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Changing the Rules to Increase Discourse

A second-grade teacher challenges the raise-your-hand-to-speak tradition and enables a classroom community of student-driven conversations that share both mathematical understandings and misunderstandings.

By Lisa A. Brooks and Juli K. Dixon

Have you ever thought about the effects of the rule that requires students to raise their hand before speaking? Although it may provide order and a quiet classroom, what if the practice were removed? Is this rule necessary? Would learning still take place without it? Might students learn more?

This article describes how one of the authors, second-grade teacher Lisa A. Brooks, challenged the raise-your-hand-to-speak rule. Her desire to make this change was a result of experiences gained in a graduate class taught by the second author, Juli K. Dixon. Brooks had learned that it is possible to create a classroom community where students share their mathematical understanding and misunderstanding through student-driven discourse.

Making sense of a standard

The Common Core State Standards for Mathematics (CCSSM) (CCSSI 2010) document emphasizes Standards for Mathematical Practice. "The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students" (CCSSI 2010, p. 6). One Standard for Mathematical Practice is for students to achieve the ability to *construct viable arguments and critique the reasoning of others.* This practice describes how students should be interacting with the mathematics and with one another. Research indicates that this sort of involvement promotes understanding (Peressini and Knuth 2000; Kazemi and Stipek 2001). Often, when we think of classroom practices, we think of what the teacher should be doing. As we work to implement this Standard for Mathematical Practice, our focus must turn to what

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students are doing. How does such a change in emphasis affect our teaching practice? Asking students to construct viable arguments gives them an opportunity to provide reasoning along with their answers. The assumption is that students will make their case on the basis of their understanding of the mathematics. Their arguments must include the pathway to the solution as well as a justification of why their solution is acceptable. A process of negotiation between the teacher and students establishes the teacher's clear expectations and involves the students (Cobb 2000).

The second part of this practice is students' ability to *critique the reasoning of others*. Students must be able to listen to how a classmate or the teacher arrives at his or her answer. They must make sense of that answer (which includes a solution pathway and justification), decide if they agree or disagree, and say if they do not understand. This expectation is also negotiated (Cobb 2000).

When the focus is on reasoning, students engage in the process of mathematics. This requires them to become active participants, gaining new perspectives of what mathematics is about (Boaler 2008). The question is, Must the teacher be the one who manages these conversations, or are elementary school students capable of speaking directly to one another?

Changing the rules

This question marked the beginning of a journey for Brooks when she participated in a master's program designed to create teacher leaders. Her experiences in a mathematics class for teachers motivated her to reflect on the possibility of establishing the same norms for her elementary school students. In the graduate class, students did not have to raise their hands to speak. Conversations around mathematics topics flowed freely. However, the students were all adults. Brooks questioned whether her second graders could enjoy the same freedom. She made the decision to change her classroom norms and examine how the change would influence her students' participation in classroom discussions (Dixon, Egendoerfer, and Clements 2009).

Brooks began a discussion with her class of second graders regarding class rules. She asked each of them, "What would happen if you were allowed to talk directly to others in the class without having to raise your hand first?" Fourteen of the sixteen students replied that they would get in trouble, despite the fact that the teacher had used the phrase *if you were allowed to*. Their responses indicated that they would require support in this transition. The very idea of speaking in class without permission was new to them.

The teacher outlined some new rules that would replace the raise-your-hand-to-speak rule. Students had to "unlearn" something that had been on every list of class rules since entering kindergarten. Initially, they needed constant reminders. Even when speaking without raising their hands, many students directed their conversations to the teacher rather than to the classmate to whom they were supposedly speaking.

While addressing *how* to talk to one another, Brooks also focused on the content of the conversations. This required an additional set of expectations:

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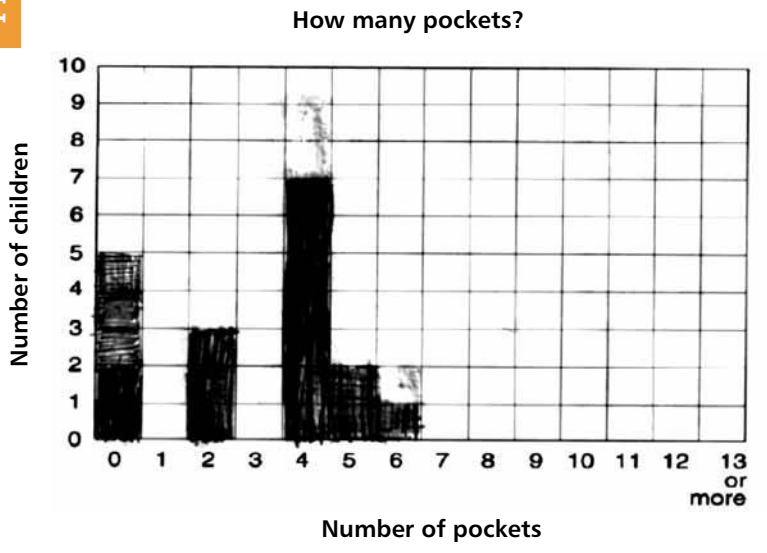
FIGURE 1

Second graders found interpreting a graph to be challenging, which led to a student-driven discussion and a shared understanding of the math content.



1. Explain your reasoning.
2. Begin a disagreement with specific questions or explanations based on what you heard.
3. Question others when you do not understand what they are saying.

The teacher used student-friendly language to explain these expectations and why each was important. Initially, students talked *at* each other rather than *to* each other and had to be redirected. For example, if Riley shared a solution pathway and, in responding to Riley, Paige went directly to sharing her own solution pathway, the teacher entered the conversation to explain to Paige that it was important to first discuss what Riley had shared before sharing her own ideas.

Examining the past

Sometimes looking back on the past provides a picture of how far you have come. This was the case for Brooks when she reviewed videotapes of her before-the-change lessons. She was an experienced and accomplished mathematics teacher, so she was surprised to find evidence of a lack of student engagement in these videos. She noticed a recurring theme of student boredom and general absence of involvement. The students were fidgety and often raised their hands for long periods of time only to get sore arms. When students were called on and asked to reiterate what others had said, they were unable to do so, indicating their lack of active participation in class activities (Boaler 2008) other than what they wanted to share.

Reaching a new level

Once the new rules were in place, the level of engagement in the classroom immediately changed dramatically. Before the rule change, some individuals talked to the teacher, but most students disengaged. After the rule change, students listened carefully when others spoke because they knew they could become part of the discussion at any moment.

In the following snapshot of a class session, students construct arguments *and* critique the reasoning of others. Students were determining the total number of pockets they were wearing that day. They created a graph (see **fig. 1**) showing that five students had no pockets, no students had just one pocket, three students had two pockets, and so on. Determining the total number of pockets worn by students that day by interpreting the graph (rather than just counting all the pockets) was a challenging task, making for a great discussion. Student errors resulted either from miscounting or from misinterpreting the graph by counting the number of students instead of the number of pockets. For example, the graph indicates that three students each had two pockets. That would account for six pockets rather than three. The correct answer was that students were wearing fifty pockets in all. The dialogue below illustrates the path students follow as they negotiate their understanding within a student-driven discussion. Notice how student interactions serve as a mechanism to bring students to a shared understanding of the mathematics content.

Anthony: [The answer is] eighteen.
Darby: Your answer is correct, because if you go to each row and you counted the boxes—and did you go back to make sure?
Anthony: Yes.
Sarah: I think it is seventeen, because if you add

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two to four, it equals six, then you add one to six, it equals seven, so if you add [*stopping*].
Teacher: Did you catch a mistake?
Sarah: Yes.
John: These are all zeros, so they are all thirteen. These are zero pockets and [the teacher] asked how many in all, and yesterday there were one, two, three…, thirteen. So that is thirteen. Eighteen is not right, because zero pockets, you're counting those and [the teacher] said how many pockets in all of the whole class, and yesterday five people had zero, so you weren't counting the zero.
Bob: One, two, three…, eighteen [*counting the numbers of boxes on John's chart*].
John: Yeah, but these are zero pockets [*pointing to the column showing students with zero pockets*].
Bob: I found all of those. I counted, and it equals eighteen. It is not thirteen; it's eighteen.
Multiple students: We don't count zero!
David: Bob, I think what you meant is that these were pockets, and you thought these were pockets, too. But not everyone was wearing them. Say, if you erased them, then how many pockets would you have then?
Bob: OK, I agree with John now.
John: There are zero pockets, so you don't count zero.
Alex: I don't agree, because I counted eighteen groups.
John: You don't count the groups that are above zero, because there are no pockets there.
Mike: I agree with Anthony, still.
Bob: No, let me show you. You don't count the zeros. One, two, three…, thirteen. Don't count the zeros. There is no zeros.
Sarah: Actually, I think there are more than thirteen, because each box is pockets.
Teacher: Explain to the class.
Sarah: This box wouldn't be counted one, because that is a two-pocket. Then there would be another two pockets and then three pockets….

Students were talking to one another. They did not back down on their incorrect answers until they were convinced. This sort of dialogue did not exist in the class before the rule change. Students would just look to the teacher to resolve inconsistencies in answers. After the rule change, the type of dialogue above was much more common. Although students had different answers, they worked it out together rather than turning to the teacher as the authority. Students were able to critique one another's reasoning in an effort to come to a shared understanding. Notice the teacher's role as she purposefully removed herself as much as possible from the conversation. Prior to the teacher's focus on supporting discourse, she might have alerted students to the error immediately and had them correct it based on her guidance.


TATYANA CHERNYAK/VEER

Student engagement improved dramatically after one simple change to behavioral expectations in the classroom.

Changing this one rule—and then offering support through clear expectations and opportunity as well as encouraging students to share their thinking—seemed to promote an environment in which more learning could take place. Students were truly engaged in Mathematical Practice 3: *constructing viable arguments and critiquing the reasoning of others.*

Making the change to student-led discourse

Readers might find the idea of changing a rule to be daunting. Three steps should make the change manageable.

1. Provide clear expectations and examples

Students are accustomed to the teacher being in control of classroom conversations. Transitioning control to the students requires clarity and support. It is helpful for students to know exactly what will be expected of them. Here are some directions to consider giving to them:

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- Address one another by name. [*This will help serve as a reminder for students to talk to one another rather than just to the teacher.*]
- Talk about your classmate's method before sharing your own thoughts. Expect this to be a challenge.
- Take turns talking; speak one at a time.
- Speak clearly and loudly so others can hear you. [*As students require this of one another, it will become a natural part of class discussions.*]

Common Core Connections

SMP 3
2.MD.D.1

Three keys to successfully changing a classroom rule

Focusing on mathematical reasoning requires students to become active participants in the classroom. However, students and teachers alike must break out of familiar routines when seeking to establish new classroom norms.

1. Expect regression to the familiar

Students have had years of following the convention that they must raise their hands to speak. And even if they do remember to speak without raising their hands, their "talk" is often directed to the teacher rather than to their peers. As teachers, we are also likely to fall back to our practiced routine of controlling classroom conversation. Maintaining the new norm requires attention.

2. Purposefully refrain from explaining too much

Allowing students to make and learn from their mistakes is fine. When we jump in too quickly to provide *our* explanations, we diminish the importance of *their* work in the process. If we believe in this change, we need to commit to it and help our students to stay committed as well.

3. Catch them doing well

Students need reassurance with this new norm. Verbal praise can be effective when students are engaged in dialogue with one another around the mathematics topic at hand. Teacher comments can be motivating. Try using encouragement: "Notice how Alex did not change his mind about his answer just because everyone else disagreed. Disagreeing is OK, and he eventually found a mistake." Emphasize to students that disagreeing with someone is different than saying they are not smart; disagreeing is not mean.

2. Start small

If the thought of making a drastic change in your class is overwhelming, we recommend taking baby steps with implementation. Rather than completely eliminating the rule to raise hands, you could start by having *students* call on one another directly. Another great place to start is to have students state their agreement or disagreement with others.

3. Practice before plunging

Before the teacher changed the raise-your-hand-to-speak rule, she had her students communicate agreement or disagreement by a show of thumbs up or thumbs down, helping them adjust to the idea of publicly agreeing or disagreeing with their classmates' solutions. Eventually, she had them include explanations and justifications with their answers. After students became accustomed to supplying explanations and justifications with their solutions, challenging the thinking of others was a natural next step for them.

Making it permanent

We are all conditioned by the raise-your-hand-to-speak rule—students and teachers alike. Despite this fact, students in this class demonstrated their ability to manage their own mathematical conversations. However, can one isolated year of this sort of classroom dynamic make a difference? Before the end of the school year, each second-grade student was asked to describe what happened when the rule to raise your hand before speaking was changed. The response of one child was quite telling:

> It's pretty cool. I never got to do that without raising my hand. But I needed to get used to it, and when it's the end of the school year, I'll have to get out of it because if I try do it in math class next year, then I might get a bad report card.

If we are to meet the challenge of having students "construct viable arguments and critique the reasoning of others" (CCSSI 2010), we may need to make this change in the rules a permanent one by allowing our elementary school students to speak directly to one another, something that was clearly powerful for these students.

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