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Co-teaching to Enhance Mathematical Discourse and Respect for Diverse Voices

Mary P. Truxaw

University of Connecticut, Retired

mary.truxaw@theteachingcorner.com

Rebecca D. Eckert

University of Connecticut

rebecca.eckert@uconn.edu

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Abstract

This research investigates co-teaching aimed at enhancing meaningful mathematical discourse in linguistically diverse elementary classrooms (i.e., classrooms with emergent bilingual students). Findings demonstrate that co-teaching approaches (e.g., team teaching, parallel teaching, alternative/differentiated teaching, one teach/one assist, one teach/one observe) can be strategically combined with talk/discourse moves (e.g., revoicing, exploratory talk, accountable talk, etc.), talk formats (e.g., partner talk, small group talk, etc.), and language support strategies (e.g., visuals, modeling, code-switching, translanguaging, etc.) in order to enhance mathematical discourse. Further, an unanticipated, but consequential finding uncovered that co-teaching provided opportunities for "listening, understanding, and reasonably considering" (AERA 2021 Conference theme statement) others' voices and viewpoints – for both co-teachers and their students. Promising practices, approaches, strategies, and structures for supporting productive co-teaching, math discourse, and respect for diverse voices are shared.

Co-teaching to Enhance Mathematical Discourse and Respect for Diverse Voices

Objectives and Purpose

The AERA Conference theme, "Accepting Educational Responsibility," highlights the need to "respectfully engage" and to listen, understand, and reasonably consider others' viewpoints. We explore this essential need by examining the intersection of co-teaching, mathematical discourse, and linguistic diversity in elementary classrooms within a multi-year research and professional development project. We share promising practices and associated approaches, strategies, and structures that support productive co-teaching, math discourse, and respect for diverse voices. Indeed, as co-teachers collaborate and "transcend the experience of isolation" (Tobin & Roth, 2005, p. 314), there is potential for them and their students to learn to respect and acknowledge different voices and perspectives – about mathematics and beyond.

Perspectives

Excellence and Equity in Linguistically Diverse Mathematics Classrooms.

This research builds from sociocultural perspectives that recognize language as a mediating tool in the teaching-learning process (Vygotsky, 1978) and in the teaching-learning process for mathematics in particular (Moschkovich, 2002; Truxaw & DeFranco, 2008). Focus on language and discourse are particularly pertinent for the increasing number of emergent bilingual (EB)[1] students in schools (National Clearinghouse for English Language Acquisition, 2011). Language can be a resource (Moschkovich, 2013) or a source of meaning (Barwell, 2018). Indeed, there is evidence to suggest cognitive advantages of speaking more than one language (e.g., Hakuta, 1986). However, we also know that linguistic diversity can impact teaching and learning in complex ways (Moschkovich, 2007). For example, when perceived from deficit perspectives, mathematics instruction for EBs may focus on procedures and vocabulary rather than cognitively demanding activities and rich mathematical discourse (Moschkovich, 2005). To promote excellence and equity, EBs need "access to rich, rigorous, and relevant mathematics" (National Council of Supervisors of Mathematics [NCSM], TODOS: Mathematics for ALL [TODOS], 2016) that recognize their competencies, challenge their thinking, and provide

[1]In this paper we use the term *emergent bilingual* or EB to describe students who are learning to speak at least two languages. For thoughtful considerations of terms used to describe or label people who speak or are learning to speak more than one language, see Translanguaging Study Group, 2020, p. 10.

necessary support (Celedón-Pattichis & Ramirez, 2012; Moschkovich, 2012, 2013; Truxaw, 2020). Mathematical discourse is an important mediating tool for supporting excellence and equity.

Co-teaching to Support Excellence and Equity

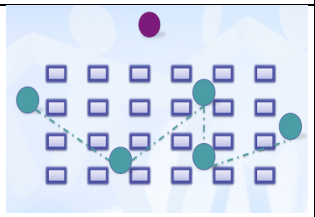
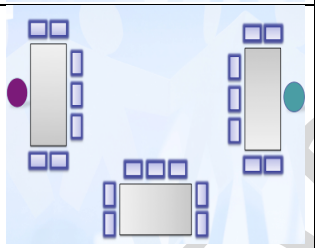
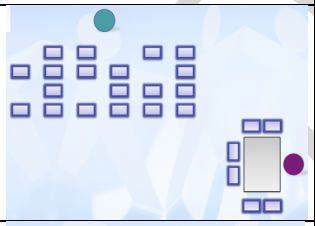
Co-teaching involves more than simply having two teachers in a classroom at the same time. Co-teaching involves two (or more) educators collaborating to share instructional responsibility and mutually agreed-upon goals for a single group of students. The teachers have mutual ownership, pooled resources, and joint accountability, though individual teacher's roles may vary (Friend & Cook, 2006). A variety of co-teaching approaches were developed in response to providing special education services and supports to students in inclusive general education classrooms (Friend, 2008; Murawski & Swanson, 2001; Scruggs, Mastropieri & McDuffie, 2007). Such approaches have been applied to other classroom settings where students may benefit from increased interactions between students and teachers and more differentiated instruction. Co-teaching has been shown to provide opportunities for increasing teacher confidence and flexibility in order to respond to diverse student needs, including supporting EBs (Truxaw & Eckert, 2018; Honigsfield & Dove, 2010; Pardini, 2006). There are also numerous documented benefits of using co-teaching to enhance pre-service teacher education, including addressing the needs of traditionally underserved students (e.g., Bacharach, Heck, & Dahlberg, 2010; Tobin & Roth, 2005).

See Table 1 for a list of approaches (i.e., one teach, one observe; one teach, one assist; parallel teaching; station teaching; alternative [differentiated] teaching, and team teaching), along with related diagrams, explanations, and examples of benefits noted by co-teaching teams.

Table 1.

Co-teaching Approaches from the Literature (Bacharach, Heck, & Dahlberg, 2010) **with Benefits Noted by Co-teaching Teams** (Truxaw & Eckert, 2018)

Approach	Diagram	Explanation	Examples of Benefits Noted by Co-Teaching Teams

One Teach, One Observe		One teacher teaches while the other strategically observes and collects purposeful data. Co-teachers share and analyze observational data afterwards.	• Having one teacher observe helps to inform instruction for grouping and differentiation • Planned observations of teacher practice can support professional growth
One Teach, One Assist		One teacher has the primary responsibility for planning & teaching; the other teacher moves around the classroom helping individuals and/or "voicing" student perceptions and questions.	• Can support higher order thinking – for example, one teacher questioning individuals. • Can support use of hands-on materials. • Can allow teachers to do different tasks.
Parallel Teaching		The two teachers plan jointly but split the classroom in half to teach the same content at the same time. (Teaching may be done in different languages.)	• Supports greater student engagement, use of language, and individual attention. • Can observe student needs more efficiently.
Station Teaching		The two teachers share responsibility for planning & teaching. The classroom is divided into teaching centers. Co-teachers are at particular stations; other stations are run independently by the students or by another adult.	• Supports differentiation (overlap with alternative teaching). • Students enjoy being able to move around and do different activities.
Alternative (Differentiated) Teaching		One teacher manages most of the class; the other teacher works with a small group inside or outside of the classroom. The small group does not have to integrate with the current lesson.	• Allows for more targeted, scaffolded, and/or sheltered instruction. • Helps support students to "catch up."
Team Teaching		Both teachers are responsible for planning, instruction, and classroom management of all students. Lessons are taught by both teachers who actively engage in conversation to encourage student discussion.	• Co-teachers can model academic conversations and vocabulary. • Allows teachers to support each other, jumping in when helpful.

Research Questions

This research investigates the intersection of co-teaching and math discourse in the context of linguistically diverse classrooms (i.e., classrooms with EBs). We ask the following research

questions:

RQ1) What are promising practices for co-teaching that support meaningful mathematical discourse in linguistically diverse elementary classrooms?

RQ2) How does co-teaching provide opportunities for listening, understanding, and reasonably considering others' voices and viewpoints?

Methods

Context

Our project involved research and sustained professional development (PD) with both experienced and preservice teachers. The co-teaching teams participated in PD workshops; dedicated, extended co-teaching planning time; structured reflections; and ongoing support. The co-teaching teams co-taught 3-days per week throughout the academic year at Eastbrook School (all names are pseudonyms).

Eastbrook is a K-5 elementary school located in the eastern United States. It is a professional development school for the university's teacher preparation program. The 2018 school year profile reported the following student demographic information: 80% Hispanic, 33% English learners, and 85% eligible for free/reduced meals. Eastbrook is home to the district's dual language program (DLP) at the elementary level where instruction takes place in English and Spanish. In each grade level of the DLP, one teacher teaches predominantly in English and the other teacher teaches predominantly in Spanish. Students switch between the two classrooms and the two languages. There are two DLP classrooms per grade level and the remaining classrooms are instructed in English only.

Participants

Participants in this research comprised co-teaching teams that included one experienced teacher and one master's intern who had completed student teaching the year before – essentially, the intern had the experience of a first-year teacher. The master's interns co-taught three days per week as part of their master's program at the local university. Project data were collected across four academic years (2015-2019) with a total of 13 co-teaching teams, ranging in grades from kindergarten to grade 4. Five of the co-teaching teams were part of the dual language program, co-teaching with the English language teachers. See Table 2 for details.

Table 2

Co-Teaching Team Information

	Total # Teams	K	1	2	3	4	Dual Language Teams
2015-16	4	2		1		1	2 (grades 2 & 4)
2016-17	3		2	1			1 (grade 2)
2017-18	4	1		2		1	1 (grade 4)
2018-19	2					2	1 (grade 4)
Total	13	3	2	4		4	5

Data Sources

Data sources come from classroom observations (field notes, audio and/or video recordings, transcriptions), interviews with teachers and administrators (audio and/or video recordings, transcriptions), and teachers' written reflections.

Data Coding and Analysis

Thematic coding and constant comparative methods (i.e., the "process of taking information from data collection and comparing it to emerging categories" (Creswell, 1998, p. 57) were employed. To begin coding, a *start list* of provisional themes/codes (Miles & Huberman, 1994) was generated from relevant research literature. See Tables 3 through 6 for the start list coding categories (i.e., talk/discourse moves, talk formats, co-teaching approaches, and language support strategies), sub-codes, descriptions, and examples. Additionally, open coding (Creswell) was used to inductively uncover other themes within the data. Next, axial coding (Creswell) was employed to look for patterns, interconnections, and relationships across themes – for example, promising practices associated with the intersection of themes.

Table 3

Start List of Talk/Discourse Codes

Move	Code	Description	Example
Revoice	Rv	The teacher restates some or all of what a student has said and verifies if it was an accurate interpretation (Chapin, O'Connor & Anderson, 2009).	"So you're saying …" "I heard you say …"

Repeat/ Restate	Rp	Students are asked to restate someone else's idea or reasoning. (Chapin, et al.)	"Can you repeat what ___ just said in your own words?"
Reason	Rs	Students are asked to apply their own reasoning to someone else's reasoning (Chapin et al., 2009)	"Do you agree or disagree with ___ (idea, conjecture, result) … and why?
Add On	AO	Students are prompted for further participation (Chapin et al., 2009)	"Would someone like to add something more to this?"
Wait/Think Time	WT	Providing wait time or "think time" (Chapin et al., 2009)	Silence or "Take your time, we'll wait …"
Exploratory Talk	ET	Speaking without answers fully intact, analogous to rough drafts in writing (Cazden, 2001)	Students participate in brainstorming or partner talk.
Accountable Talk	AT	Interactions that require accountability to knowledge, to standards of reasoning, and to the learning community (Michaels, O'Connor, Hall & Resnick, 2008)	Student offers an explanation that incorporates others' ideas and evidence to support mathematical claims.
Generative Feedback	GF	Feedback that promotes students' active monitoring and regulation of thinking about the math being taught, supporting tendencies toward dialogic functions (Truxaw & DeFranco, 2008)	"What do you think?" or "Why do you think that?" or "Do you agree/disagree and why?"

Table 4

Start List of Talk Format Codes

Move	Code	Description	Example
Whole Class	WC	Whole class talk	Teachers share and converse with the whole class group
Small Group	SG	Students in small groups talk with each other	Students converse in small groups, often related to a prompt or task
Partner Talk	PT	Partners talk with each other	Think, pair, share; turn and talk; etc.
One to One Talk	1:1	Teacher talks with one student	Teacher has individual conversation with a student
Self-Talk	ST	Person talks to self	Individual student thinks aloud while working on a task or problem

Table 5

Start List of Co-teaching Approach Codes

Approach	Code	Description	Example
One Teach, One Observe	1T1O	One teacher teaches while the other strategically observes and collects purposeful data. Co-teachers share and analyze observational data afterwards.	T1 facilitates whole class instruction/discussion; T2 observes for -----
One Teach, One Assist	1T1A	One teacher has the primary responsibility for planning & teaching; the other teacher moves around the classroom helping individuals and/or "voicing" student perceptions and questions.	T1 presents objectives and task. T2 circulates, checks in with students, and informs T1 if clarifications needed.
Parallel Teaching	PT	The two teachers plan jointly but split the classroom in half to teach the same content at the same time. (Teaching may be done in the same or different languages.)	T1 and T2 teach the same lesson but to smaller groups, allowing for more interactions.
Station Teaching	ST	The two teachers share responsibility for planning & teaching. The classroom is divided into teaching centers. Co-teachers are at particular stations; other stations are run independently by the students or by another adult.	T1 facilitates one station. T2 facilitates a different station.
Alternative/ Differentiated Teaching	ADT	One teacher manages most of the class; the other teacher works with a small group inside or outside of the classroom. The small group does not have to integrate with the current lesson.	T1 teaches a lesson to most of the class. T2 works with students who have been absent to help them catch up on work.
Team Teaching	TT	Both teachers are responsible for planning, instruction, and classroom management of all students. Lessons are taught by both teachers who actively engage in conversation to encourage student discussion.	T1 and T2 teach collaboratively, exchanging ideas back and forth – for example, modeling partner talk for the class.

(Bacharach, Heck, & Dahlberg, 2010)

Table 6

Start List of Language Support Strategies and Practices Codes

Strategy/ Practice	Code	Description	Example
Objectives	CO/LO	Teachers post, share, discuss content &/or language objectives	"Your language objective for the day, *students will be able to explain their reasoning for ordering fractions."*

Vocabulary	Voc	Explicit teaching or use of math/academic vocabulary	An interactive word wall is used in the classroom that includes math vocabulary words, pictures, examples, and definitions
Code-switching	C-S	Going back and forth from one language to another	Teacher refers to cognates in English and Spanish – e.g., denominator (English); denominador (Spanish)
Modeling	Mod	Teachers modeling expected practices	Teachers model ways of respectfully disagreeing about a math idea
Visuals	Vis	Visual aids to support learning & practices	Smartboard shows visuals to provide context of word problem
Feedback	Fdbk	Feedback to support learning & practices	"I love the use of vocabulary." "I love how you're taking turns."
Translanguag-ing	TrnLg	Dynamic multilingual, multimodal, multisensory meaning/sense making - validating bilingual, multilingual	Gestures, context, visuals, signs, multiple languages to support constructing meaning – validating bilingual and multilingual

(Celedón-Pattichis & Ramirez, 2012; Honigsfeld & Dove, 2010)

Results and Discussion

Overview of Results

Our analysis demonstrated that co-teaching approaches (e.g., team teaching, one teach/one assist, parallel teaching, etc.) can be strategically combined with talk/discourse moves (e.g., revoicing, wait/think time, exploratory talk, etc.), talk formats (e.g., whole class, partner, small group, etc.), and language support strategies (e.g., visuals, language objectives, etc.) in order to enhance mathematical discourse (RQ1). Further, we uncovered that co-teaching provided opportunities for "listening, understanding, and reasonably considering" (AERA, 2021) others' voices and viewpoints – for both co-teachers and their students (RQ2).

Research Question 1 Results

We uncovered *promising practices for co-teaching that support meaningful mathematical discourse in linguistically diverse elementary classrooms* across multiple classrooms and co-teaching teams. For this paper, we highlight a promising practice, modeling math discourse, from a co-teaching team in a fourth-grade DLP classroom where mathematics lessons were taught in English. The co-teachers were SG, an experienced teacher with dual language certification (English speaker) and MV, a master's intern (Spanish & English speaker).

Promising Practice: Modeling Math Discourse. The co-teachers worked collaboratively to identify and explicitly model productive mathematical discourse that focused on thinking and language. To implement this promising practice, the co-teaching team strategically selected and used co-teaching approaches, talk formats, talk/discourse moves and strategies, and language-support strategies during the modeling and during the student partner/small group work and whole class instruction. Their aim was to scaffold and support students' engagement in similar discourse. It is important to note that although we highlight *modeling math discourse*, this promising practice is tied to and supports other promising practices – for example, providing opportunities for students to reflect on what they saw and heard when discourse was modeled, providing opportunities for students to actively engage in math discourse with partners and small groups, monitoring and providing feedback on student discourse, and asking generative questions to support student thinking and math discourse. See Figure 1 for an example structure for how modeling math discourse could play out in a math class and how it connects to co-teaching approaches, talk formats, talk/discourse moves, and language support strategies. We also share brief examples from a fourth-grade math lesson related to ordering fractions with different denominators.

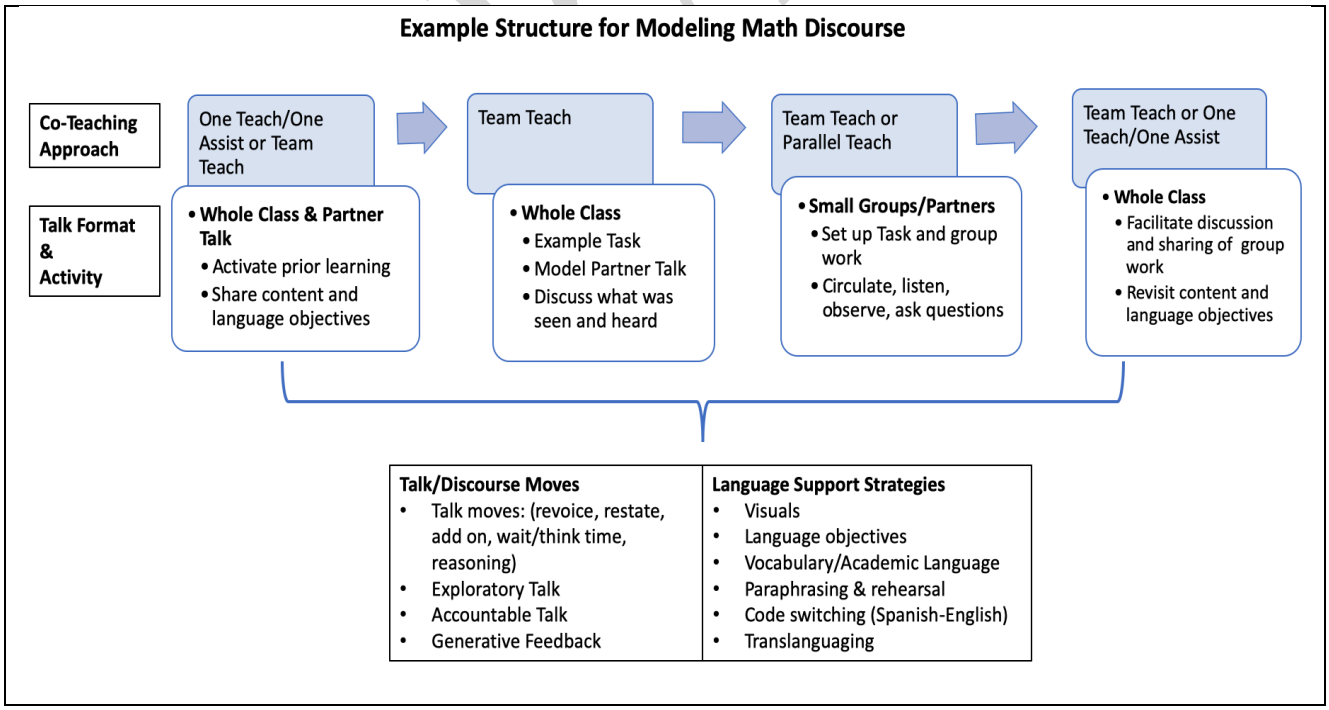


Figure 1. Example structure for modeling math discourse while co-teaching.

Math Class Example. The co-teachers, SG and MV, initiated the lesson using a *one teach/one assist* approach – alternating roles taking the lead and assisting to facilitate discussion of prior learning, to identify key vocabulary (see Figure 2), and to make connections to the content objective ("Students will be able to order fractions from least to greatest by creating common denominators.") and the language objective ("Students will be able to explain their reasoning for ordering fractions."). During this time, the co-teachers facilitated whole group discussion using talk moves (e.g., "Can you restate in your own words?") (Chapin, O'Connor & Anderson, 2009) and also partner/small group talk (e.g., "Turn and talk to your partner.") in order to actively engage and position students as capable learners.

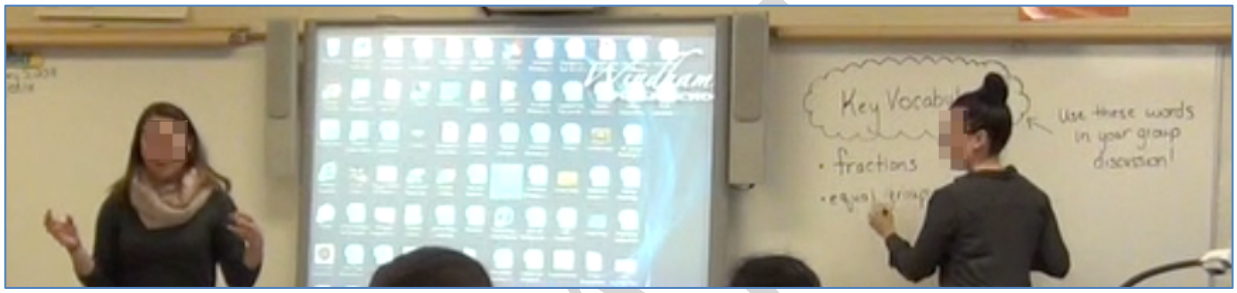


Figure 2. Co-teachers facilitate discussion to activate prior knowledge about relevant math vocabulary that will be used as part of the math discourse.

Next, SG introduced the discourse modeling:

> … Before you get your new scenario you are going to listen to MV and me figure this out. Because we want to show you two things. We want to show you our thinking, and we want you to [hear] the language that we use. So you are listening for **our thinking** and you are listening for **the language that we use** to solve this problem.

Using a *team teaching* approach, SG and MV shared visuals and explained and discussed a context related to ordering fractions. The context involved finding the winner in a pie eating contest when the pies were the same sizes, but were cut into different numbers of pieces (hence, different sized pieces; therefore, different denominators when represented as fractions). For example, contestants ate "one of those two pieces" (1/2), "five out of eight of her slices" (5/8), "three out of 4 of his slides" (3/4), and "five out of 12 of his slices" (5/12)

As they modeled the discourse, the co-teachers actively exchanged ideas, highlighting key concepts, questions, thinking, and related language. For example, after stating the general context, they noted possible connections to fractions concepts.

SG … each pie, same size different pieces. I'm starting to think about fractions. What does that mean if we have different sized pieces Miss V., what part of the fraction is that? Different sized pieces.

MV Hmm… well the pieces, the number of pieces is the denominator.

SG So there are different denominators?

MV There are different denominators.

MV Uh oh!

The co-teachers continued to model how they unpacked and made sense of the problem.

SG So John ate one out of 2 or 1/2 or half of his pie. What was his denominator, Miss V? We have 2 numbers there.

MV "Two, I see the denominator is 2 so it must be … two pieces."

SG And how many did he eat?

MV He ate one of those two pieces.

SG He ate one out of two slices. Okay. And then we have Sarah who ate 5 out of 8 of her slices, so her denominator was what?

MV Eight.

SG And how many did she eat?

MV Five.

SG Five of her slices.

MV Jack ate 3 out of 4 of his slices, and Jose ate 5 out of 12 of his slices. Miss V., there's a lot of numbers there.

To support student engagement, the co-teachers provided handouts of the task, displayed pictures, recorded ideas, and shared "concerns" about the task – for example:

SG Yeah, Ms. G., I think we have a bigger problem than just having to eat these pies … because I'm reading this word problem and I see that it says the judges need to determine the winner, but have trouble ordering the contestants.

MV Why would they have trouble?

SG Maybe it was because we have a lot of different denominators. So how are they going to figure out who came in first, second, or third place?

The co-teachers modeled discussing and developing strategies for solving the problem, including attending to prior learning and possible misconceptions.

SG So I know I can't just look at the numerators and say okay 5 is more, so he ate more slices. We have to figure out how to line them up from least to greatest. So we learned back last week that we cannot just compare the denominators that we have to find something. So I should have all eyes up here. Miss V., what do I have to find?

MV I think we need to find a common denominator for all of them.

SG Common denominator. So I should find their… factors?

MV Uhh, no Ms. G., it's their multiples.

The co-teachers continued to model discourse, including re-reading parts of the problem aloud, highlighting academic language, unpacking the task, asking questions, etc. To further engage students, the co-teachers would occasionally ask students in the class for their input as they worked to discuss, make sense of, and solve the example problem. For example, when working to order fractions to determine who ate the most pie, students were asked for input related to determining multiples and common multiples of the denominators of the fractions.

After modeling the math discourse, the co-teachers facilitated discussion with the students about what they had seen and heard and how it might inform partner/small group discourse and work. This reflection involved partner/small group talk, where the teachers circulated and checked in with groups (see Figure 3), and then whole class sharing of what they had seen and heard and how it might apply to their own math discourse and collaborative work.

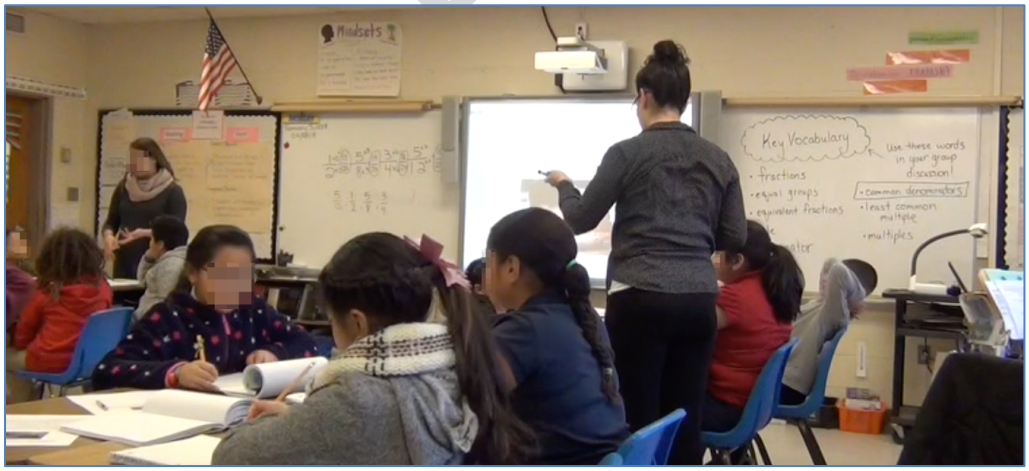


Figure 3. Students engage in small group math discourse while teachers circulate.

It is important to note that the co-teachers used their modeling of math discourse as a starting off point, but then provided students with the opportunity to reflect on and practice math discourse in their small groups. Small groups were assigned problems to collaboratively solve – with attention to *thinking* and *language*, as noted by SG below.

> SG "So Ms. V. and I are going to be coming around. We're going to be listening for your math language. We're going to be listening for students working together. And last, but not least, we are looking for you to show your work."

The co-teachers worked in parallel, checking in with specific small groups, listening, reinforcing thinking and language, asking questions, etc. Then the small groups posted and shared their work with the whole class with an emphasis on respectful and productive math discourse.

Co-teaching that focused on math discourse provided opportunities for students to see and experience collaboration and discourse. *Positioning*, that is, "the discursive process whereby selves are located in conversations as observably and subjectively coherent participants in jointly produced story lines" (Davies and Harré, 1990, p. 48) was important. The co-teachers positioned themselves as active collaborators in discussing and working through the problem. Their positioning was aimed at supporting students to position themselves similarly – that is, as capable learners worthy of respect.

RQ2 Results

Open coding revealed an unanticipated theme – respect for different voices and perspectives, aligned with the AERA 2021 Conference theme. Further analysis led to Research Question 2 and findings that co-teaching provided *opportunities for listening, understanding, and reasonably considering others' voices and viewpoints* – for both co-teachers and their students.

During an interview, the school principal, LB, articulated challenges and affordances of co-teaching that could lead to considering others' viewpoints:

> … co-teaching dynamics is really about how to engage with someone else because classrooms are kind of like a bedroom. It's kind of our private space – public spaces for kids and teaching – but just think, at the end of the day, teachers become very protective of their own space. And I think that this [co-teaching] allows for practice in the area of engaging with another adult about best practices in the classroom with kids. (2016)

Cogenerative dialogue – that is, reflection where members refer to the same set of events, and explanations are cogenerated, thus supporting reflection on experiences and co-generation of perspectives (Tobin & Roth, 2005) was instrumental not only in supporting effective co-teaching, but also in supporting the ability to listen, understand, and consider others' voices and viewpoints. During interviews across co-teaching teams, the power of collaboration that included being able to refer to shared spaces and experiences came up repeatedly. For example, during an interview with a second-grade dual language co-teaching team (2017), a co-teacher remarked, "… it's powerful to be in the same space and hearing the same language and seeing the same strategies which is something that we don't get to see most of the time." Other co-teaching teams shared similar ideas in their interviews.

To provide a sense of how co-teaching and cogenerative dialoguing not only allowed teachers to co-teach effectively, but also promoted *opportunities for listening, understanding, and reasonably considering others' voices and viewpoints*, we share some excerpts from an end-of-year interview with the same fourth-grade co-teaching team that we highlighted for RQ1. In the interview, the co-teachers acknowledged that they came from different backgrounds and experiences.

SG We kind of do have different approaches to the world.

MV Yeah, we do. We both come from very different experiences and have very different …

SG We had to put politics aside a little bit. *[Both laugh.]*

They noted that there were times when the students saw them respectfully disagree.

MV The kids see that and we even talk about it. "Oh, well, Ms. G, … thinks this. And I think that. And it's okay."

SG And they're amazed by that. "What do you mean, you don't think the same thing? … You're not going to fight about it?"

SG … And I got to share my views and she shared hers and the kids were like, "Oh, okay. There's more than one way of thinking …"

MV … We can have different views and still work together and still get along.

As the interview continued, they shared that mutual, professional respect was at the heart of their being able to collaborate productively with each other, even if their world views and experiences were different. MV shared the importance of feeling "valued and respected" and treated as a full teacher with authority (recalling that MV was the master's intern and SG was

the experienced teacher). SG shared the importance of sharing the authority and having professional trust in MV. Their interview and others that we analyzed showed a number of key themes and ideas that supported respect for different voices and perspectives by both co-teachers and their students. Components that supported respectfully listening, understanding, and considering others' voices included the following: ***co-teacher identity and agency*** that positions co-teachers with respect, shared authority, and professional trust; ***student identity and agency*** that positions students as active, capable learners worthy of respect and empowers students to negotiate and build ideas; ***respectful discourse*** that includes opportunities for modeling, agreeing to disagree, and rehearsing and practicing respectful discourse; and, finally, ***cogenerative dialogue*** where collaborators' reflection refers to the same set of events and where explanations are cogenerated (see Figure 4).

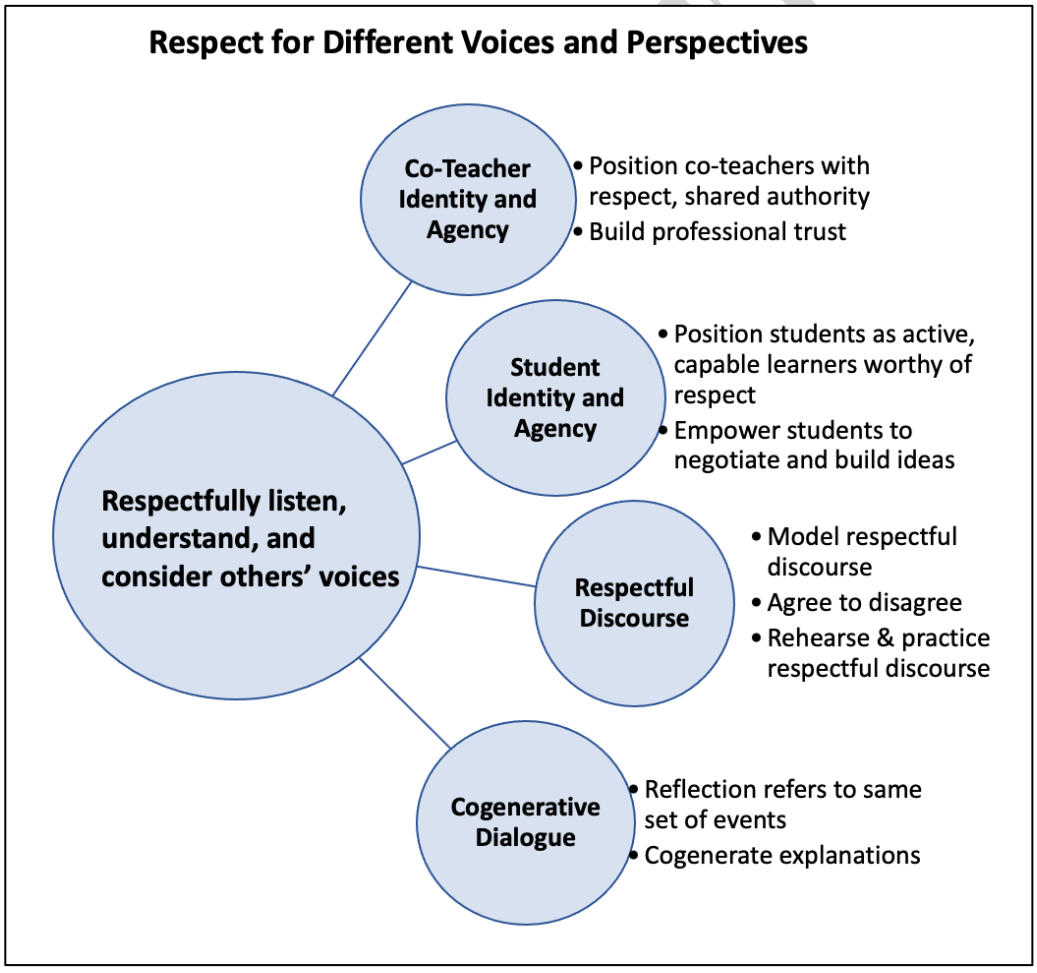


Figure 4. Respect for different voices and perspectives.

Implications/Significance

The results suggest that investigating intersections of co-teaching, math discourse, and linguistic diversity can uncover promising practices for enhancing meaningful mathematical discourse in linguistically diverse elementary classrooms. This work identifies not only promising practices, but also approaches, strategies, and structures for supporting them. Discourse is a powerful mediator of meaning (Vygotsky, 1978) – for mathematics teaching and learning (Moschkovich, 2002; Truxaw & DeFranco, 2008; Truxaw, 2020)… and beyond. Discourse is even more powerful when those involved can position themselves as active and capable collaborators who can respectfully listen, understand, and reasonably consider viewpoints beyond their own. This research suggests that co-teaching with an emphasis on discourse can empower teachers and their students – moving toward richer and more meaningful discourse to support mathematics learning and openness toward others' perspectives.

There are implications for research and practice related to teacher preparation, teaching, and learning. For example, co-teaching with an eye toward discourse can enhance dispositions, perspectives, and promising practices to support equitable teaching and learning – for both preservice and in-service teachers. Additionally, related research could inform recommendations for co-teaching and collaborative discourse within linguistically diverse schools.

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