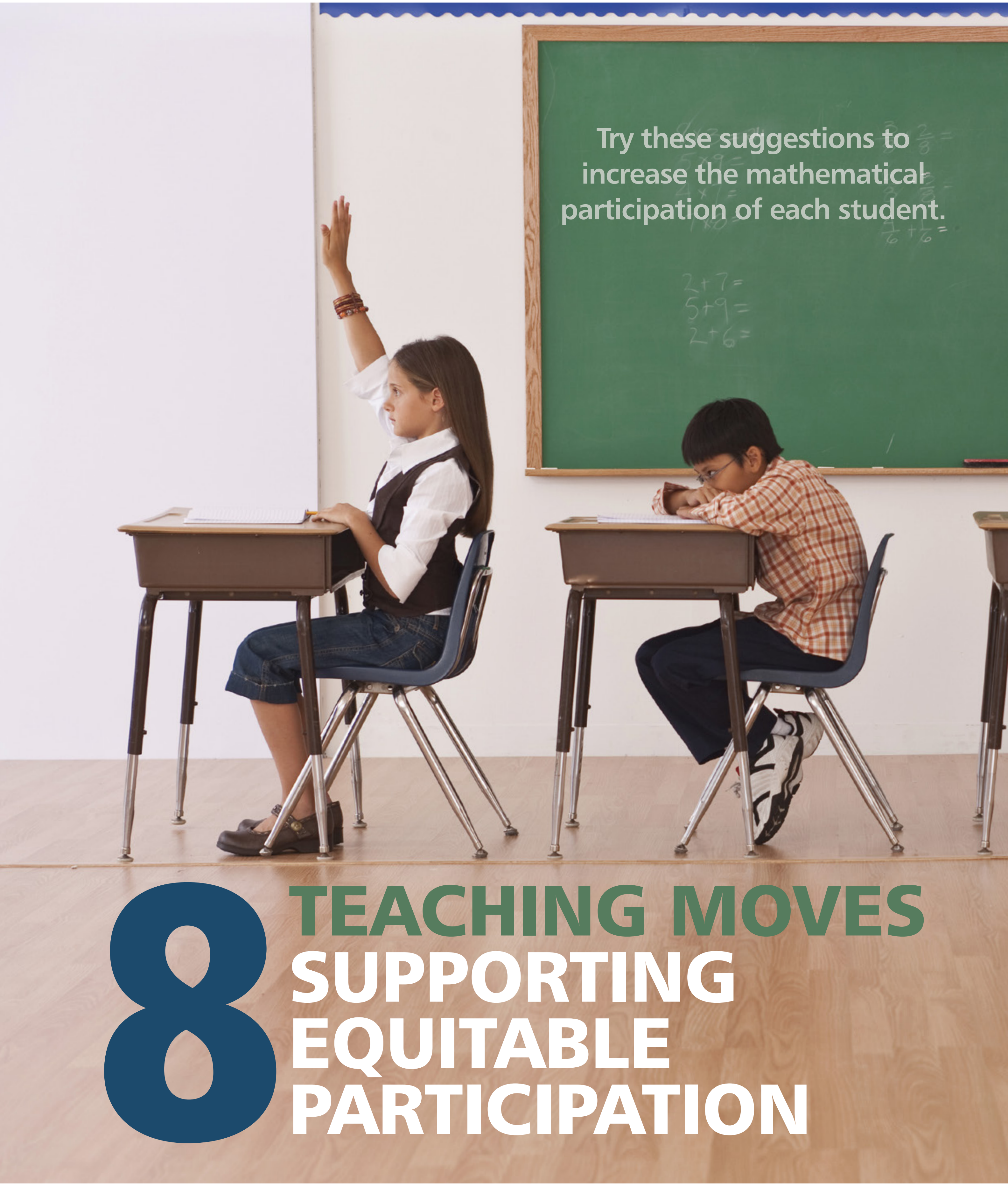

Try these suggestions to increase the mathematical participation of each student.

8 TEACHING MOVES SUPPORTING EQUITABLE PARTICIPATION

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We often hear statements like these in our classrooms: "I'm not good at math."

"I can't do this!"

"Ask Daniel what this means. I copied it from him."

The proclamations frequently come from students we struggle to teach, especially those who seem to passively occupy their seats or actively disrupt others' learning. Frustrated, teachers often turn to group work, hoping that working in small groups will give students who are underperforming more opportunities to participate. However, these students are often just as mathematically reluctant in small groups as in whole-class settings. One solution for getting all students engaged is to focus on barriers to participation. In particular, we need to address perceptions of intelligence that mean some students are seen as more entitled to participate than others.

Barriers to participation

Students often choose to participate, and are allowed to participate, in mathematics to the degree that they are seen (and see themselves) as smart. Students' perceived mathematical skill is intertwined with their social, peer, and academic standing—their status. "Higher status" students are seen as smarter (by their peers, by their teachers, and even by themselves) and participate more often, whereas "lower status" students often get sidelined.

Student status is often based on characteristics that seem to have little to do with mathematics. For example, students may judge one another's intelligence on the basis of physical attractiveness, popularity, reading ability, social skills, race, gender expression, or first language.

Also, status is dynamic. A student's status increases when she makes a mathematical contribution that is recognized by a classmate or teacher. As status increases, a student is likely to gain confidence and to make further contributions. In contrast, as students with lower status defer to the ideas of their higher-status peers, their status diminishes. As a result, high-status students spiral up in status and participate more as low-status students spiral down and participate less. Status can also depend on the situation: Some students who may be seen as more competent on the playground, in literacy tasks, or in art may have lower status in math class.

Taking status into account

To address differences in participation and status, we use strategies from Complex Instruction (CI), a set of principles and practices developed by Cohen and Lotan (2014) after observing unproductive student interactions in elementary school classrooms. CI was later refined by the teachers at "Railside" High School (Nasir et al. 2014) who successfully used CI strategies to support students in learning challenging mathematics in detracked classrooms.

CI starts with the premise that *all* students can solve complex mathematical problems and that each student brings important mathematical strengths to the table. Teachers can leverage students' diverse skills by placing them in groups and presenting them with complex and challenging tasks. These tasks must be multidimensional, meaning they have different entry points; must have multiple paths to a solution that uses a diverse set of abilities; and must be challenging enough that a single student is unlikely to solve them.

COMSTOCK IMAGES/GETTY IMAGES

Eight teaching moves to address unequal participation

Even after teachers have redesigned tasks and placed students in groups, "higher status" students may still tend to take over or exclude others from participating. Teaching moves can work to equalize status in the classroom and help students see everyone's contribution as essential. We illustrate these teaching moves with examples from the Tables task (see **fig. 1**), adapted from Koestler and her colleagues (2013).

Move 1: Focus on participation instead of student ability.

As teachers work to describe the diverse abilities in their classrooms, they may refer to students as *struggling* or *successful*, *fast* or *slow*, *high-achieving* or *low-achieving*. Such labels often lead us to modify tasks so they are sufficiently challenging for some students while not overwhelming others. However, these labels and our task modifications distract us and our students (who are well aware of who is seen as "fast" and "slow") from the real barriers to learning: challenges with unequal status and participation.

If, instead, we focus on how students' past experiences have taught some students to *overparticipate* and others to *underparticipate*, we gain a new lens for understanding student activity. Some students have been rewarded for engaging in overparticipation behaviors, such as shouting out answers, telling other students what to do, and interrupting others. Other students who have not been successful in these ways have instead learned to avoid drawing attention by underparticipating, possibly by disengaging or copying answers.

Focusing our attention on these learned forms of participation shifts us away from labeling students on the basis of perceptions of ability. Rather than see a student as slow or struggling, the lens of participation helps us see how overparticipation by one student might prevent or limit participation for others. A teacher can intervene with students by asking some to wait before responding and providing others with structures to draw out their voices and ideas (see below). These moves bring more diverse ideas into the open, providing a more complex and enriching mathematical problem space.

Move 2: Expand what counts as mathematical competence.

In many classrooms, the student who is quick at standard algorithms or equations is seen as mathematically smart and may dominate group interactions. However, the Common Core (CCSSI 2010) Standards for Mathematical Practice (SMP) remind us that mathematical proficiency is more than just calculations. To expand what counts toward mathematical competence, teachers can design tasks that require a range of academic skills (Cohen and Lotan 2014; Featherstone et al. 2011).

For example, the Tables task involves developing multiple strategies for solving a nonroutine problem (SMP 1), moving back and forth between a semirealistic context and mathematical ideas (SMP 2 and 4), communicating mathematical ideas clearly to others and listening to others' thinking (SMP 3 and 6), using a variety of tools and representations (SMP 5), and identifying patterns and making generalizations (SMP 7 and 8). Underparticipating and overparticipating students alike will have some (but not all) of these skills. Therefore, teachers can use such tasks to challenge overparticipating students to think about problems in new ways and encourage underparticipating students to actively participate. Also, as students come to see that mathematics requires diverse skills that they already possess, they start to see themselves as mathematical people whose ideas are valuable and worthy of sharing (Oslund and Barton 2017).

Move 3: Make ". . . yet!" a norm.

A classroom norm developed at Railside High School, ". . . yet" requires that any claim students make about what they cannot do or do not know in mathematics be qualified by the word *yet*. For instance, on the Tables task, a student might sigh and say, "I'm not good at pattern problems." A teacher using CI strategies would remind the student, "You're not good at them *yet*!" This move reminds students that abilities in mathematics are continually changing rather than fixed. This additional word prevents students from using claims about current incompetence as an excuse for nonparticipation. In fact, the word *yet* quietly reinforces a classroom expectation that all students (regardless of status) will become more capable over time.

In classrooms where the "yet" norm is routinely practiced, students often remind others to add the word to their sentences. For example, one third-grade boy told his tablemates that his older sister was teaching him algebra. A girl at the same table said, "I don't even know what

FIGURE 1

Teaching moves can work to equalize status in the classroom and help students see everyone's contribution as essential. This Tables task has been adapted from Koestler et al. (2013).

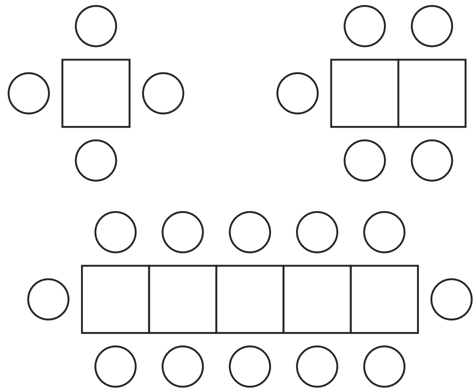
The Tables Task Card

Materials:

Square tiles
Graph paper
Paper
Pencils or markers

Directions:

Look at the pictures below. There are 4 people sitting at just one square table, 6 people sitting at two square tables, and 12 people sitting at five square tables. We always push the square tables together to make one long row.



Task:

As a group, determine how many people can sit around a row of

- 10 square tables
- 20 square tables
- 52 square tables
- *any number* of square tables

Everyone in your group must record and be able to explain **two different strategies** for solving these problems.

algebra is." A chorus of voices added, "Yet!" In this way, ". . . yet" helps students change the stories they tell themselves about their own capabilities and those of their classmates.

Move 4: Give students responsibility for managing work.

As teachers, we usually assume that we are responsible for time management, student behavior, available resources, off-task activity, and much more. However, students can and should manage these aspects of learning. In CI, teachers use roles to assign this work to group members (Cohen and Lotan 2014). For example, the Facilitator is responsible for watching time and reminding the group to stay on task. The Resource Manager is responsible for gathering and returning resources (Featherstone et al. 2011).

These roles must be carefully designed so responsibilities are spread equally. If one role has too much responsibility or authority, overparticipators will take up that role and end up running the group. Also, the responsibilities of a role are for making sure that *work gets done*, but not for *doing the work*. For example, the Recorder/Reporter might be responsible for ensuring that the group's ideas get recorded. However, this student does not need to do the recording. Instead, she can ask others to help. This focus on getting the work done (rather than doing the work) means that any student can be successful in any role and teachers do not need to carefully assign roles.

Also, the responsibilities for each role must require students to engage in the mathematics of the task in some way. For example, the resource manager's responsibilities must include more than collecting and putting away materials; this person may also be responsible for collecting the group's questions and relaying them to the teacher.

Roles give students responsibility for managing their learning, invest them in making important decisions about their education, and help them feel involved in their group. Roles have an important impact on students who hesitate to participate, giving them authority to manage particular aspects of the group and to engage in the lesson. Roles also free up teachers to focus on students' mathematical learning and progress.

Move 5: Observe unobtrusively.

After assigning roles, a teacher may be tempted to use her newfound time and energy for additional instruction. However, we urge teachers to listen to groups unobtrusively and to intervene only if the group is on the verge of calamity. When we work with groups, we stand just close enough to groups so we can hear and see their activity, but not so close that they turn to us for help. This "no hovering" injunction (Cohen and Lotan 2014) allows students to focus on their work and to make sense of how to use one another as resources, rather than turning to teachers to solve their problems or approve their answers. The teacher can then spend energy observing students' mathematical learning and noting areas of struggle, status problems, interesting mathematical explorations, participation patterns, and student ideas.

Move 6: Highlight student strengths.

Once teachers have noticed students' mathematical strengths, they can use this information

"...yet" helps students change the stories they tell themselves about their own capabilities and those of their classmates.

to raise student status. We do this through a move Cohen and Lotan (2014) called "assigning competence," but which we call *highlighting strengths*. When making this move, the teacher *publicly* acknowledges a *specific academic* contribution made by a student whose academic ideas are not usually noticed by other students.

For example, imagine Andrea, a student whose voice is rarely heard by her classmates. As her group puzzles out the Tables task, Andrea draws a row of ten squares and writes 10 + 10 + 2 = 22. Because Andrea has low status in her group, her peers may not pay attention to her ideas, but the teacher can intervene. She might stand across the table from Andrea so her talk carries across the group and say, "I think Andrea has an idea that might help you. Andrea, can you explain what you wrote on your paper?"

By publicly highlighting a specific academic contribution, a teacher can help Andrea and her peers see Andrea as mathematically competent and essential to the group's success, which raises Andrea's academic status in that moment. Repeated use of this move over time works to convince students that everyone has important mathematical ideas to contribute to their group. We have found that this relatively simple move can result in dramatic changes in student participation.

Move 7: Take only group questions.

In this move, developed at Railside High School, the teacher answers only questions that the group has already discussed and cannot answer on their own. For instance, on the Tables task, one student might call the teacher over to ask how to arrange the square tiles (some students create two rows instead of one long row). When the teacher arrives at the group, he talks with any student *other than the student calling him over*, asking, "What is your group's question?" By querying a student who is not raising his or her hand, the teacher can determine whether the question has been discussed by the group. If this other student does not know the question, the teacher responds, "It sounds like you need to talk as a group first. If you still have a question after that, call me back." At this point, the teacher leaves the group, sending the message that he is available only when the group is truly stuck. As a result, students realize they can rely on the group, rather than on the teacher, to meet their needs.

Move 8: Establish a norm that "no one is finished until everyone understands."

As students arrive at a solution, they should verify that each group member understands and can explain the solution. In doing so, students "construct viable arguments and critique the reasoning of others" (CCSSI 2010, SMP 3, pp. 6–7). The teacher can reinforce this norm by asking several students in the group about their mathematical understandings. When a group finishes, the teacher approaches and chooses one student to explain and justify one part of the group's strategy. Hearing from students who have a history of underparticipation is important, so we suggest that teachers start by asking questions of these students. We find we sometimes have to insist that students who are overparticipating allow other students to respond. We might have to say, "Pat, I asked Terry to respond, and I would like to hear from him."

On the Tables task, a teacher might ask, "Where did this number come from?" "Can you show me with a picture or the tiles?" or "Can you write a number sentence that matches your strategy?" As the teacher becomes satisfied with one student's understanding, he or she can interrupt the student and ask another student to continue the explanation. If a student struggles to explain an idea, the teacher can leave the group, giving the student a few minutes to discuss ideas with group members before calling the teacher back to finish the explanation. Eventually, students will start asking one another these questions and will practice their explanations before the teacher visits their group. Additionally, conversations about understanding sometimes trigger additional mathematical talk as students realize they have more to learn.

Getting started

Thinking about students in terms of participation instead of "high" or "low" achievers is more than replacing one term with another; it encourages us to shift our focus to student activity as well as barriers to and supports for productive activity. It encourages us to create classroom spaces that draw on student strengths and invite the activity of each student, resulting in an increasingly positive and productive student-centered classroom.

Common Core Connections

SMP 1–8

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