



# BEYOND SHOW-AND-TELL: FACILITATING CLASS DISCUSSION IN QUANTITATIVE REASONING COURSES

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Faculty Retreat, Curry College,  
May 2018


# AGENDA

1. Welcome and introductions
2. Benefits and challenges of class discussion in quantitative courses
3. Video of class discussion
4. Thoughts about how to make deeper discussion happen
  1. Norms
  2. Tactics
5. Video of class discussion
6. Takeaways

# WELCOME AND INTRODUCTIONS

Your name, department

What was the most fun you had teaching this year?

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1. What are some benefits to having discussion in quantitative reasoning courses?
  2. What might be some challenges?

# WHY CLASS DISCUSSION?

1. Instructors can **assess** and address student understanding and misunderstanding in **real time**.
2. Students can practice **articulating** their thinking and reasoning.
3. Students must **reason more deeply** when attending to others' thinking and articulating their own thinking
4. Understanding is more **robust and complex** when considering multiple perspectives from their peers.
5. Students begin to see each other as **intellectual resources**.

Challenges?

# PARTICULAR CHALLENGES OF QUANTITATIVE COURSES

- ❖ Math anxiety
- ❖ Perception that there's only one “right answer”
- ❖ A tradition of:
  - Lecture
  - Initiation-Response-Feedback interactions
  - Use of funneling questions
  - Listing steps counting as “discussion”

# “DISCUSSION” COMMON IN SECONDARY MATH CLASSES

## Initiation – Response – Feedback

*Teacher [Initiation]: What kind of mathematical relationship does this equation  $[y = 2x + 5]$  show?*

*Student [Response]: A linear relationship.*

*Teacher [Feedback]: Okay. It's a linear relationship.*

Herbel-Eisenmann, Beth, and M Breyfogle. “Questioning Our Patterns of Questioning.” *Mathematics Teaching in the Middle School* 10, no. 9 (2005).

## Funneling

Teacher: (0, 0) and (4, 1) [are two points on the line in graph B.] Great. What's the slope?

[Long pause – no response from students.]

Teacher: What's the rise? You're going from 0 on the y [axis] up to 1? What's the rise?

Students: 1.

Teacher: 1. What's the run? You're going from 0 to 4 on the x [axis]?

Students: 4.

Teacher: So the slope is \_\_\_\_?

Students: 0.25 [in unison with the teacher.]

Teacher: And the y-intercept is?

Students: 0.

Teacher: So,  $y = \frac{1}{4}x$ ? Or  $y = 0.25x$  would be your equation.

# OUR CHARGE: TEACHING CONTENT AND HOW TO ENGAGE IN ACADEMIC DISCUSSION

Students have to learn how to engage in a discussion in a math course.

There are structures, norms, and instructional moves that the instructor can use to help them learn how to engage in discussion.

# NORMS & VALUES

Norms are developed over time, not just a list distributed the first day of class. The instructor's actions during class time help shape and maintain these norms.

Mine:

1. We are a community of learners.
2. Mistakes/Half-formed ideas are valuable to talk about.
3. Everyone contributes.

# TALK MOVES

Purpose	Talk Moves
Help students clarify and share their own thinking	Wait Time (I'm going to wait for # hands.) Turn and Talk Stop and Jot
Make sure something is heard	Can you say more? Can you say that again? Will you share that with the class? Revoicing, "Are you saying....?" to <i>clarify</i> – not correct or validate or add
Help students orient to the thinking of others	Can you repeat what ____ said? Can you explain what ____ said in your own words? Do you agree or disagree with ____'s idea? (Thumbs Up/Down/Sideways)
Help students reason more deeply	How did you figure that out? Why do you think that? (What evidence do you have?) Why do you agree/disagree?

# TAKEAWAYS — SHARE OUT

Pick one to answer:

1. What's one lesson or topic that you could incorporate class discussion on?
2. What's one challenge you anticipate with class discussion? How might a talk move help you with that challenge?

# THANK YOU & RESOURCES

Chapin, Suzanne, Catherine O'Connor, and Nancy Canavan Anderson. *Classroom Discussions in Math*. 3rd ed. Sausalito, CA: Math Solutions, 2013.

Herbel-Eisenmann, Beth, and M Breyfogle. "Questioning Our Patterns of Questioning." *Mathematics Teaching in the Middle School* 10, no. 9 (2005).

Smith, M. S., & Stein, M. K. (2011). *5 practices for orchestrating productive mathematics discussions*. Reston, VA: National Council of Teachers of Mathematics.