Overview of Supporting Emergent Multilingual Students

Students' native languages are not only an important part of their cultural heritage, but they are vital to how they think, communicate, and learn. We must draw on students' funds of knowledge, which includes building on their cultural and community knowledge, recognizing their language and cultural heritage as a resource, and connecting mathematics instruction to their experiences and interests (Aguirre, Mayfield-Ingram, & Martin, 2013; Bartell et al., 2017). Comparing algorithms from different countries, exploring games or cooking from different regions, and storytelling can serve as cultural and linguistic resources in learning mathematics.

A quick review of the Mathematical Practices illuminates the critical role that language plays in learning mathematics. Student actions described in these eight Practices include making conjectures, reasoning, explaining connections among representations, constructing arguments, justifying conclusions, listening to the arguments of others, asking questions, and communicating precisely to others. Listening, speaking, reading, and writing—all embedded in the Mathematical Practices to focus on the learning of mathematics—are also the language processes needed to support the development of language. **Culturally responsive mathematics instruction (CRMI)** focuses on the big ideas of mathematics, makes that content relevant to the student, attends to each student's identity, and ensures each student's contributions are "taken up" in the classroom in an equitable manner. With this as the goal for supporting all students, here we focus specifically on effective strategies for supporting emergent multilingual students (as we stated, the phrase *emergent multilingual student* replaces *English language learner* because it is a more accurate and inclusive phrase). The following 10 strategies are not meant to be comprehensive, but to highlight critical strategies, based on research, that support emergent multilingual students.

1. ***Communicate high expectations***. How do you respond when an emergent multilingual student does not start to work on a problem or assignment? Too often, our first attempt to "help" is to simplify the mathematics and/or remove the language from the lesson. Both of these teacher moves can instead eliminate opportunities to develop mathematical proficiency. Instead, focus on the big ideas of mathematics and use tasks worthy of group work. Such tasks emphasize multiple representations and incorporate students' justifications and presentations, which support equitable opportunities to learn math (Nasir, Cabana, Shreve, Woodbury, & Louie 2014; Dunleavy, 2015).
2. ***Make content relevant***. This includes two equally important elements. First, is the *mathematics itself* presented meaningfully, and is it connected to other content? Second, are the situations or contexts familiar and interesting?
3. ***Establish norms for participation***. All students deserve opportunities to develop a strong mathematics identity (Bartell et al., 2017). A mathematical identity emerges from how a students' mathematics ideas and contributions are received by their peers and their teachers. Therefore, effective teaching of emergent multilinguals includes explicit attention to establishing norms that value all students' contributions and equitable participation among classmates, as well as establishes positive social interactions in small groups.
4. ***Honor native language and other languages***. Students can communicate in their native language as they learn mathematics and still advance their English proficiency (Haas & Gort, 2009; Moschkovich, 2009). Students might do their initial thinking in small groups in their preferred language and then consider how to communicate those ideas to others by translating their ideas into English or by using visuals or pictures. Multilingual students often code-switch, or move between two languages. Code-switching supports mathematical reasoning because students are selecting the language in which they can best express their ideas (Moschkovich, 2009). Explicitly highlighting connections between languages is also interesting and helpful to students. Many mathematics words are similar across languages (Celedón-Pattichis, 2009; Gómez, 2010)—for example, *equal* (English) and *igual* (Spanish). If you know these words, share them. If you don't, ask your students (or use a translator app).

5. ***Set content and language goals***. The first Teaching Practice (NCTM, 2014) states that goals should "identify the Mathematical Practices that students are learning to use more proficiently." These include significant use of language. An objective such as "Students will describe in writing how two strategies compare to each other" attends to both mathematical and language outcomes for students. And having such an objective means teaching must attend not only to using multiple strategies but also to what counts as a difference or similarity and how that might be written or stated.
6. ***Provide vocabulary support***. Language support benefits every student, but it is absolutely essential in accomplishing #3 in this list. Can you think of a word that means something different in mathematics classrooms than it typically means outside of mathematics classroom? There are many (e.g., *sum (some), mean, table, difference, etc.*). In fact, it is likely that any given lesson has at least one word that is taking on specialized meaning. Auditing lessons for both context and content vocabulary is important. If a context is not familiar to students, change it or preteach the necessary context words. While a context is critical to building understanding, too many contexts can take away from learning. Consider staying with one context for situations rather than using a variety of contexts. For example, for multiplication story problems, use stories about the same situation but vary the missing values in the story. This removes unnecessary language demands while maintaining high-level mathematical thinking.
7. ***Use comprehensible input***. This is closely related to vocabulary support, but it is a more general focus on communicating ideas so that they are understood. For example, giving instructions using visual cues can help an emergent multilingual student understand the expectations. Visuals, realia, picture books, and many other resources can be used to ensure the student understands the big ideas of the lesson and the expectations for doing a task.
8. ***Use cooperative groups strategically***. Building on #3 in this list, it is important to use cooperative groups with emergent multilinguals (Baker et al., 2014). Grouping of students must consider students' language skills. Placing a student who is just beginning to learn English with two English-speaking students may result in the student being left out, but grouping all Spanish speakers together prevents the students from learning English. Try to place bilingual students with students who are just beginning to learn English. Emphasize that using different languages in small groups is acceptable, but they must make sure everyone in their group understands and is engaged in the conversations.
9. ***Select tasks with multiple entry and exit points***. When a task is open-ended, students can apply their prior knowledge and experiences to solve the task. Algorithms vary from country to country, as do ways to represent mathematics concepts. Inviting and encouraging different methods and representations will result in approaches to problems that may be novel to other students (and the teacher!). This also presents an exciting opportunity for engaging the class in seeing how different strategies are alike and different.
10. ***Use diagnostic assessment tools***. **Diagnostic interviews** provide a chance to observe what content or language a student does or does not understand. Too often, assumptions are made about students' *mathematical understanding* when in fact the challenge was *linguistic*. Watching students solve a problem and probing to see what they know about the problem, as posed, can provide important insights into their mathematical and language knowledge, which can then inform instructional decisions.

Across these 10 strategies is a consistent and critical message: Every student must have the opportunity to develop a positive mathematics identity, and cultural diversity in a classroom can enrich the learning of mathematics.