Explicating Mental Models

"*The art and science of asking questions is the source of all knowledge*." Thomas Berger

We know questions are an integral part of teaching and learning. The following exercises are designed to explore questions and questioning techniques in more detail.

Exercise 1a: Concept Maps

A concept map is a diagram representing relationships between ideas, concepts, and/or processes, typically in a nonlinear fashion. Project Zero's Thinking Routines offer an excellent resource for scaffolding concept map development: Generate-Sort-Connect-Elaborate.

(10 minutes) Create a concept map about how teachers' questioning may help students learn. As you create your concept map, consider the following:

- Types of questions, their purposes, and when to use them
- Beliefs about teachers' use of questions
- Benefits and drawbacks of using questions
- Questions about questions

(5 minutes) Review your concept map and reflect on what you observe and what you're thinking about questions and questioning techniques.

(30 minutes). Engage in a modified STAR Model: *Dialogue By Putting Something in the Middle* protocol.

Join two other people and use the following protocol to discuss your concept map. Do three rounds, one for each person. 10 minutes per round.

1. **Person 1** presents their concept map. They should highlight key features in their map, as well as some highlights from their reflection What do they observe in their concept map? What do they wonder? (3 minutes)
2. **Persons 2 and 3** have time to review Person 1's concept map. (2 minutes)
3. **Person 2** shares what they observe in Person 1's concept map and what they heard in **Person 1's** reflection. What stands out? Are there patterns they notice? What might be missing? What thoughts do Person 1's concept map and reflection raise? (2 minutes)
4. **Person 3** shares what their observations and thoughts about Person 1's concept map and reflection. (2 minutes)
5. **Person 1** shares what they're thinking now. (1 minute)
6. Repeat round for each of the other participants.

Dialogue about what you heard, what you're thinking now. (5 minutes)

Debrief the process. What worked? What did you like? What didn't you like? (5 minutes)

Save your concept maps! We'll use them again in the next few exercises.

Exercise 1b. Thinking maps

Thinking maps are a specific type of concept map used to organize ideas and information to illustrate dynamic, causal relationships or connections. In this exercise we are particularly interested in exploring hypotheses about causes and effects.

(10 minutes) Pick 1 - 3 types of elements from your Questions Concept Map to build a cause and effect thinking map illustrating how each element influences how students feel, how they understand, and what they do.

(3 minutes) Review your thinking map and reflect on what you observe and what you're thinking about your three elements.

(20 minutes) Pairs Exercise: Share your thinking map with a partner. Have your partner capture what they see/hear as assumptions and beliefs in your thinking map presentation, then report back to you and check whether those assumptions and beliefs are what are intended. Switch.

(10 minutes, depending on number of participants) Gallery Walk

Post all thinking maps and assumptions and beliefs (or display on tables).
Participants silently view their colleagues' thinking maps, using sticky notes to post feedback and questions around each other's maps, and assumptions and beliefs.
Participants return to their thinking map and read the notes associated with their map.

(10 minutes) Whole group discussion: What did you observe? What patterns emerged? What agreements, disagreements did you notice? What are you wondering now?

TEMPLATES:

Thinking Map

If [Element] is used, then students will:

Feel:

and

Understand:

and

Do:

Assumptions/Beliefs

Assumptions	Beliefs