

Beyond the Move: A Coding Scheme for Teacher Responses to Instances of Student Mathematical Thinking

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Why attend to how teachers use student thinking?

- Teachers' use of student thinking during instruction supports students' learning of mathematics (e.g., Fenemma, Carpenter, Franke, Levi, Jacobs, & Emspon, 1996)
- Teachers' use of student thinking undergirds features of effective classroom mathematics instruction, such as mathematical discourse (e.g., National Council of Teachers of Mathematics, 2014)
- While the field benefits from research identifying how teachers may plan for and use written records of student work to facilitate discourse (Stein, Engle, Smith, & Hughes, 2008), less is known about how teachers respond in-the-moment to instances of students' mathematical thinking.

Why a new coding scheme?

We found three themes in the literature related to teacher responses to student thinking: (1) student engagement in classroom communication, (2) responsiveness, and (3) attention to mathematics. These themes suggest important components to attend to in teacher responses, yet existing research seems to foreground only one of these components at a time by the way they incorporate that component into their definition of "move" (e.g., Bishop, Hardison, & Przybyla-Kuchek, 2016; Conner, Singletary, Smith, Wagner, & Francisco, 2014). In order to develop a more nuanced coding scheme, we disentangled these three components of a teacher's response from the teacher move in our *Teacher Response Coding Scheme (TRC)*.

Teacher Response Coding Scheme (TRC)

Our disentanglement of the three themes in the literature from teacher moves led to the *Teacher* Response Coding Scheme (TRC):

- Actor: Who is asked to consider the student thinking? [student engagement] Codes: Teacher, Same Student, Other Student, Whole Class
- **Recognition:** The extent to which the student who contributed the thinking is likely to recognize their idea in what is being considered. [responsiveness] Captured through:

Student Actions: The degree to which the teacher's response uses the student action. Codes: *Explicit*, *Implicit*, *Not*

Student Ideas: The degree to which the teacher's response captures the student's idea. Codes: Core, Peripheral, Other, Cannot Infer, Not Applicable

- **Mathematics:** The extent to which the move focuses on improving students' understanding of the mathematical point of the instance of student thinking. [attention to mathematics] In particular we look for the extend to which the teacher response seems to be going for the mathematical point of the instance of student thinking. Codes: Core, Peripheral, Other, Cannot Infer, Non-Mathematical, Not Applicable
- **Move:** What the actor is doing or being asked to do with respect to the student thinking? Codes: Adjourn, Allow, Check-in, Clarify, Collect, Connect, Correct, Develop, Dismiss, Evaluate, Justify, Literal, Validate

References:

Illustrating the TRC: An Instance of Student Mathematical Thinking

After working on a problem that related the amount of money accumulated by saving both a one-time gift and babysitting money that was earned weekly, Chris made the following comment during the whole-class discussion:



Possible Teacher Responses:



Coding of Possible Teacher Responses:

Actor: Who is publicly invited or allowed to consider the instance of student thinking?



Teacher

Recognition: To what extent is the student who contributed the instance likely to recognize their idea in what is being considered? Student Actions (Student Ideas)



Mathematics: The extent to which the move focuses on improving students' understanding of the mathematical point of the instance of student thinking.

Peripheral

Move: What is the actor doing or bei

Correct

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"I put the money on the bottom and weeks on the side."

- **Student Mathematics (SM)**: I put the money on the x-axis and weeks on the y-axis.
- Mathematical Point (MP): The placement of the variables on the axes of a graph is determined by what makes the most sense in the problem situation given the established convention of the x-axis representing the independent variable.



Same Student







Core	Cannot Infer	Cannot Infer
eing asked to do with respec	t to the instance of student thinkin	g?
Justify	Collect	Literal



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