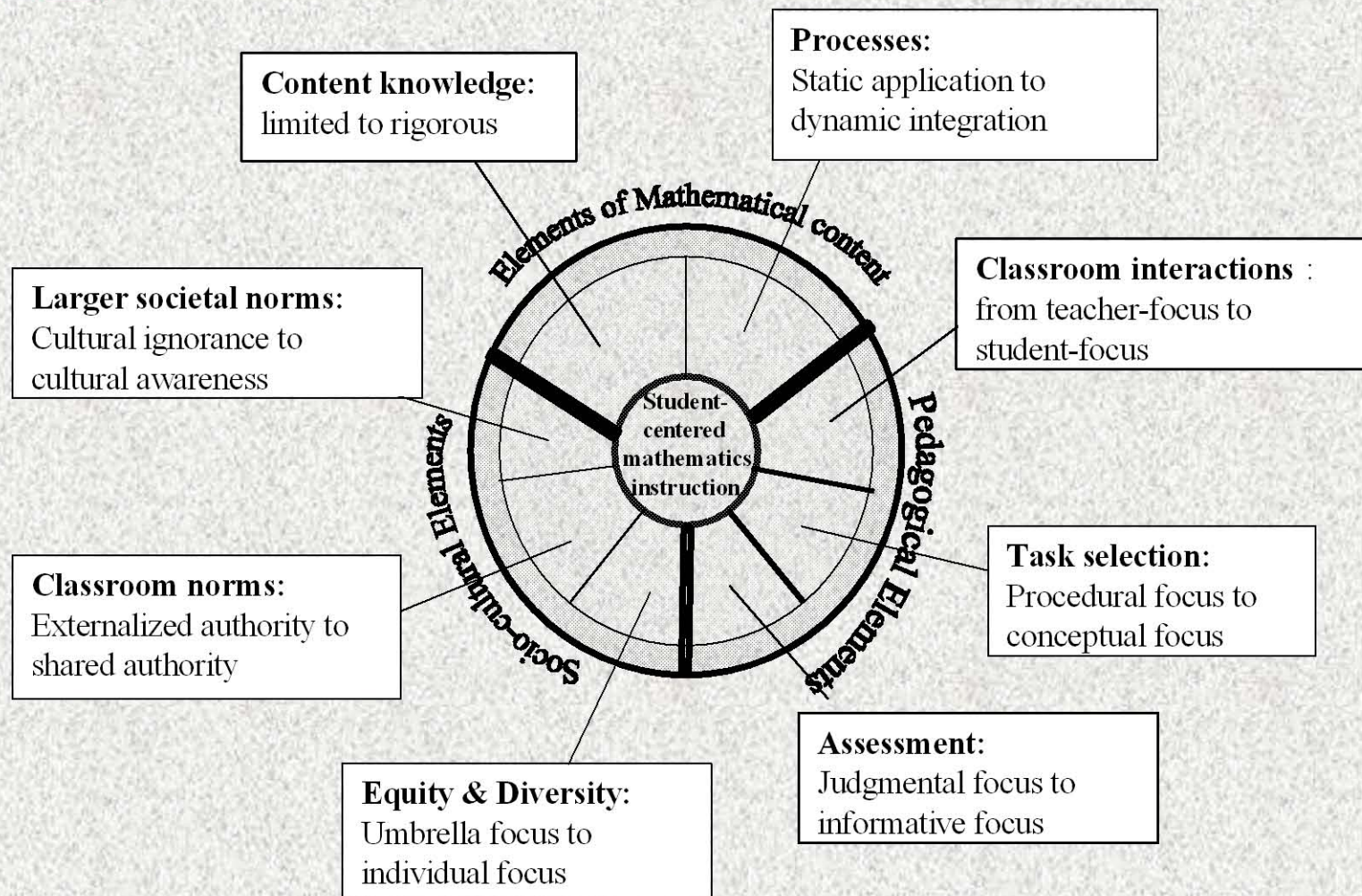


MCP: Framework

- Mathematical Content
- Pedagogical Elements
- Socio-Cultural Elements



MCP Conceptual Framework





Research Base

- Student Thinking
- Inquiry



MCP: Research Base

- Teacher content knowledge (Leinhardt & Smith, 1985; Lampert, 1990; Ma, 1999; Simon, 1993); Mathematics knowledge for teaching (Ball, Hill & Bass, 2005); PCK (Shulman, 1986, 1987; Pinar, Reynolds, Slattery & Tubman (1995); Wilson, Shulman & Richert, 1987)
- Critical features of instruction (Hiebert, J., Carpenter, T., Fennema, E., Fuson, K., Wearne, D., Murray, H., Oliver, A., & Human, P., 1997); Teaching practice (Lampert, 1990; Ball & Cohen, 1999; Smith, 2001),
- Student thinking (Fennema & Carpenter, 1990; Franke; Bright; Cobb, Wood, Yackel; Battista)
- Non-instructional factors (Crane, 1996; Erickam, Lapointe & McCreith, 2005; Ladson-Billings, 1995a; 1995b; Tate, 1997).
- PD (Darling Hammond & McLaughlin, 1995; Shifter & Fosnot, 1993; Sparks & Loucks-Horsley, 1990).
- Mathematics Coaching (Davenport, Grant, Carter, Gorman & Mark, 2006; Staub, Resnick, West).



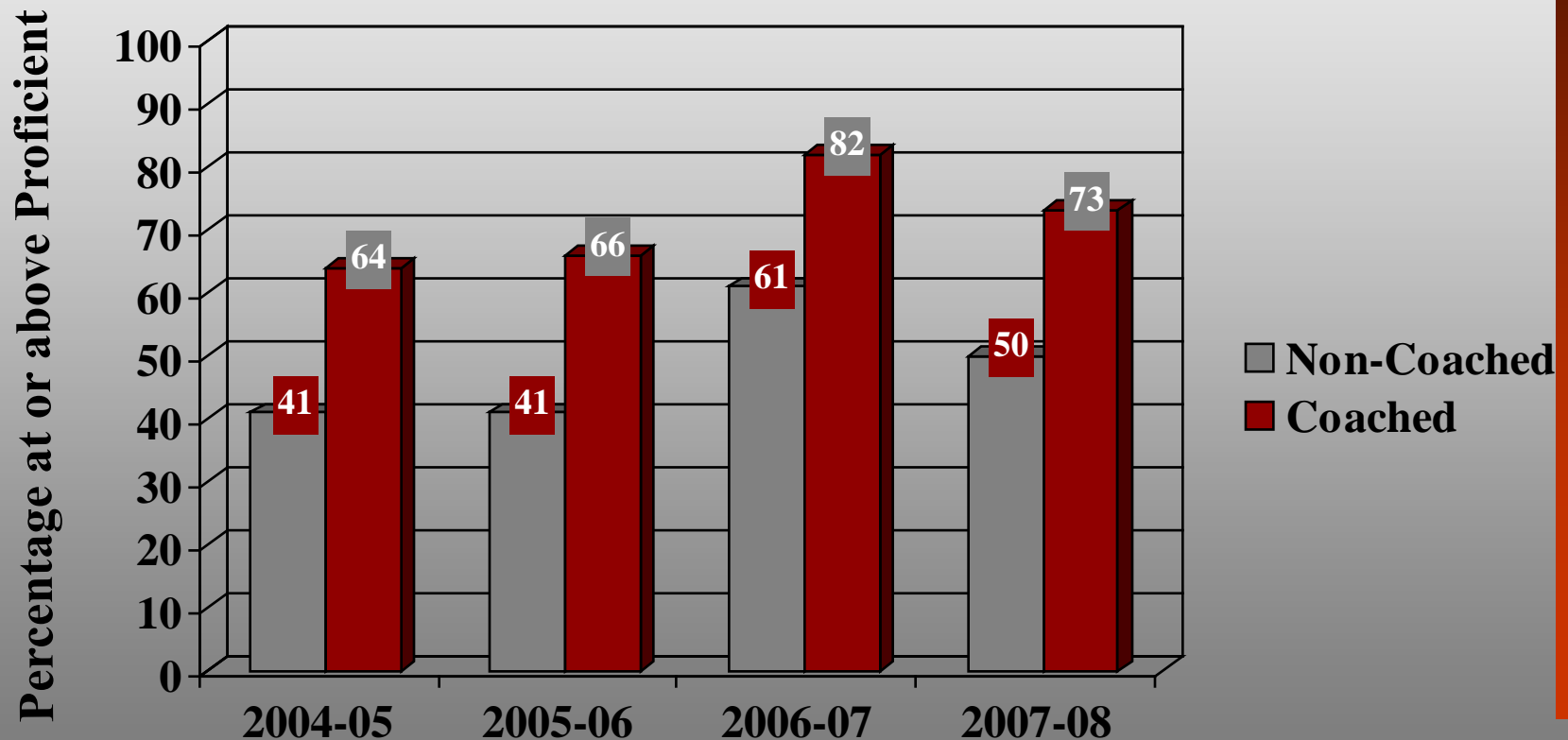
We have one GOAL

Work together to get researched-based ideas working in YOUR classroom with YOUR kids using YOUR materials and YOUR curriculum to improve student learning and understanding of mathematics.



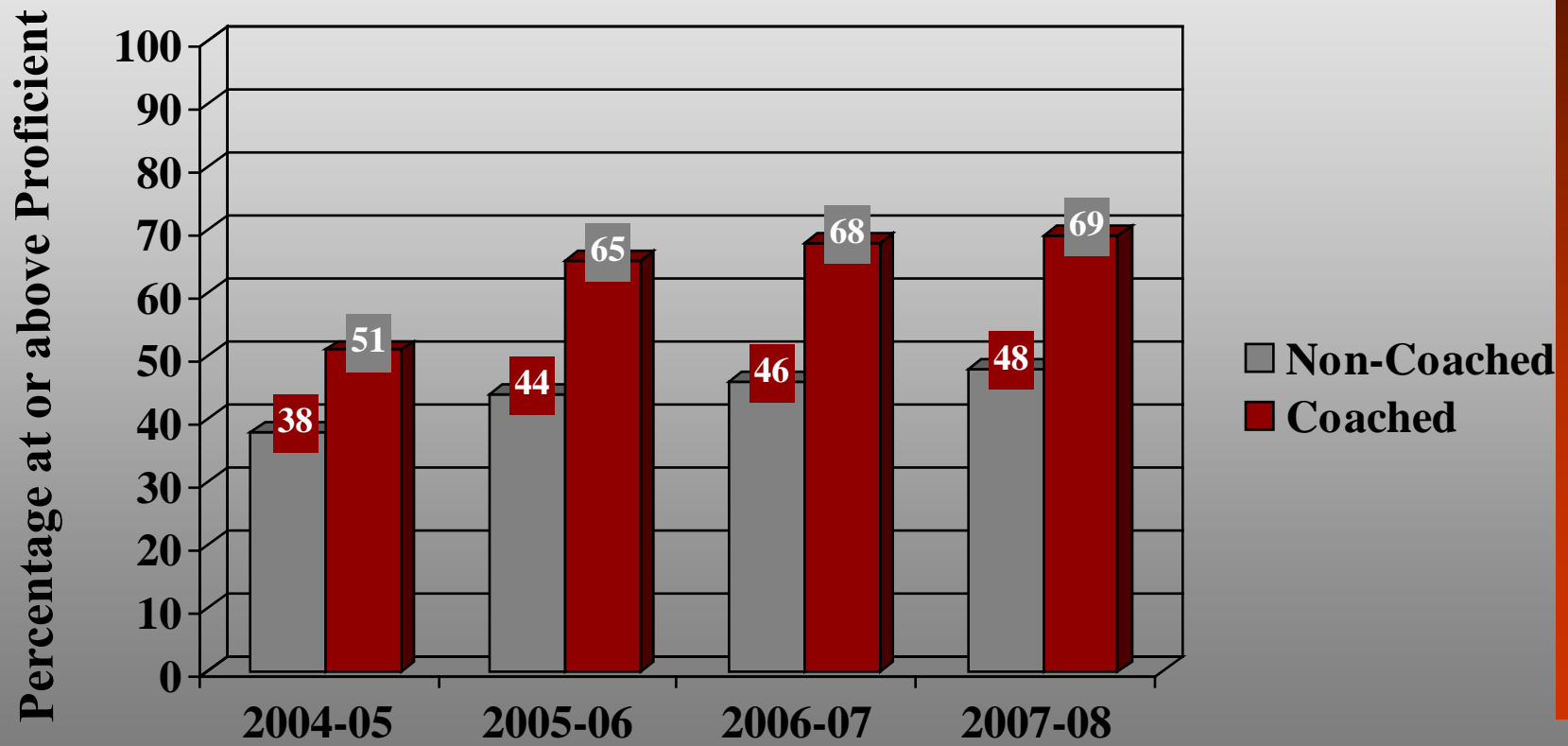


3rd Grade Mathematics Ohio Achievement Test Results



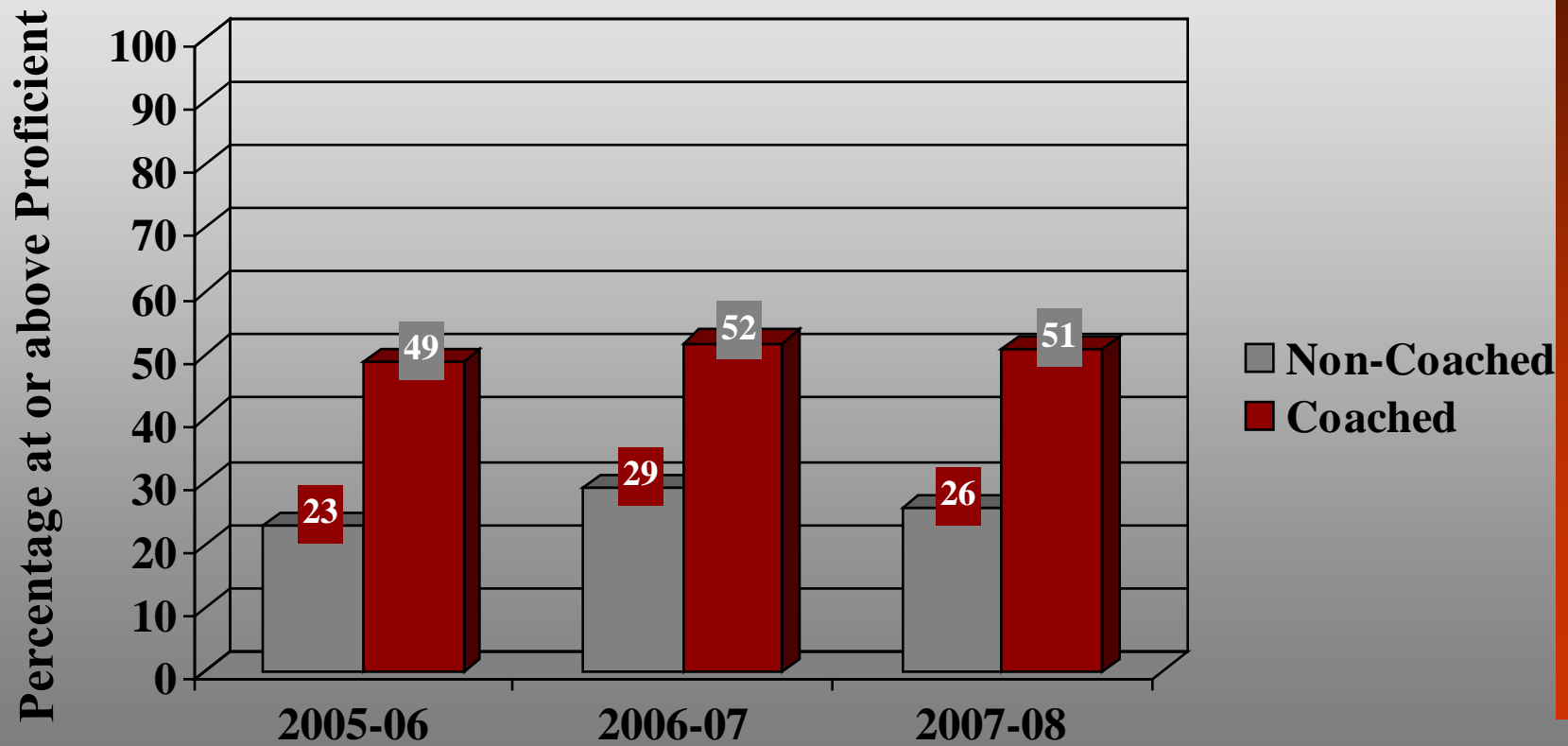


4th Grade Mathematics Ohio Achievement Test Results



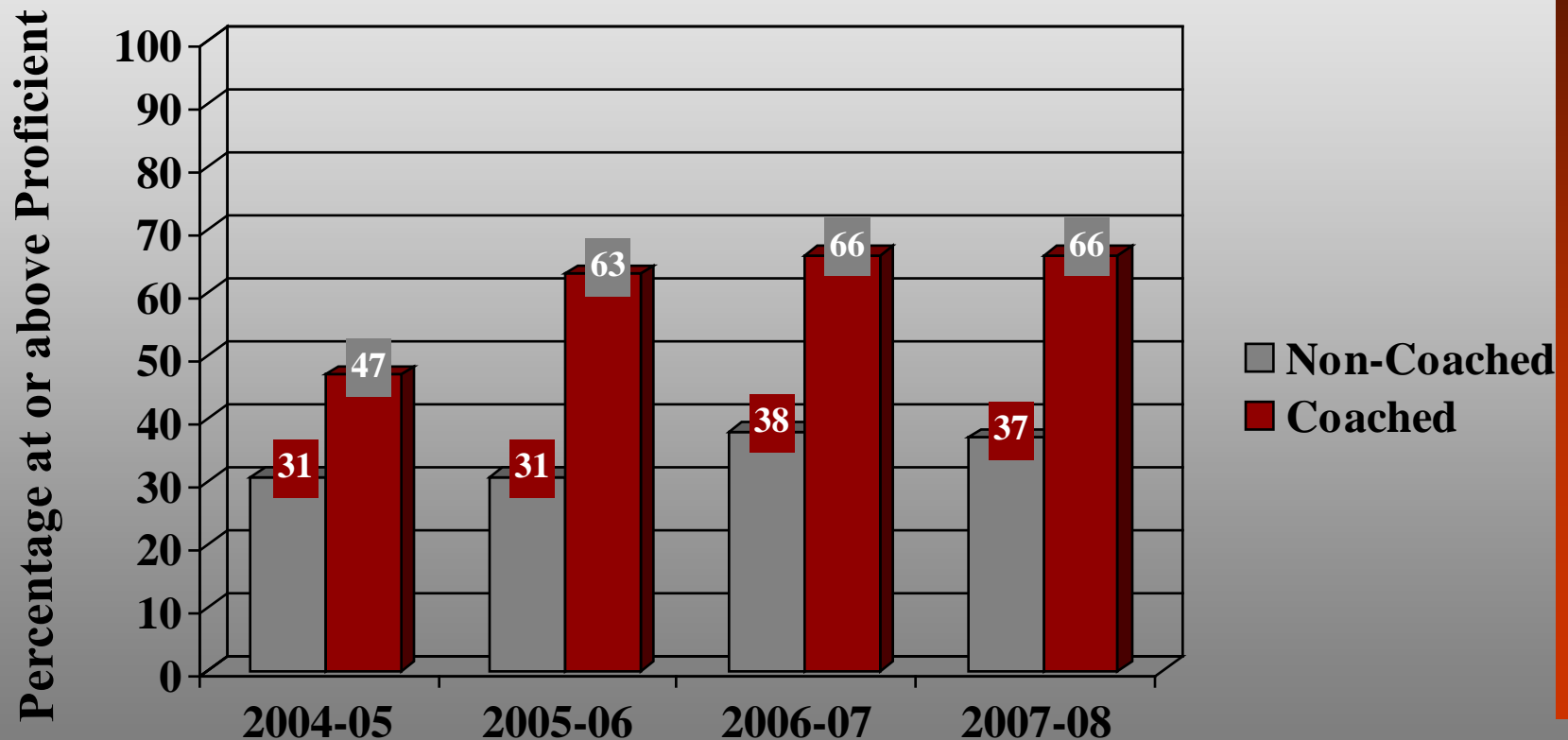


5th Grade Mathematics Ohio Achievement Test Results



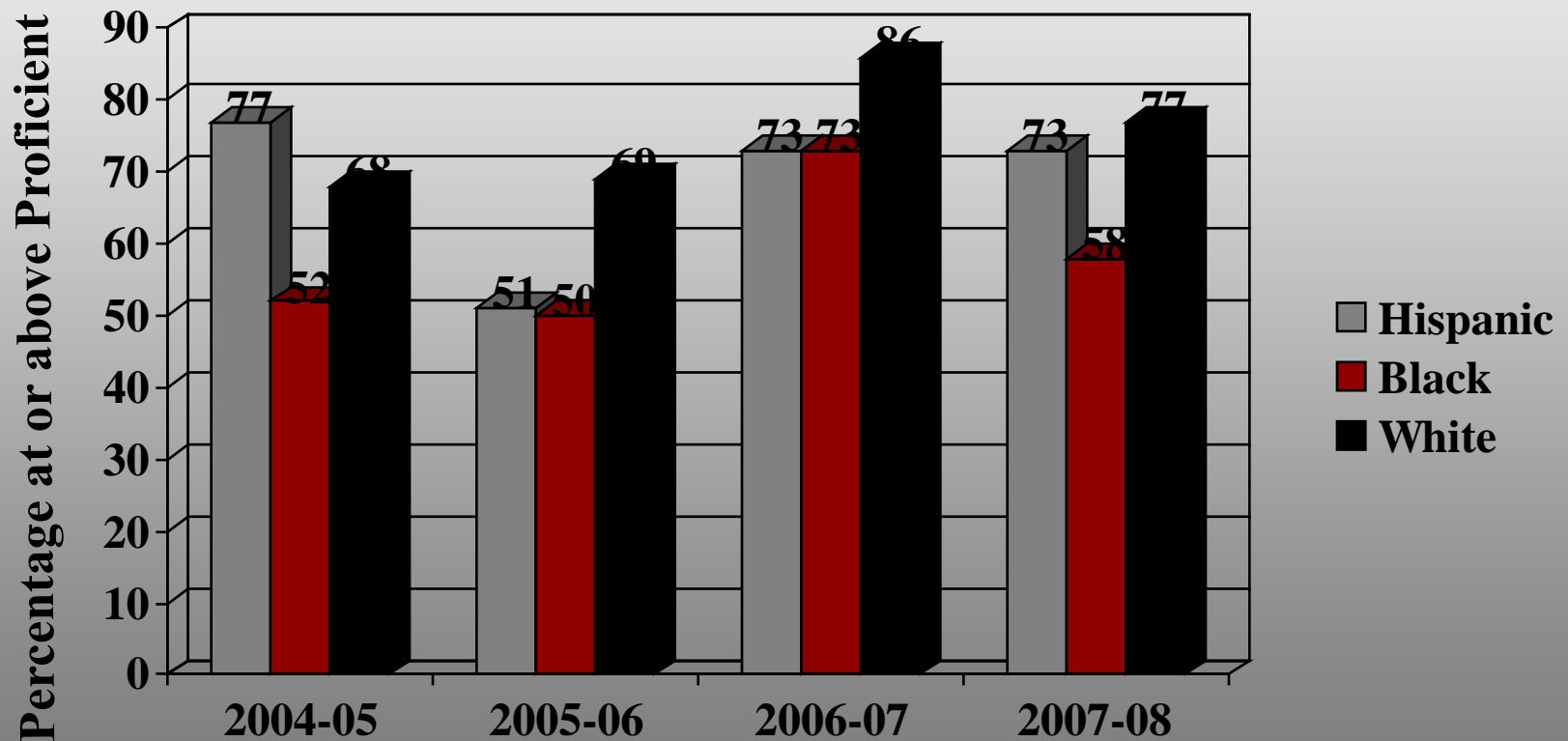


6th Grade Mathematics Ohio Achievement Test Results



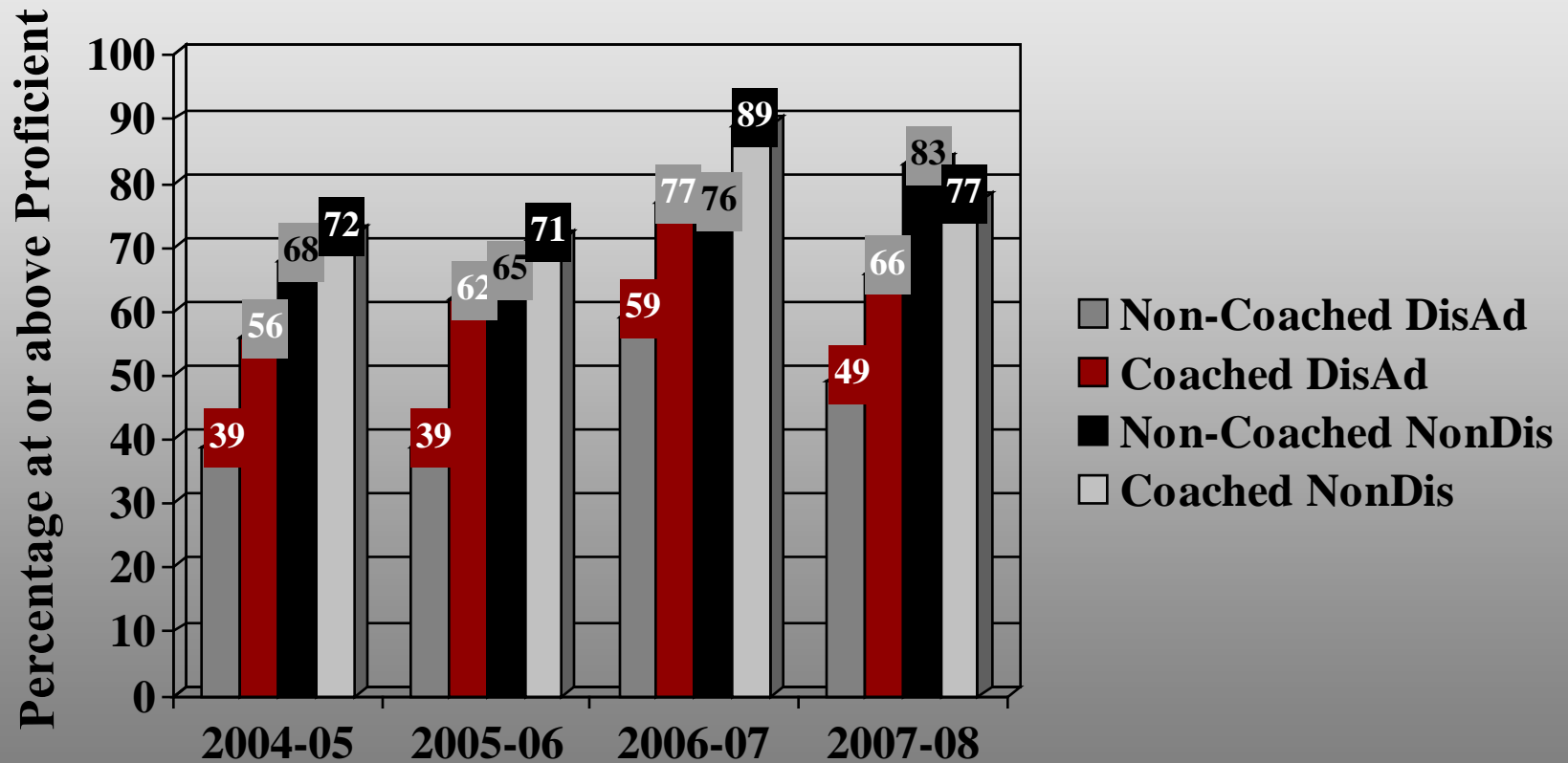


3rd Grade Results by Ethnicity





3rd Grade Results by Economic Status





Scaling UP

- Bring in University or Educational Service Center folks for one year to learn program.
- Satellite MCP sites Year Two and Three.
- Facilitators' Role.
- Maintain program integrity.
- Non-Negotiables / Assurances.



Conference

- Awareness of State Projects.
- Learning about Mathematics Coaching Program.
- Building Leadership Capacity.
- Identifying universities and facilitators.
- CLI certificate - help Ohio P-6 Mathematics Specialist Endorsement.
- Understand CLI delivery.
- Outreach to those without access to PD.
- Teacher solution strategies, student solution strategies.



Challenges

- Of 34 Cohort I schools, 12 remain
 - Lost 20 Cohort I schools because they emerged from School Improvement.
 - Lost 2 coaches (and hence schools) because of school restructuring RIFs.
- Funding is dependent on School Improvement status
 - Considering variations of the model
- Identifying schools early.
- School buy-in up front: 80% of staff buy-in before joining MCP.
- Hiring coaches.
- Understanding program assurances.
- Administrative support.
- Union contracts.



Future Directions

- Expanding to grades K-12 in Ohio.
- Changing role of coach.
- Variations of the model.
- P-6 Mathematics Specialist Endorsement.
- EdS Degree for Teacher Leaders.
- Cisco Learning Institute's National Mathematics Specialist Certificate.
- AMTE working group.



Questions?

Comments?



Jasmine and the Role of the Teacher

- View Jasmine over three time periods.
- Teacher Responsibility
 - Content
 - Pedagogy
 - Socio-Cultural Elements
- Takes Time and Persistence