ORCHESTRATING PRODUCTIVE DISCOURSE IN THE CLASSROOM

NCSM ANNUAL CONFERENCE

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WHAT DOES CGI LOOK LIKE IN THE CLASSROOM?

• Problem solving is the focus of instruction; teachers pose a variety of problems.

• Many problem-solving strategies are used to solve problems. Children decide how they should solve each problem.

• Children communicate to their teachers and peers how they solve the problems.

• Teachers understand children’s problem-solving strategies and use that knowledge to plan instruction.
TODAY’S OBJECTIVE

- Participants will understand the importance of teacher moves that will increase the levels of student engagement.
## Levels of Classroom Discourse

<table>
<thead>
<tr>
<th>Level</th>
<th>Teacher Role</th>
<th>Questioning</th>
<th>Explaining Mathematical Thinking</th>
<th>Mathematical Representations</th>
<th>Building Student Responsibility Within the Community</th>
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</thead>
<tbody>
<tr>
<td>Level 0</td>
<td>Teacher is at the front of the room and dominates conversation.</td>
<td>Teacher is only questioner. Questions serve to keep students listening to teacher. Students give short answers and respond to teacher only.</td>
<td>Teacher questions focus on correctness. Students provide short answer-focused responses. Teacher may give answers.</td>
<td>Representations are missing, or teacher shows them to students.</td>
<td>Culture supports students keeping ideas to themselves or just providing answers when asked.</td>
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<td>Level 1</td>
<td>Teacher encourages the sharing of math ideas and directs speaker to talk to the class, not to the teacher only.</td>
<td>Teacher questions begin to focus on student thinking and less on answers. Only teacher asks questions.</td>
<td>Teacher probes student thinking somewhat. One or two strategies may be elicited. Teacher may fill in an explanation. Students provide brief descriptions of their thinking in response to teacher probing.</td>
<td>Students learn to create math drawings to depict their mathematical thinking.</td>
<td>Students believe that their ideas are accepted by the classroom community. They begin to listen to one another supportively and to restate in their own words what another student has said.</td>
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<td>Level 2</td>
<td>Teacher facilitates conversation between students, and encourages students to ask questions of one another.</td>
<td>Teacher asks probing questions and facilitates some student-to-student talk. Students ask questions of one another with prompting from teacher.</td>
<td>Teacher probes more deeply to learn about student thinking. Teacher elicits multiple strategies. Students respond to teacher probing and volunteer their thinking. Students begin to defend their answers.</td>
<td>Students label their math drawings so that others are able to follow their mathematical thinking.</td>
<td>Students believe that they are math learners and that their ideas and the ideas of their classmates are important. They listen actively so that they can contribute significantly.</td>
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<tr>
<td>Level 3</td>
<td>Students carry the conversation themselves. Teacher only guides from the periphery of the conversation. Teacher waits for students to clarify thinking of others.</td>
<td>Student-to-student talk is student initiated. Students ask questions and listen to responses. Many questions ask &quot;why&quot; and call for justification. Teacher questions may still guide discourse.</td>
<td>Teacher follows student explanations closely. Teacher asks student to contrast strategies. Students defend and justify their answers with little prompting from the teacher.</td>
<td>Students follow and help shape the descriptions of others’ math thinking through math drawings and may suggest edits in others’ math drawings.</td>
<td>Students believe that they are math leaders and can help shape the thinking of others. They help shape others’ math thinking in supportive, collegial ways and accept the same support from others.</td>
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ORCHESTRATING CLASSROOM DISCOURSE

• *Design of Instruction*: writing or selecting a problem or task
• *Anticipating* likely student responses to cognitively demanding mathematical tasks
• *Monitoring* students’ responses to the tasks during the explore phase
• *Selecting* particular students to present their mathematical responses during the discuss-and-summarize phase
• Purposefully *sequencing* the student responses that will be displayed
• Helping the class *make mathematical connections* between different students’ responses and between students’ responses and key ideas

Purposeful Pedagogy Model (TDG; Cognitively Guided Instruction) and Orchestrating Classroom Discourse (Stein et al.)
MODEL OF TEACHING THAT IS RESPONSIVE TO CHILDREN’S MATHEMATICAL THINKING

Based on the work of Victoria Jacobs & Susan Empson, 2016

- Understanding CGI research around Problem Solving Trajectory
- Content Standards

Generative Instructional Practices

<table>
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<tr>
<th>Knowledge of Children’s Mathematical Thinking</th>
<th>Noticing Children’s Mathematical Thinking</th>
<th>Enacting Moves to Support and Extend Children’s Mathematical Thinking</th>
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Opportunities for Children to Advance Their Mathematical Thinking

Occur in the Moment “Informed Spontaneity”
What strategies have you observed that keep students engaged during mathematical discussions?
WHILE VIEWING...

Take note of:

• What questions/moves is the teacher doing to keep students engaged and to help students make mathematical connections?
• How do the students respond?
• What commendations would you offer this teacher?
• What Next Steps would you suggest?
2 \times 7 = 14

7 + 7 = 14 \quad 7 \times 2 = 14

3, 4, 6, 8, 10, 12, 14

8 + 2 + 3 + 2 + 2 = 14

1 \times 7 \Rightarrow 7 + 7 \Rightarrow 14

5 \times 7 = 35

5, 10, 15, 20, 25, 30, 35

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7 \times 7 = 49

35 + 14 = 49
WHAT ARE YOUR COMMENDATIONS AND RECOMMENDATIONS FOR NEXT STEPS?
$2 \times 7 = 14$

$7 + 7 = 14 \quad 7 \times 2 = 14$

$8 + 8 = 16$

$3, 4, 6, 8, 10, 12, 14$

$2 + 2 + 2 + 2 + 2 + 2 = 14$

$1 \times 7 \Rightarrow 7 + 7 \Rightarrow 14$

$5 \times 7 = 35$

$5, 10, 15, 20, 25, 30, 35$

$\square \square \square \square \square \square \square \square \square = 35$

$\square \square \square \square \square \square \square \square \square = 35$

$7 \times 7 = 49$

$35 + 14 = 49$
commutative property of multiplication

$2 \times 5 = 10$

$5 \times 5 = 25$

$10 \times 5 = 50$

$15 \times 5$

Distributive property

$5 \times 5$

Break it down

$50 + 25 = 75$

$5 \times 13 \rightarrow (5 \times 10) + (5 \times 3)$

$50 + 15 = 65$
WHAT DID YOU NOTICE?

- What questions/moves did the teacher do to keep students engaged and to help students make mathematical connections?
- How did the students respond?
- What commendations would you offer this teacher?
- What Next Steps would you suggest?
REFLECTION

What ideas from this session are you planning on implementing with the teachers and/or administrators that you work with?
2ND GRADE END OF YEAR
THANK YOU!

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