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Jacqueline Stewart and Elizabeth Phillips, Connected Mathematics  
Project, Michigan State University

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**“Establishing Classroom Norms for Mathematical Dialogue:  
Moving Straight Ahead, Investigation 2”**

**LAUNCH: Before viewing the video “Establishing Classroom Norms for Mathematical Dialogue.”**

<p><b>Note:</b> Transcripts and student work should be available.</p>	<p><b>Before participants view “Establishing Classroom Norms for Mathematical Dialogue” they need an opportunity to talk about what communication goals they have for their own students.</b></p> <p>I think I will launch this discussion by asking teachers to clarify their thinking about mathematical dialogue:</p> <ul style="list-style-type: none"> <li>• <i>What are some characteristics of a productive mathematical dialogue among students?</i></li> <li>• <i>Does the teacher have a role in this dialogue?</i></li> <li>• <i>What are some things the teacher can do to promote good communication skills and discourage unproductive behaviors?</i></li> </ul>
<p>My challenge is to motivate participants to want to start wherever their students are and begin to improve their mathematical communication skills.</p>	<p>Sometimes when teachers view video of other teachers working with students they say “my kids are not like that.” This seems to give them permission to give up on trying to establish a classroom where mathematical communication among students is common. The point of this introductory discussion is to get teachers to think about a vision of what a classroom might look like where students are talking about mathematics productively, and to implant the idea that there are things that teachers can do, in planning and in enacting a plan, that raise the level of mathematical dialogue and empower students to independently discuss mathematical ideas. Some classrooms are more of a challenge than others, not because of students’ intelligence, but because of their educational preparation. But every classroom can benefit from the teacher taking actions that establish norms that improve communication about mathematical ideas.</p> <p>The goal for this workshop is to take the ideas that come out of this preliminary discussion and use them to help analyze the evidence for the existence of classroom norms on the video, specifically to analyze the teacher’s role in establishing those norms.</p> <p>I should emphasize that we will see <i>one</i> teacher’s strategies for establishing norms on the video. There are other ways to establish productive classrooms. The teacher on the video would be the first to acknowledge that she does not always have the perfect question to ask, or does not always understand exactly what is puzzling a student; but she always has a way of supporting and respecting students’ mathematical contributions. Her overall goal of establishing a productive and efficient classroom environment is achieved.</p>

<b>Getting Ready to view the video</b>	<b>Possible “Teacher” Discussion Questions:</b>	<b>In Previous Workshops Teachers Have Said:</b>	<b>Follow Up Questions</b>
	<ul style="list-style-type: none"> <li>• What are some characteristics of a productive mathematical dialogue among students?</li> </ul>	<ul style="list-style-type: none"> <li>- <i>Everyone should listen to others.</i></li> <li>- <i>Students must feel comfortable asking questions.</i></li> <li>- <i>Explanations and justifications are always given.</i></li> <li>- <i>Students must clarify whenever needed.</i></li> </ul>	
	<ul style="list-style-type: none"> <li>• Does the teacher have a role in this dialogue?</li> </ul>	<ul style="list-style-type: none"> <li>- <i>The teacher can model how to participate in a dialogue.</i></li> <li>- <i>The class can decide on what makes a good discussion.</i></li> <li>- <i>The teacher has to be careful not to take over the discussion, or to become the group leader.</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>What are some specific things a teacher can do to encourage participation?</i></li> <li>- <i>What are some specific things that the teacher can do to model respect for others’ ideas?</i></li> </ul>
	<ul style="list-style-type: none"> <li>• What are some things the teacher can do to promote good communication skills and discourage unproductive behaviors?</li> </ul>	<ul style="list-style-type: none"> <li>- <i>The teacher can re-direct student ideas so they are talking to each other and not to or through the teacher.</i></li> <li>- <i>Re-phrasing student ideas to clarify might help.</i></li> <li>- <i>The teacher can ask questions instead of giving direct answers or help.</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>How do you prepare for asking questions?</i></li> </ul>

## **VIDEO: “Establishing Classroom Norms for Dialogue about Mathematics”**

***(Moving Straight Ahead, Investigation 2, 15 chapters, approx. 35 mins)***

*Note: This video has been edited to focus on student-student and teacher-student interactions. Clips come from 3 different days.*

### **EXPLORE: While watching the video**

**Note: A  
transcript of the  
video and  
student work  
are available.**

### **Focus Questions to consider while watching the video**

**Note: It might  
be a good idea to  
put the focus  
questions on a  
handout.**

**Note: There are  
some excellent  
articles on the  
teacher role in  
orchestrating  
good discussions  
and asking good  
questions. See  
appendix.**

This video has been edited to focus on student-student and teacher-student interactions. All clips show students working on *Moving Straight Ahead*, Investigation 2. On most clips we see the teacher asking questions or making comments. These questions reflect the teacher’s planning, her knowledge of the mathematical ideas in this investigation, and her determination to understand how students think about these ideas. Her goals are to advance student thinking by building on their developing ideas, and to provide support for their understanding without taking ownership of the learning process away from them. On other clips we see students independently discussing mathematical ideas. Each clip depicts a single scenario; the clips are separated by slides. Some scenarios are sequentially related.

My focus questions should be about the evidence for the existence of classroom norms for mathematical discussions, and about the effectiveness of the teacher’s questions and comments in terms of establishing classroom norms. I should select only three or four clips to view as a large group, and have small groups choose which question from the list below they want to focus on. After viewing these clips each small group may then report to the larger group, and we can connect the teacher’s actions to the evidence of classroom norms.

- Do the tasks posed encourage rich mathematical discussions? Give examples of how the teacher’s questions and comments preserve or do not preserve the cognitive challenge in the task.
- Identify the purpose of a specific teacher question or comment: assessing, focusing, re-voicing to direct students’ attention, eliciting and supporting contributions, encouraging clarification, advancing understanding, or asking for justification, etc. Was the question or comment successful?
- Look for evidence of classroom norms and expectations for students: making sense of ideas, explaining and justifying, clarifying thinking, using correct mathematical language, listening to and building on the contributions of others, taking ownership of ideas, asking questions of each other etc.
- Where is the locus of responsibility for and ownership of learning?

It has worked well in the past to allow time for participant groups to clarify the questions *before* viewing the video. In small group discussions *after* viewing the video I have an opportunity to ask follow up questions, before orchestrating a large group discussion.

	<b>Focus Questions (see entire question above):</b>	<b>In Previous Workshops Teachers Have Said:</b>	<b>Follow Up Questions:</b>
<b>SUMMARIZE: Discussion in small and large group after watching the video</b>	<ul style="list-style-type: none"> <li>Do the tasks posed encourage rich mathematical discussions?</li> <li>Identify the purpose of a teacher question or comment.</li> </ul>	<ul style="list-style-type: none"> <li><i>The students came up with different strategies because the task is open-ended.</i></li> <li><i>I think students should do the problem in more than one way.</i></li> <li><i>The teacher sometimes says she is confused. This makes students clarify their ideas.</i></li> <li><i>The teacher sometimes re-phrases a student idea. Sometimes she uses this to clarify; sometimes she uses this to get students to listen to each others' ideas and compare to their own ideas.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>How might a teacher question open up or close down the challenge?</i></li> <li><i>What else does the teacher do in addition to asking questions?<sup>Ω</sup></i></li> </ul>

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<sup>Ω</sup> Sometimes the teacher asks a student to repeat a conversation she has had with that student. This respects student ideas and brings more students into the class discussion. Sometimes she uses body language to indicate she is listening or puzzled or has a question or has understood. She seems to be modeling what students should be doing, because she is not *really* confused or puzzled. It is interesting that students accept this “act.”

**Focus Questions  
(cont'd):**

- Look for evidence of classroom norms and expectations for students.

**In Previous  
Workshops****Teachers Have Said:**

- *Students continue to explain to each other after the teacher has left the group.*
- *Students ask each other questions without going through the teacher.*
- *Students compare and connect strategies across problems, and bring these connections up in discussion.*
- *Students use mathematical vocabulary, not always correctly.*

**Follow Up  
Questions:**

- *Give an example of students talking to each other without the teacher as intermediary. Characterize their interactions.<sup>Ω</sup>*
- *Does the teacher address the issue of correct use of mathematical vocabulary?<sup>Ω</sup>*

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<sup>Ω</sup> We see Kelsey and Jocelyn explaining their idea to Melanie and Lily in chapter 6. The teacher's role is to help Kelsey and Jocelyn understand what is puzzling Melanie and Lily. She does not take over the explanation. So, when she leaves the group Kelsey continues to explain until Lily can "get it." In chapter 7 we see that Becca has spotted something she thinks is illogical. The teacher gives them a suggestion as to how to check on the logic and leaves. Becca and Travis and Jayna continue to work on this until they have to stop for the Summary. They do not resolve this issue until chapter 9. In chapter 7 they have to leave the "creepy" issue unresolved.

<sup>Ω</sup> The video "Management Issues" looks closely at how this teacher handles mathematical vocabulary.

**Focus Questions  
(cont'd):**

- Where is the locus of responsibility for and ownership of learning ?

**In Previous  
Workshops****Teachers Have Said:**

- *The teacher takes responsibility for preparing for lessons and for orchestrating small and large group discussions, but the students also take responsibility for making sure they understand what others are saying, and for explaining.*

**Follow Up  
Questions:**

- *Do the teacher's actions have an impact on where the responsibility and ownership lie?<sup>Ω</sup>*
- *Give an example of an interaction where you think students are taking ownership of learning. Was the teacher present?*

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<sup>Ω</sup> In chapter 8 the teacher sets up another discussion opportunity. Students are given the responsibility of explaining to each other. The teacher assumes students will want to understand other ideas, and will want to explain their own ideas. This has the added benefit of clarifying ideas or fixing errors. For example, the error that we see puzzling students in Chapter 7, becomes apparent in chapter 8 and is solved in chapter 9.

**Large Group Summary**

**Note: The teacher reflections on the video “Students Using Representations” address the teacher’s thoughts on establishing classroom norms.**

My goal in the large group summary should be to help participants connect the evidence of classroom norms, to the purpose of the teacher questions and comments, and vice versa. For example, if a participant group has noticed that it appears to be a norm for students to explain their ideas to each other independently of the teacher’s presence, or to question each other without going through the teacher, I might ask what teacher action supports the development of this norm. If a participant group notices that the teacher often re-voices one student’s idea to another student in the same group, I might ask to what extent we think that the classroom norms are related to this action.

Kathy’s questions, comments and actions are very low-key, but she thinks hard about what she is going to ask, and what she is *not* going to say, about different ways to give students opportunities to explain their thinking, and about ways to encourage contributions from all students. In her reflections she talks about her concern for encouraging effective small and large group behaviors, and about supporting students as they develop mathematical ideas and the language to talk about the ideas. There’s no proof that her actions create the classroom expectations we see. However, participants might find ideas they can incorporate into their own teaching behaviors, and make their own observations about whether the level of mathematical dialogue is improved or not.

**Reflection**

At the end of the large group discussion I should give time for participants to reflect on the implications of the discussion for their own classrooms.