

On the Use of Reform Mathematics Curricula with ENL Students

Brynn Strahan
Metropolitan School District of Pike Township

Each year, teachers adjust lessons and activities to meet the diverse needs of children in their classrooms. Designing creative, interactive, hands-on activities is one way that teachers differentiate instruction for each child. Likewise, lessons are often adjusted to account for students' reading or writing abilities. Students for whom English is a new language (i.e., ENL students), however, create unique challenges for teachers. For instance, many teachers are only fluent in English, so that communicating with ENL children and their parents can be an ongoing struggle.

Like many reform curricula, *Everyday Mathematics*, an elementary mathematics curriculum by the University of Chicago School Mathematics Project (UCMSP, 2004), is designed to facilitate conceptual learning and differentiated instruction. Despite its focus on mathematical understanding, however, some activities still present special challenges for ENL students, including counting, recognizing shapes and numbers, and process-related tasks (e.g., problem solving, communication). As an example, many of the problems in the *Everyday Mathematics* curriculum ask students to choose appropriate materials to solve problems, make connections to other problems, and justify their solutions. Considering that these tasks are difficult for average English-speaking students, the struggles of ENL students are understandable.

To assist teachers of ENL students, *Everyday Mathematics (EM)* provides curricular materials in Spanish for Spanish-speaking learners and their families. Over the past four years, I have had the opportunity to implement these materials in my classroom and work with others in my district to address the needs of ENL students. In this paper, I reflect on our use of the Spanish materials in the *EM* curriculum and identify the ways that we have organized our classrooms to better work with ENL learners. In doing so, I hope to provide strategies that all teachers of ENL students will find useful.

EM ENL Resources

Overall, the *EM* curriculum is designed to expose children to mathematics through a variety of instructional strategies (e.g., cooperative activities, context-rich settings) and address all of the common grade-level standards. In the area of number sense, for instance, children develop understanding and skill through multi-modal activities (Hasenbank & Hodgson, 2007), utilizing a variety of representations, estimation skills, and self-assessment strategies. Like many curricula, *EM* revisits number concepts throughout the year — always cycling back to reinforce concepts and skills. Likewise, problem solving is addressed daily via context-rich problems, hands-on strategies, and concrete manipulatives.

One of the helpful features of the *EM* curriculum is the fact that the page numbers for the student and teacher ENL materials are exactly the same as those in the standard versions. For example, if English-speaking first-grade students are working on the Math Boxes of Lesson 3.8 on page 48 in the Math Journal and the Home Link page 189, the ENL materials also present the Math Boxes on page 48 in the Math Journal and the Home Link on page 189. When looking at Math Boxes on page 48, children are expected to count by 5's in box 1. On the Spanish Journal page, it is set up the exact same way; the numbers and spaces are the same for the kids to complete and the directions - Count back by 5s — are given in Spanish (“Conde de vuelta por la 5”). It is easy for ENL children to follow along with other students and, if they are able to *read* in Spanish, it makes them feel much more comfortable.

The *EM* ENL materials are wonderful tools for assisting children in small groups. Modifications in the materials facilitate differentiation of instruction, allowing teachers to better address the needs of above- and below-grade-level students. Other Spanish materials that are available are Student Reference Books (for students to locate key concepts for *Everyday Mathematics*) and Math Masters. On the Math Masters, each page is provided in both English and Spanish, including Home Links (homework pages for the children to do with their families) and Journal pages.

Adaptations & Organization

Having ENL materials provided by the mathematics curriculum provided me with a variety of ways to address the needs of all students. To effectively use all of the resources, however, we have found that some adaptations and organizational methods are essential. For instance, problem solving poses a special challenge for ENL students, largely due to their reliance on their first language. So when ENL students are asked to solve problems and justify their solutions, I encourage them to explain their methods in Spanish, speaking into a tape recorder. With the assistance of an ENL specialist, students then translate their explanations into English. In this way, ENL students are eased into new expectations of problem-solving in English.

To be successful in an English-speaking classroom, it's especially important for ENL students to be organized and aware of classroom expectations. Each day, therefore, I begin with an agenda that lists the activities and assignments for the day. Each item on the agenda is coded in a different color, accompanied by pictures that depict the nature of the activity. Children quickly grasp the meaning of the different colors and can see that “we are done with the blue reading activity, next we are on the red math activity. I know it was the blue reading activity because I saw a picture of books and ABCs. I knew red was the math activity because there are addition problems on the agenda.” The use of color-coding and icons helps those students in the pre-reading or early-reading stage. Student worksheets are also color coded so that they recognize the nature of each activity. Supplemental activities for reading, for instance, are on blue paper, math worksheets are red, and so on. Again, the use of color coding helps students to connect subject areas with the activities and agenda.

With many reform curricula, using and tracking manipulatives can be an organizational nightmare. To assist all students (ENL and non-ENL), tool kits containing math supplies are distributed to each table. The kits consist of materials that are needed for the activity or unit that students are completing, such as money, clocks, felt, rulers, game markers, number grids, and dice. Each table is assigned a number and the same number is listed on the tool kit, so that students can connect the two. To assist the ENL students with language development, the tool kit supplies are labeled in both English and Spanish.

Games play a prevalent role in the *EM* curriculum, and these often travel home with the children—with instructions in both languages. The materials needed for each game were also included. ENL parents provided the teachers in our district with positive feedback about the use of games at home. Many claimed, for instance, that the use of games helped all members of the family feel more comfortable with math. Through at-home games, the parents of ENL students gained greater comfort with the *EM* materials and with assisting their child.

Having Spanish resources is only going to benefit teachers if they can locate the materials. While schools often purchase Spanish-language materials for teachers, the building, or the district, it is important to be able to find and use them daily! Like many reform curricula, *Everyday Mathematics* is designed to be used with children daily. In this environment, students better understand concepts and skills, and the constant exposure daily helps with mathematics understanding and language development. The daily exposure to mathematics, which the Spanish-language materials make accessible, encourages the consistent, little-by-little effort by which all students learn.

Reflections from Students and Parents

Feedback from ENL students and parents was of great assistance to my teaching. During parent-teacher conferences, parents and students would share their feelings about the instruction they were receiving. Parents that did not speak English frequently brought English-speaking family members with them as translators. Our district also has an ENL specialist, who can translate as well. Overall, I wanted to be sure that I was meeting the needs of each student *and* family.

The feedback that I received from students and parents indicates that the *EM* resources—and my adaptations of the materials—were greatly appreciated. A parent of one of my Spanish-speaking boys, said, “Thank you for sending home the homework with English on one side and Spanish on the other. Alan and I are working very hard to learn English, so we work on that side, but it helps to look at the Spanish side to make sure I understand the directions and the assignment.” Alan told me one morning that he liked doing the math homework because he could finally understand it—and he and his mom were both learning mathematics!

ENL materials also create language-learning opportunities. For instance, the father of one of my Spanish-speaking girls said, “We are trying to teach Zaira how to read in Spanish. She speaks Spanish fluently, but we also want her to read it. She is able to read the assignments in English, so when she is done, we practice reading the other side in Spanish. I am more comfortable with the Spanish side and Zaira likes the English side better. We really like getting the math activities at home, so we can work together to learn math!” The families of the students in my room all benefited from learning mathematics in this way, and it helped to comfort each ENL family.

Summary

Each year, teachers struggle because they do not know how to properly differentiate instruction in their classrooms. Differentiation is a struggle for all teachers and administrators. Teachers need to know that ENL materials exist and learn to use them. For teachers of ENL students, these resources represent one less thing they need to create to help students learn. The resources are also helpful for parents. For instance, the *EM* Home Links, Study Links, and Family Letters are great ways to communicate with parents and can be used by parents to teach their children Spanish. Making all children comfortable in our classrooms—so that students focus on mathematics—is an important goal, and the daily use of ENL materials is one small way to help.

References

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Contact info.: Brynn Strahan
Eagle Creek Elementary School
Metropolitan School District of Pike Township
6905 West 46th Street
Indianapolis, IN 46254
bstrahan@pike.k12.in.us