Hesitating, Revising, Backtracking:
Essentials in Developing Mathematical Agency

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I. *Some Assumptions about the Teaching and Learning of Mathematics*

A. The Nature of Mathematics

- A realm of exploration
- A web of interconnected concepts and ideas
- The greater the number of connections → the deeper the understanding

B. Students Have Mathematical Ideas

- Part of the work of teaching is to elicit and work with students' ideas.
- Eliciting students' ideas involves posing questions, listening, posing more questions, and continuing to listen.
- Mathematics discussions are a key part of classroom practice.

II. *The Need for a Dual Commitment: To Equitable Participation and to Deep Mathematics*

This shift in practice, with an emphasis on math discussion, requires a dual commitment on the part of the teacher to deep mathematics and equitable participation. Without the opportunity for students to engage in significant mathematical content, a focus on equity is empty. If there are systems in place to ensure that every student speaks, but the math content is superficial and devoid of sense-making, we are not preparing students to become mathematical thinkers.
On the other hand, if we attend exclusively to the rigor and depth of the mathematics, a few students may dominate, and what's perceived to be a correct and complete response from one or two students may stop continued discourse. Without attention to how each student engages with the content, the depth of the mathematics makes no difference for too many students.

III. *Take-Aways from the Classroom Videos*

- Everyone has mathematical ideas that are worthy of being heard and considered.
- Students learn to voice their thinking and listen carefully to the ideas of others.
- Ideas will frequently be expressed in fragments, with hesitation, revision, and backtracking.
- Part of the responsibility of teaching is to work with such fragments, supporting students to develop more robust concepts.

IV. ***Four Teacher Practices to Support and Honor Hesitating, Revising, Backtracking as Essential to Interweaving Equitable Participation and Deep Mathematics***

- ***Encourage persistence.*** There is an unfortunate myth about mathematics learning that you either know the correct response or you don't. Rather, help students learn that you are challenging them to think about hard ideas and that you expect them to need time and effort to make sense of them.
- ***Embrace pauses, backtracking, silences.*** In order to tolerate the repeating, backtracking, rewording, and rethinking that are *essential* parts of mathematical discourse, we have to come to terms with our own discomfort when students are uncertain, our own tendencies to want to save them from frustration, and our own difficulties in tolerating the time students take to articulate their thoughts.
- ***Reflect back students' own words to them.*** Help students see that they have kernels of mathematical ideas by reflecting back to them their own beginnings of sense-making. This can be as simple as, "you started to say something about multiplication" or "you said something about a 1—where were you seeing a 1?" Reflecting back in this way indicates that you are listening hard and that you expect students to have ideas.
- ***Give students opportunities to rehearse their ideas.*** While you circulate during individual and small group work, engage students to explain their thinking. Identify ideas that could be shared with the whole group, keeping in mind which students often share and which do not. Ask more reluctant students in advance about how they might share their ideas, and give them opportunities to rehearse what they might show or say.

For more about these ideas:

Interweaving Equitable Participation and Deep Mathematics: Building Community in the Elementary Classroom

by Susan Jo Russell and Deborah Schifter (Corwin Press, 2024)

with classroom video and commentary by Collaborating Teachers and Critical Friends

The book is organized around these four broad themes:

1. ***Every Voice Matters***
2. ***Collaboration Supports Student Agency***
3. ***Student-Created Representations Offer Anchors, Openings, and Depth***
4. ***Students Are Initiators and Advocates for Their Own Learning***