Supporting the Transition from Arithmetic to Algebraic Reasoning (STAAR)

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STAAR Teacher Professional Development

• PD Goals: Enhancing Teachers’ Professional Knowledge
  • Mathematics knowledge for teaching
  • Pedagogical content knowledge

• Tools for Teacher Learning
  • Artifacts of practice
  • Teacher learning communities
The Problem Solving Cycle

Workshop 1: Solve Problem and Develop Lesson Plans

Workshop 2: The Teachers’ Role and PCK

Workshop 3: Student Thinking and KAT

Videotaping the Lesson: Teachers’ Implementation of Problem
Workshop 1: Solving the Problem
Teaching the Lesson
The Problem Solving Cycle

Workshop 1:
Solve Problem and Develop Lesson Plans

Workshop 2:
The Teachers’ Role and PCK

Workshop 3:
Students’ Thinking and KAT

Videotaping the Lesson:
Teachers’ Implementation of Problem
Research Questions

• Impact of PD
  • KAT
  • PCK
  • Instructional practices

• Nature of participation in PD
  • Professional learning community
  • Video as a tool

• Relationship between participation in PD and impact of PD
Data Collection

• Video
  • Professional development sessions
  • Classroom instruction

• Interviews
  • Teachers
  • Facilitators

• Artifacts of PD
  • Teachers’ reflections
  • Teachers’ mathematical work & tests

• Classroom artifacts
  • Lesson plans and instructional materials
  • Student work
Changes in Instructional Practices: Case Studies

- Broad patterns of practice
  - View videotaped lessons and summarize along key dimensions
    - Overall structure of the lesson
    - Mathematical task
    - Discourse patterns
    - Community
  - Summarize patterns for each dimension

- Specific features of instruction
  - Identify and transcribe representative video segments
  - Finer grained analyses

- Example: changes in classroom discourse
Ken: Jordan why don’t you do letter b.

[Jordan writes his answer on the board.]

Ken: Okay, thumbs up if you agree; thumbs down if you disagree.

[Ken scans the room and observes that most students have their thumbs up.]

Ken: Alright…pretty good.

Ken: John, do you agree or disagree?

[John aggressively shows the thumbs-up sign.]

Ken: Thanks
Ken: How did you figure out what the cost of the 14th floor was?

S1: I multiplied 6 by 19 to add onto the...

S2: ‘Cause you need 6 ... you need 6 more floors

S1: ... the 8th story...’cause 6 more numbers onto 8 you get...

Ken: So you’re going [he goes to the board and points to the student’s work] 1, 2, 3, 4, 5, 6?

S1: No. I multiplied 6 by 19 and added that number to 209 to get 323 or the cost of 14 (floors). I double checked it and it was that.

Ken: You’re adding these...1, 2, 3, 4, 5, 6... nineteens?

S1: No, no I am adding 19 times 6 onto...

Ken: Okay, I see where you’re getting 19...
Professional Development: Video as a Tool for Learning

• Research questions
  • How do teachers learn to watch and discuss video of classroom teaching?
  • Do discussions of video change over time? How?
  • How does video promote teachers’ exploration of mathematics and pedagogy?
Analysis of Video Based PD Activities

- Transcribe all discussions
- Code 2 minute segments
- Coding categories
  - When (before, during, after)
  - Who (facilitator, video teacher, other teacher)
  - What (describe, critique, suggest, ask, identify, set up)
  - Content (teacher role, student role, pedagogy, mathematics)
  - Value of watching video (+, -)
  - Comfort (+,-)
- Look for patterns and changes over time
Video as a Tool: Affordances

• Permanent record
  • Can go back to video again and again
• Research tool
  • Opportunity to ask questions that require analyses of different grain sizes
  • Opportunity to pursue new questions and new insights as they arise
• Pedagogical tool
  • Ground teacher learning in classroom practice
  • Ground facilitator learning in PD practice
Video as a Tool: Some Considerations

- When and what to video
  - Multiple purposes: research and PD
  - Research questions
  - Conceptual framework
  - Our decisions:
    - Multiple cameras on all groups in PD
    - CR taping to record PSC lessons
    - Capture talk of teacher and students

- What and how to transcribe
- Can video be used by other researchers?
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Ken: What can you tell me about a cube?
S: It has 8 edges.
Ken: What do you mean by that, it has 8 edges?
S: It has 8 corners.
Ken: 8 corners?
S: 8.

[He points to the corners of the cube his group has constructed.]

Ken: Oh, okay I see what you mean…
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