Categories of Interaction/Action

Interaction between students, student and teacher, and other sources, and resulting actions made by students or teacher (verbal or otherwise) can be seen as an evolving dialectic in making sense of a mathematical idea. We will discuss categories of interaction and action in an inquiry based-classroom particularly focusing on questions, and what makes certain questions key to facilitating investigation and developing deeper understanding.

Inquiry based classrooms, where investigation and discovery are facilitated by small group work and whole class discussion, can lead to open-ended and unexpected questions from students. Teachers often ask: “How do I handle a student question that I am unsure of the answer?” or “What do I do with a student response?”

The questions could be legitimate or not, the response might be right or wrong, irrelevant or need further attention. Decisions have to be made within a classroom of multiple cognitions, with students freely asking questions that need reaction to, or ideas that need consolidating.

Do we curtail their response, challenge the mathematical “beliefs” of a student if they are convinced that their wrong answer is correct, or do we carry on with “our agenda”? What do our classroom environments look like? What decisions do we think we make with our present practice? Can you give examples?

Notes:
In order to be successful with inquiry based pedagogy we need to actively create learning environments that support and effectively manage the diverse and rich forms of discourse that envelop. The normal classroom culture needs to be changed and new standards of practice enculturated by both the students and the teacher.

We need to ask profound questions about the content, its nature and how it will be delivered. What beliefs do we have about how students should best be introduced to this new material, which representations will be used and what decisions am I making as a teacher to attend to the needs of my students, my understanding of their cognition, and the subject matter itself.

We focus today on interaction. These exist in two extremes:

**Teacher Dominated Space.** This is often at the front of the classroom or in a well-defined zone). This space can include the following actions/interactions:

- Questions to pose (as decided by teacher)
- Directions (often static and factual/informatory)
- Increased awareness of a symbolic/representational system with respect to student understanding
- Discovery of a student learning moment
- Awareness of pedagogical style and its impact (reactions to the effectiveness of certain pedagogies or interactions/actions)
- Managing responses (see styles of questions below)

**Student Dominated Space**

- Peer-Peer interactions
- Questions posed by students to the teacher/to the class
- Use of ancillary hand-held devices/resources
- Evolving belief structure
- Social skills of discussion & questioning (i.e. how to receive questions, process and comprehend)

Teacher responses can fall under the following categories:

1. Terminal
2. Coherent with the features or aspect of the representational system you are using
3. Interrogative
4. Reflexive (back to students)
Questions to work on individually then in groups

Building on my generic examples:

- Highlight examples in your recent work.
- Do you ever question the effectiveness of a question when you are in class?
- Do you ever self-critique your style of teaching?
- Are you aware of the impact of your questions and responses on your students’ learning?
- Highlight the specific content that you were covering and your aims for that episode.
- Can you categorize the types of questions you ask using the above example, your own, or ones we have developed from the CMP & Investigations activities?

Notes: