In my action research project, I chose to use the Cognitively Guided Instruction (CGI) framework for mathematics as a portal into teacher and student learning. This project was significant to my current workplace setting as St. Joseph School adjusts to the teaching of math, aligning its curriculum to the Common Core State Standards and Principles of Mathematical Practice. In order to carry out my inquiry, I collaborated with my grade level partners to plan, teach, and reflect on the use of the CGI framework in our math instruction. I then used teacher/student surveys, student work, field notes, and team meeting notes to monitor changes in both teacher and student learning. My research resulted in three findings: professional inquiry builds over time; the placement of procedural instruction impacts students’ mindsets; and making room for student sense making reveals student thinking and next steps for instruction. Claiming that this research is finished would not do justice to the nature of an inquiry cycle; instead, as a teacher leader I can only humbly claim that I have taken the first step in a journey toward better understanding of the intimate connection between teacher and student learning.

PROFESSIONAL INQUIRY

How might Cognitively Guided Instruction (CGI) impact both professional and student learning?
• How, if at all, did job-embedded professional learning, with joint instructional work at its core, change the collaborative nature of the teaching team?
• How, if at all, did CGI, a methodology with inquiry at its heart, facilitate a deeper understanding of the learners?
• How, if at all, did CGI’s emphasis on professional noticing of student learning and development, foster a deeper teacher and student understanding of mathematics?

INTERVENTION

Cognitively Guided Instruction is a professional development program, which uses developmental frameworks for the teaching and learning of whole numbers, fractions, and decimals. As student thinking develops, learners are able to use more abstract strategies as they think through contextualized word problems. CGI is grounded in four beliefs about student understanding of mathematics:
• Knowledge is connected.
• Knowledge is generative.
• Students describe, explain, and justify mathematical thinking.
• Students identify themselves as mathematical thinkers who see that math should make sense and that they have the power to make sense of it.

(Children’s mathematics: Cognitively guided instruction, 2015, p.185)

METHODS

Analysis of student work using CGI frameworks.
Field/Meeting notes as evidence of qualitative data.
Surveys coded for shifts in practices/beliefs.
**FINDINGS**

1) Placement of procedural instruction in a unit of study seems to affect the mathematical mindset of students.
   - Procedures taught too soon in a unit of study seemed to limit mathematical exploration.
   - There was a contrast in mindset among students in the classroom where procedural instruction was up-fronted versus the classroom where procedural instruction occurred later in a unit of study.

2) Creating space for student sense making reveals student thinking and furthers teacher inquiry.
   - Examining student work reveals student misconceptions.
   - Student work provides next steps in instruction.

3) Professional inquiry builds over time.
   - The teaching team’s inquiry spilled over into unanticipated areas.
   - Team meeting notes revealed more team time dedicated toward collaborative curriculum and instruction work.

**IMPLICATIONS**

Cognitively Guided Instruction created a culture of inquiry.

Evidence of shifts in professional mindset.

- Decreased belief that students need explicit instruction on steps to solve a word problem.
- Increased flexibility in regards to strategy use among students.
- Increased practice of examining student work to plan next instructional steps.

Re-examination of the role of problem solving in math learning and instruction.

- Placement of problem solving in a unit of study.
- Is problem solving best used for the application of skills or as a strategy to build deeper conceptual and procedural understanding?

**CONTACT**

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