A BETTER BLEND

STRUCTURE AND STRATEGY INCREASE CO-TEACHING'S IMPACT IN AN INCLUSIVE CLASSROOM

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In co-teaching, typically a general education teacher and a special education teacher pair up to provide instruction in an inclusive classroom setting. Several co-teaching models are available. Some call on a co-teacher to simply observe or assist, whereas others more fully involve both co-teachers in providing instruction. Despite having various models to choose among, teachers typically use the one teach/one assist model because they either lack planning time or lack experience in more complex models like team teaching (Rosas & Campbell, 2010).

However, given the opportunity to plan together, co-teachers not only become more equal partners in providing instruction, they can also more effectively incorporate a variety of evidence-based practices in their inclusive classrooms (Hunter, Jasper, & Williamson, 2014). And in this work, coaching can help.

To that end, we engaged seven math co-teaching teams (grades 7 and 8) in a rural Midsouthern school district in professional development and virtual coaching. The district enrolls more than 2,500 students, 75% of whom receive free or reduced-price lunch. Our work focused on building the capacity of co-teachers to plan and implement team teaching in an evidence-based practice called Numbered Heads Together (Hunter & Haydon, 2013; Haydon, Maheady, & Hunter, 2010). We selected this strategy because it

increases student engagement, provides an incentive for students to master content, and becomes most effective when implemented using a team-teaching approach.

NUMBERED HEADS TOGETHER

Numbered Heads Together is a cooperative learning strategy that attempts to provide more equitable response opportunities to all students — especially those who don't typically raise their hands to answer.

Students are clustered into groups of three or four, with each student in a group assigned a number. Teachers pose questions to the groups, and students use a dry erase board and marker to indicate their team's answers.

When the teacher calls out, "Numbered heads together," it's a signal for all groups to discuss possible solutions to the question. After a minute or two, teachers call on students with a given number to stand up and give their team's response.

The power of the approach is that it increases the number of opportunities to respond (Hunter, Dieker, & Whitney, 2016). Teachers pose more questions during the activity compared to traditional instruction, providing more opportunities for students to respond within their small groups.

Research suggests that teachers should offer a minimum of four to six opportunities to respond per minute. Students should be able to answer with 80% accuracy when learning a new skill (Reinke, Herman, & Stormont, 2013). During a co-teaching Numbered Heads Together activity, teachers pose a minimum of 10 questions, and, depending on student response, they may ask additional questions to check for understanding.

Providing multiple opportunities to respond increases both student engagement and accurate responses (Lambert, Cartledge, Heward, & Lo, 2006). Moreover, when both co-teachers have the opportunity to question students and elicit answers, they acquire parity in the classroom.

WHAT A CO-TAUGHT LESSON LOOKS LIKE

To implement Numbered Heads Together with the co-teaching model, teachers first need to use data to make decisions regarding grouping so that at least one below-average, one average, and one above-average student are in a group. They also need to dedicate time to creating guiding questions.

Each co-teacher poses five questions to students. The general education teacher might pose even-numbered questions, whereas the special education teacher might pose odd-numbered questions. It's important to note that when one teacher is in the front of the room asking questions, the other teacher is observing student groups and gathering data on individual student participation.

Let's look at a lesson on rational numbers. After dividing students into groups of four, the co-teachers might begin by asking students to give examples of opposites. Real-world examples might include earning and spending money, stock market gains and losses, or gaining and losing yards in a football game.

The general education teacher could show a video of a football game, with players gaining and losing yards. The special education teacher could highlight the learning targets, such as, "I can use a number line to show the sum and difference of integers" and "I can describe real-world situations using the sum and difference of integers."

In the course of the lesson, the co-teachers model how to add and subtract integers to solve word problems,

CO-TEACHER ROLES IN A MATH ACTIVITY — NUMBERED HEADS TOGETHER

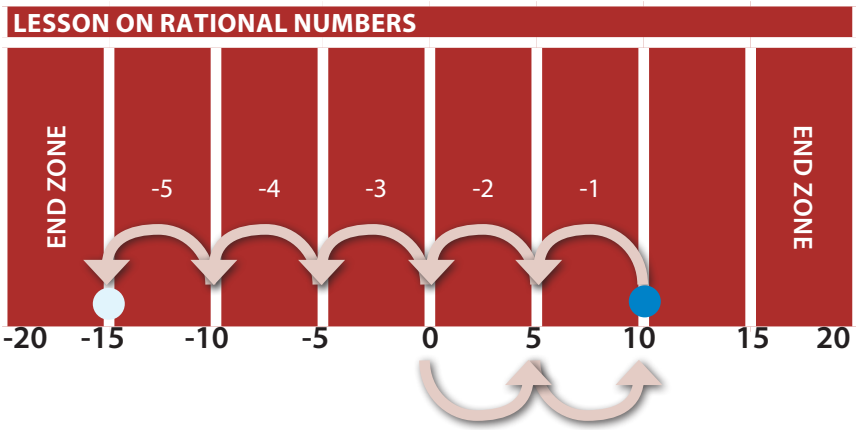
1 BOTH CO-TEACHERS		2 GENERAL EDUCATION TEACHER	3 SPECIAL EDUCATION TEACHER	4 SPECIAL EDUCATION TEACHER
During co-planning, **both co-teachers** place students in heterogeneous groups consisting of at least one high-achieving, one average-achieving, and one low- achieving student. For the activity, students are seated in groups of three to four to promote team collaboration.		The **general education teacher** distributes dry erase boards and markers to each group.	The **special education teacher** assigns each student a number (from 1 to 4) and explains students' roles when their number is called.	The **special education teacher** discusses rules of the activity: • One person talks at a time. • Respect everyone's answers. • Use "indoor voices" when talking. • Remain quiet when the teacher speaks. • Quietly return to your seat.

explain the Numbered Heads Together strategy to students, pose their 10 questions, solicit answers, and confirm understanding through using exit slips. The figure above and on p. 59 describes each teacher's role as she co-teaches a math activity using this approach.

The Numbered Heads Together strategy also enables co-teachers to engage in task analysis. They observe students grappling with problems, see how students perform their tasks, and note the degree to which they succeed (Dieker & Rodriquez, 2013).

For example, during whole-group direct instruction right before the Numbered Heads Together activity, co-teaching teams can present a math problem that requires multiple procedural steps for students to answer with accuracy. Later, during the Numbered Heads Together activity, students use task analysis — that is, their knowledge of the correct steps — to answer a similar multistep problem within their small groups.

Although there are multiple ways to find answers for complex mathematic algorithms, using task analysis provides an opportunity for students to learn one correct way (Rivera & Baker, 2013).



Task analysis enables teachers to more easily monitor students' progress and identify areas where they struggle to complete a skill (Cihak, Alberto, Taber-Doughty, & Gama, 2006). It also promotes rich discourse and gives students a chance to find errors in one another's work (Hunter, 2012).

Within the small groups, one selected student completes a math problem on a dry erase board while other students within the group provide feedback on the accuracy of each procedural step. Students must agree on the answer before presenting their solution to the co-teaching team.

In the lesson on rational numbers, the teachers might offer the following problem, displaying the graphic above.

A football player runs 10 yards. The referee throws a penalty flag, and the team loses 15 yards. How many yards did the football player gain or lose?

a. 10 yards gained
b. 5 yards gained
c. 5 yards lost
d. 0 yards

Before the lesson, the co-teachers

5 BOTH CO-TEACHERS	6 ONE CO-TEACHER	7 ONE CO-TEACHER	8 ONE CO-TEACHER	
Both co-teachers present five questions each to the student teams. Each co-teacher rolls a dice to determine which student from the teams will answer the question.	**One co-teacher** informs teams of the time they will have to answer the math questions (e.g. one minute) and instructs them to "put their heads together" to come up with an answer.	**One co-teacher** continues to ask questions until 10 questions have been asked and answered.	**One co-teacher** confirms correct answers. This concludes the activity (about 30 minutes total).	

break down the problem into multiple steps. In this case, the steps might look like this:

The student locates the starting point "0" on the number line.

The student locates the first known number in the equation, "10." Because "10" is a positive number (gained yardage), the student moves a marker to the right of zero on the graphic until he or she reaches "10."

The student locates the second known number in the equation, "-15." Because "-15" is a negative number (yards lost), he or she starts at "10" and moves left to reach "-15."

The student counts the number of times he or she moved to the left, from "+10" to "-15."

The student circles the correct answer, "c."

The co-teaching team can display the graphic of the math problem — in this case, the football field — on an electronic whiteboard or a dry erase board. Students should also have a copy of the graphic for their own reference while working within their groups to answer questions posed by the co-teaching team.

Ultimately, the goal is for the student groups to work out the problems together, agree on an answer, present their answer on the dry erase board, and receive feedback from the co-teaching team.

As teachers pose questions and students work their way through the problem, the teachers probe student responses at each step. They might use the symbol "+" for independent correct, "0" for no response, "-" for error, "V" for verbal prompt, or "M" for model prompt to indicate how well the student has grasped the material (Rivera & Baker, 2013).

If they see a student struggling with a given step, they may either engage the student in a discussion about the problem or model how to accurately complete the step. Ultimately, the goal is for the student groups to work out the problems together, agree on an answer, present their answer on the dry erase board, and receive feedback from the co-teaching team.

To ensure that students who operate above grade level aren't dominating the discussion within their group, teachers can either coach the above-average student outside of the activity in how to be a good facilitator or reorganize the groups.

COACHING FOR SUCCESS

Now all of this sounds well and good, but to do this effectively requires adequate planning time and targeted coaching support. We addressed these concerns first by offering the seven middle school co-teaching teams two hours of professional development focused on co-planning and on the Numbered Heads Together model.

The co-teaching teams developed an agenda that clarified the math content for the lesson, as well as how they would

address student strengths and needs and assess student outcomes. We provided feedback on each team's agenda and lesson plan. We also observed as the co-teachers taught the lesson using their new team-teaching skills.

Before taking part in this professional development, the co-teachers had engaged in the one teach/one assist model, with the general education teacher teaching the lesson and the special education teacher assisting. We were eager to see how successful they might be with their new team-teaching skills.

We looked at on-task behavior, which we defined as students engaging with the educational material and with the instructors and working on math problems with table mates (Hunter & Haydon, 2013). We also looked at opportunities to respond. As teachers asked questions, students answered through hand-raising and response cards.

The co-teachers were able to double the opportunities to respond during their team-taught lesson. And observational data showed that students were over 95% on-task during the team-teaching lesson, compared to being 83% on-task in the teach/assist lesson.

After the teams completed the Numbered Heads Together activity, we met with each team virtually in a brief Skype coaching session. The co-teaching teams reflected on their experience using the lesson plan, and we provided feedback based on our observation of the lesson.

STRUCTURE AND STRATEGY

A common theme we hear about co-teaching is the lack of co-planning time (Davis, Dieker, Pearl, & Kirkpatrick, 2012). However, time may not be the primary issue. Co-teachers may simply need more structure as they co-plan a lesson. They may also require a strategy, such as Numbered Heads Together, that gives them greater parity in the classroom.

The bottom line is this: Blending the two different skill sets of the general education teacher and the special education teacher with direct coaching or with a strategy like Numbered Heads Together results in a better outcome for both teachers and students in inclusive co-taught math classes.

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