Mathematics Coaches, Specialists, and Teacher Leaders: Redefining Professional Development for Student Achievement

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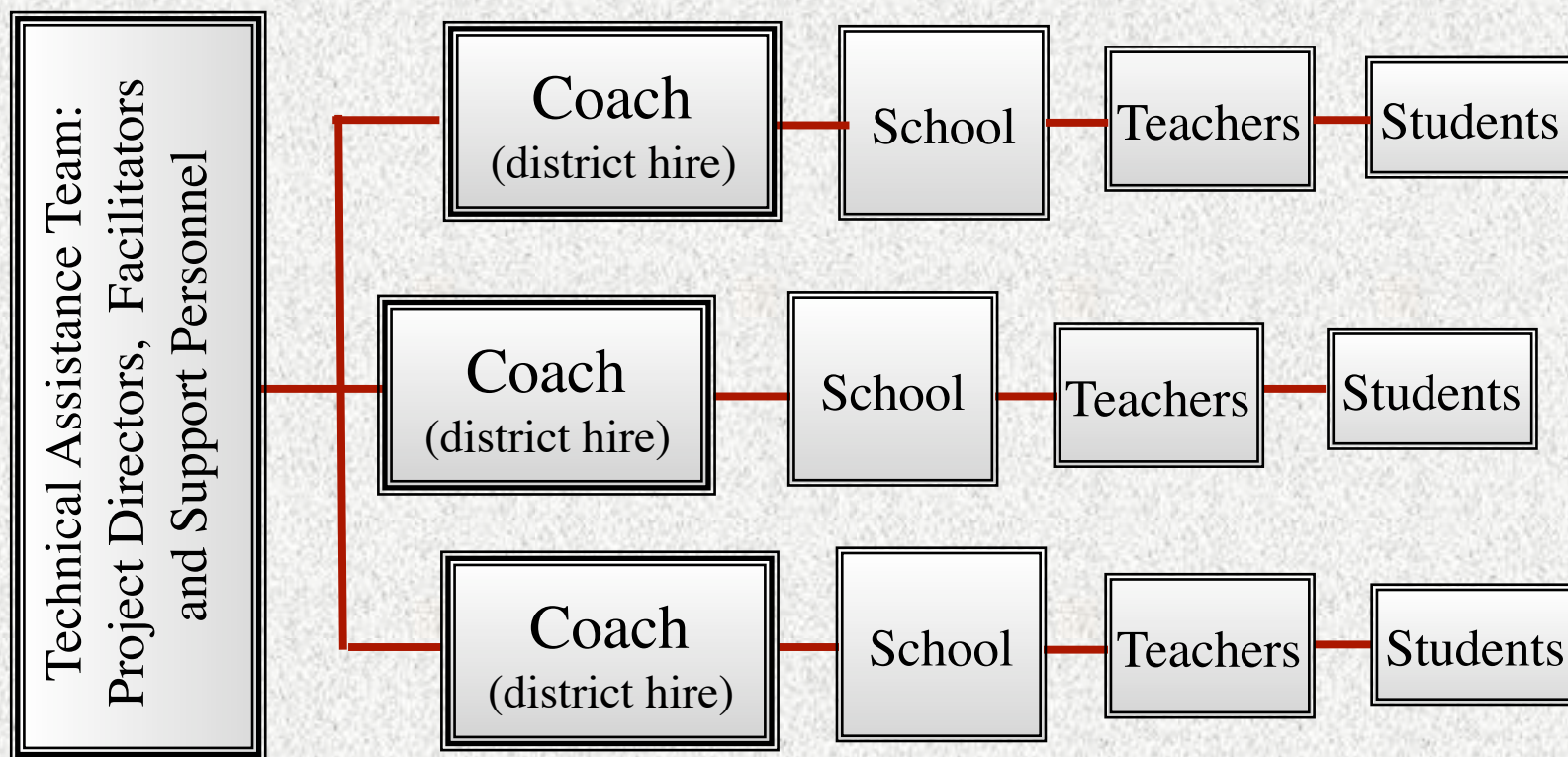The Ohio State University
Mathematics Coaching Program

Today's Focus

- Mathematics Coaching Program Framework and evaluation model

- Selected instruments, data, and findings

- Audience Sharing of research experience

- Discussion of further directions for coaching work research, issues, potentials, Q&A

MCP Structural Model

Technical Assistance Team: Project Directors, Facilitators and Support Personnel

Coach (district hire) — School — Teachers — Students

Coach (district hire) — School — Teachers — Students

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Evaluation Research

Coach Level	Teacher Level	Student Level
LMT (UM)	LAMP (MCP/OSU)	OATs – Public Record
LAMP (MCP/OSU)	Coach Reports/1-on-1	OATs – MCP Pre/Post
Facilitator Reports	Coach Reports/Classroom	Problem Sets
Coach Reports	In Development - 09-10:	Coach Report/Classroom
Site visits	Classroom Observation	Primary Grades
Coach Interviews	Teacher Interviews	In Development - 09-10:
Scripting/Scenario Prompt	Social Justice Implementation	Classroom Observation
Social Justice: Coach Development		
PD documentation		

Learning About Mathematics Pedagogy LAMP

- Purposes – content and pedagogy
- Model of first LAMP
  - 10 items, based on student work, all open response
- Emergent themes
- Model of current LAMP
  - 10 items, based on student work, each with 2 forced response and corresponding elaboration

Lamp Theoretical Grounding

Emergent themes led to fixed responses ranked from least to most desirable:

- Content:
  - Procedural to Integrated Procedural/Conceptual (Baroody et al)

- Mathematics:
  - Direct instruction to learner-responsive pedagogy

Sample LAMP Mathematics Item

9. Students were asked to tell a story to go with the graph below. Maris' story was about a sailboat's speed in a race.

Maris says when the graph gets flat, it means the boat stopped.
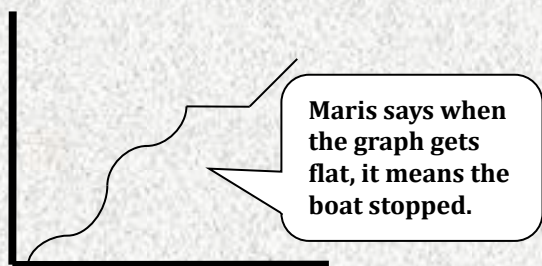
From the options below, select and circle the one that best represents what you believe Maris' response indicates she understands and does not understand:

a)   If Maris had more information on the graph she may have interpreted it differently.

b)   Maris must not understand how to use numbers and labels in her graphs.

c)   Maris does not understand that the straight line indicates that the speed remains the same over time.

d)   Maris understands that a line graph shows only a progression of time, rate, or speed.

Sample LAMP Mathematics Item

The teacher/coach chose c (Maris does not understand that the straight line indicates that the speed remains the same over time) and elaborated as follows:

If the boat stopped the graph would go down to the bottom where zero would be. The graph shows speed, where the boat is speeding up, remaining steady at a constant speed, and then accelerating again.

Sample LAMP Pedagogy Item

Suppose you have 3 marbles in a bag: 1 red and 2 green. If you reach into the bag without looking and randomly pick out 2 marbles at once, what is the probability that both of the marbles you pick will be green?

Jack said the answer is 2/3.

From the options below circle the instructional strategy that best represents what you might use to teach students to understand probability:

a) Ask Jack how he decided that 2/3 is the answer.

b) Teach a lesson where students explore experimental probability so students can understand "likelihood."

c) Play games of chance.

d) Tell the students the more there is of the color the more likely it is to be drawn.

Sample LAMP Pedagogy Item

The teacher/coach chose C (Play games of chance) as preferred instructional strategy and elaborated as below:

I would probably actually do the activity and ask them to list what they pull out. Then I would ask students what were the possibilities which would be red-green and green-green. From there they should be able to figure that the probability of choosing 2 green marbles is ½.

Ohio Achievement Tests (OATs)

- Designed to align with Ohio Academic Content Standards based on NCTM Standards by grade level.

- Given once per year in April (Mar/May)

- Release full test only after first administration.

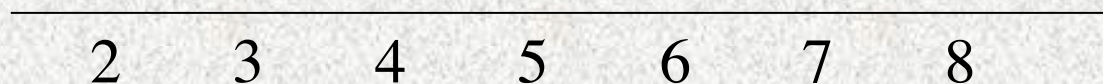- Pre/Post Data collection and analysis

Extended-Response Problem

- Twelve students wrote their names and the number of letters in their names on cards as shown.

Tommy
5

Elli
4

- Use the line to construct a line plot of the information on the students' cards. Use X to show the data.

2   3   4   5   6   7   8

10. Twelve students wrote their names and the number of letters in their names on cards as shown.

Grant 6	Al 3	Courtney 8	Kim 3	Owen 4	Heidi
Katie 5	Mark 4	Linda 5	June 4	Abdul 5	Connie

Use the line to construct a line plot of the information on the students' cards. Use **X** to show the data.

3,3,4,4,4,5,5,5,5,6,8
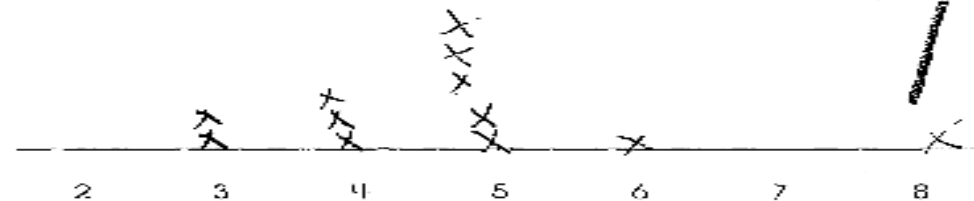
4*

Number of Letters in Names

Find the median, mode and range of the data on the cards.

Median: 5

Mode: 5
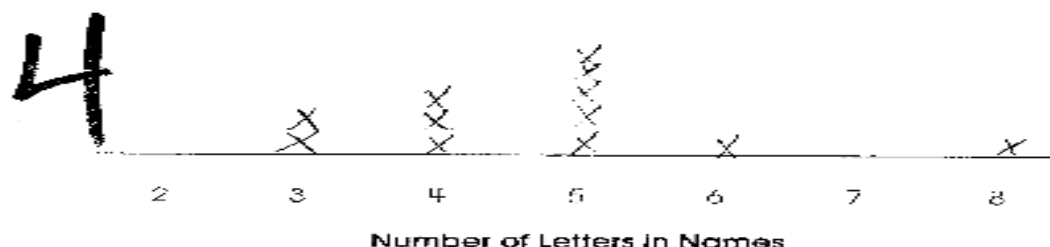
Range: 5

4-E-3

7b

10. Twelve students wrote their names and the number of letters in their names on cards as shown.

Grant X	Ali 3	Courtney X	Kim 7	Owen 7	Heidi 5
Katie X	Mark 4	Linda X	June 4	Abdul 6	Conn e X

Use the line to construct a line plot of the information on the students' cards. Use **X** to show the data.

4


```
              x
          x   x
      x   x   x
      x   x   x   x           x
   2   3   4   5   6   7   8
```

Number of Letters in Names

Find the median, mode and range of the data on the cards.

Median: _5_

Mode: _5_

Range: _5_

3 3 4 4 4 5 ⑤ 5 5 6 7 8
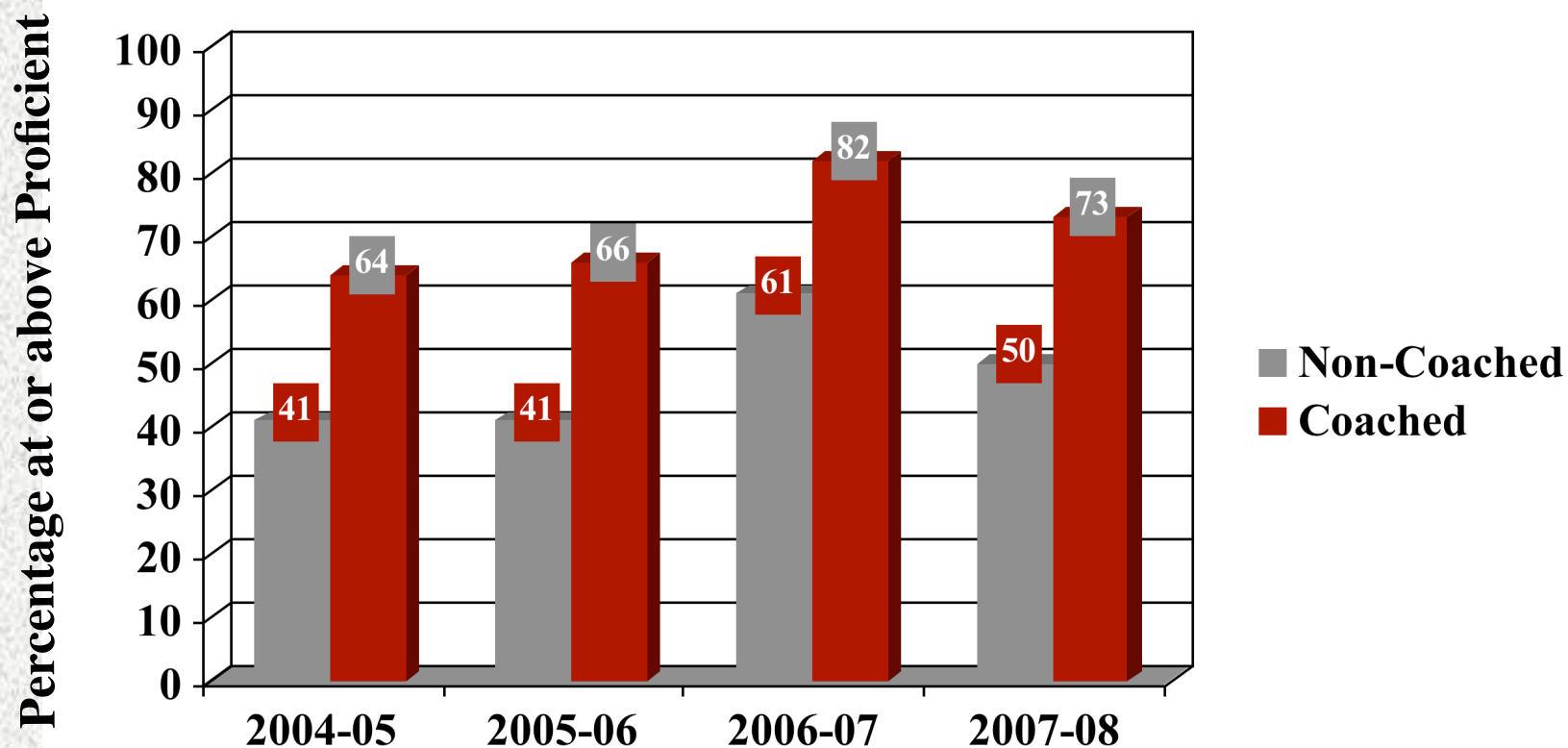
3
3
− 5

4 − 0 − 6

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Discussion

- Inter-rater reliability
- Teacher interference
- Technology skills
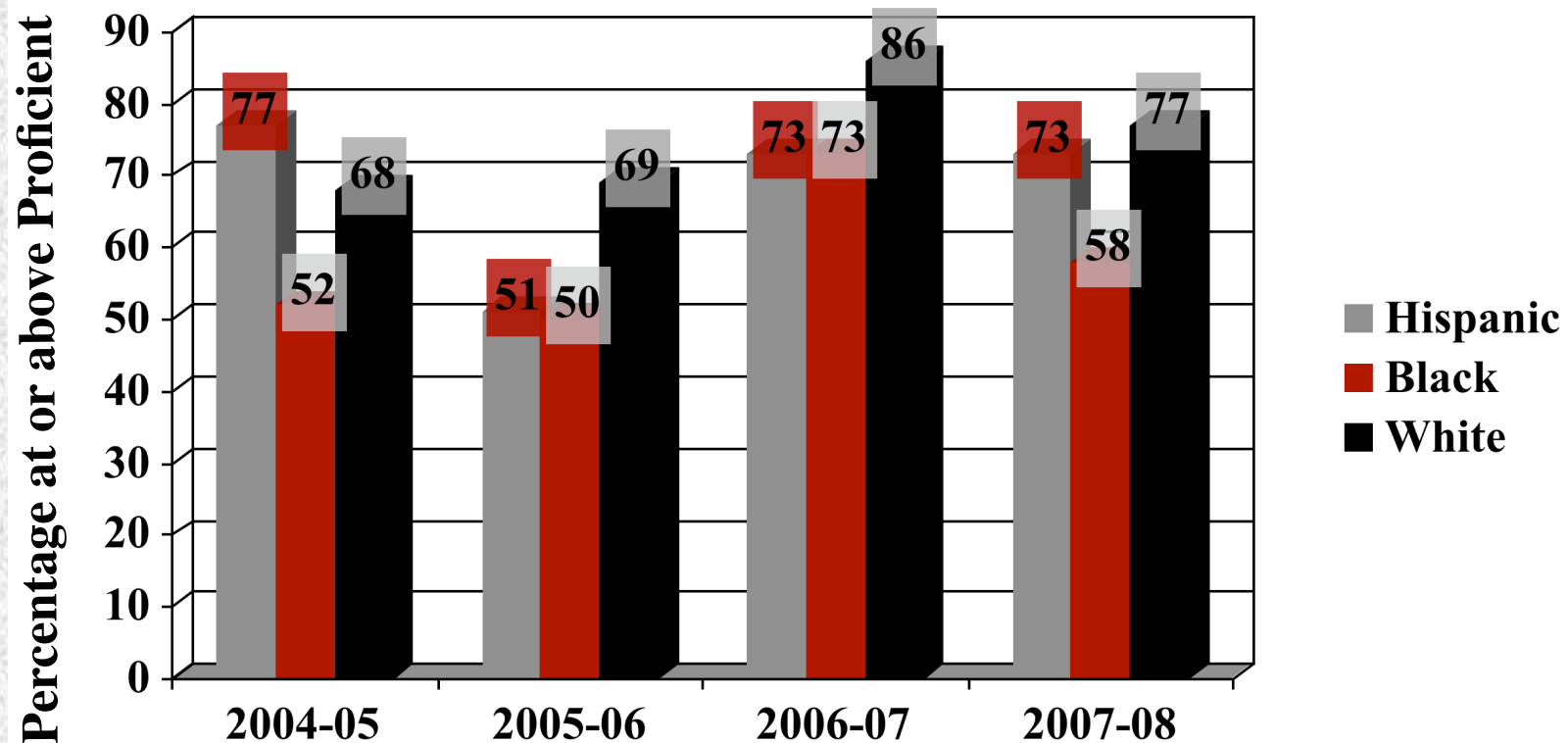- Move to public record data only
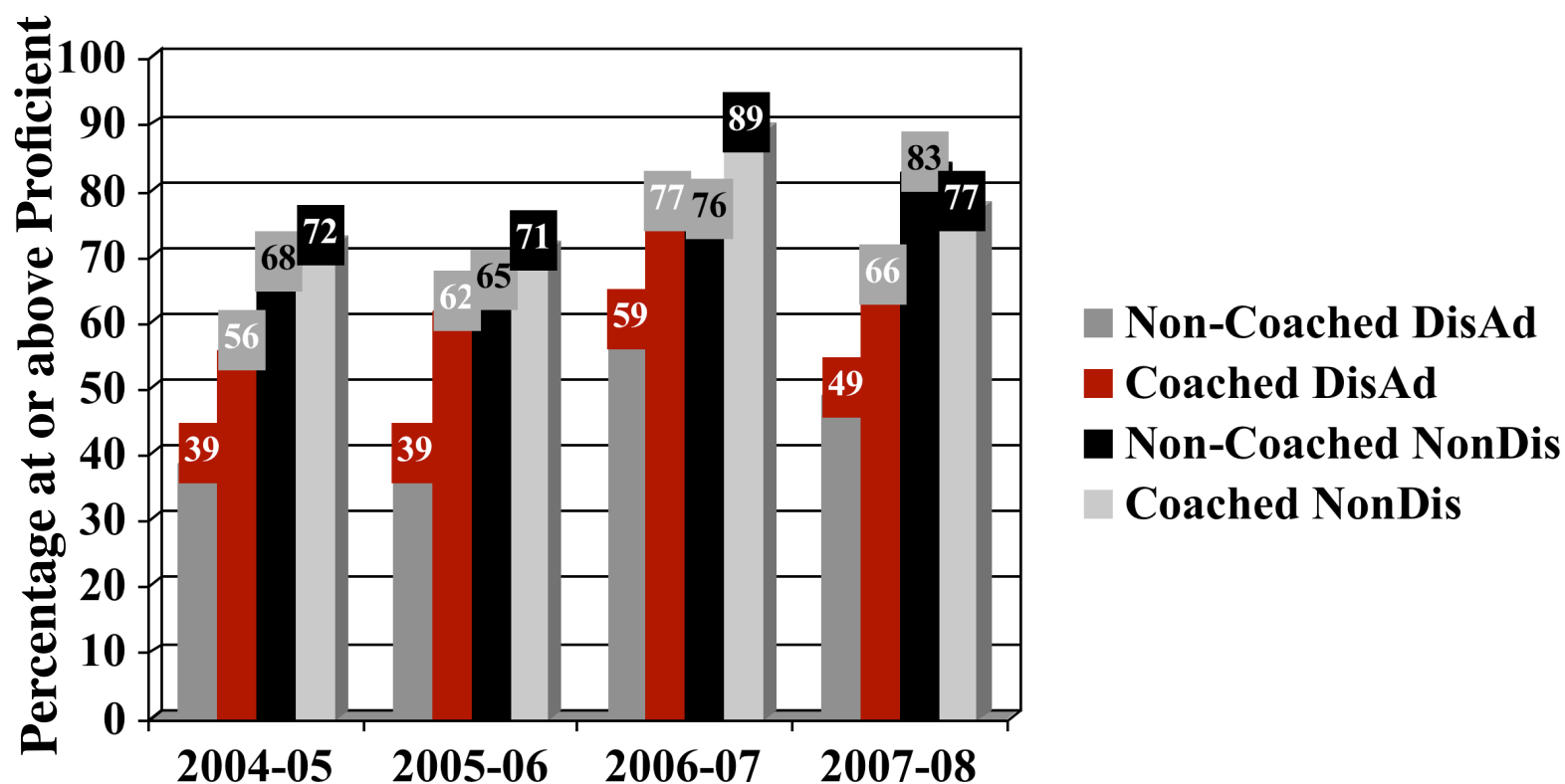- Pre/Post vs Year to Year

3rd Grade Results by Ethnicity

3rd Grade Results by Economic Status

Percentage at or above Proficient

- Non-Coached DisAd
- Coached DisAd
- Non-Coached NonDis
- Coached NonDis

2004-05: 39, 56, 68, 72
2005-06: 39, 62, 65, 71
2006-07: 59, 77, 76, 89
2007-08: 49, 66, 83, 77

Challenges

- Requires a special kind of person.
- Build relationships: trust, confidentiality.
- Must have commitment to all of MCP.
- Coach selection process.
- IRB Issues.
- RANDOMIZATION CONTROL

Discussion

- Audience participants' sharing

- Further directions for coaching work research?

- Needs and potentials?

- Q&A

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Thank You!!!

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