Mathematically Important Pedagogical Opportunities (MIPO)

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Related Ideas in the Literature

- “critical moments in the classroom when students created a moment of choice or opportunity” (Jaworski, 1994, p. 527)
- “significant mathematical instances” (Davies & Walker, 2005, p. 275)
- “potentially powerful learning opportunities” (Davis, 1997, p. 360)
- “an issue that the teacher judges to be a candidate for classroom discussion” (Schoenfeld, 2008, p. 65)
- “novel student idea[s] that prompt teachers to reflect on and rethink their instruction” (Schifter, 1996, p. 130)
Defining MIPOs

Mathematically Important Pedagogical Opportunities (MIPO) are at the intersection of three critical characteristics

- *important mathematics*
- *student thinking*
- *pedagogical opportunity*
Mathematically Important

- Grand Scheme + Classroom Context
- Mathematical Goal
Student Thinking

- Observable evidence of student thinking: instances where a student’s actions provide sufficient evidence to make reasonable inferences about their thinking.
  - verbal utterances, board-work, or gestures
  - observable in whole-class, small-group, or individual written work.
  - observable vs. observed

- Distinction between evidence that students are thinking and evidence of what students might be thinking.
Pedagogical Opportunity

- Observable student actions that provide evidence that students are engaged with or thinking about the content of an instructional goal – *provides an opening for working towards that goal*.

- Can be cultivated by the teacher, but cannot be created independently of the students.
MIPOs

- Occur at the intersection of *important mathematics, student thinking, and pedagogical opportunities.*

- Observable evidence of student thinking related to mathematical goals for a given classroom provides pedagogical openings for working towards those goals.
Relationship among Important Mathematics, Pedagogical Opportunities and Student Thinking
5th grade - finding output values for the rule $3x + 1$ given different input values. Students are asked for the output when $\frac{1}{4}$ was the input.

1. Soochow: One and three fourths.

2. T: How would you explain it please?

3. Soochow: Because one-fourth times three is three-fourths and then you just add o— add a one.

4. T: Okay, so first you times by three and then you add one.

5. T: Who can explain why one fourth times three is three fourths? Sun Wu?

6. Sun Wu: One fourth, like one fourth of a pie and then somebody brings two more and one times three is three—three pieces of pie that came out of four pieces of pie?
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Why MIPOs

• Provides a
  • useful lens for analyzing the complexity of classroom mathematics discourse
  • vocabulary for discussing instances of student thinking that are of mathematical and pedagogical importance

• Tool for analyzing practice that
  • makes more tangible the often abstract but fundamental goal of building on student thinking
  • focuses attention on high leverage instances of student thinking