

THE ELL ADVANTAGE

Bilingual Students and Mathematics

By Lesley Lee

It is common to hear teachers and other adults say of English language learner (ELL) students that their “problem is with the English, not the math.” Some have gone as far as to suggest that studying mathematics should be left until the children have mastered English. In fact, bilingual children have significant advantages in learning mathematics. These advantages include:

Seeing what others take for granted. I have often had great difficulty in getting unilingual (one language) students to think deeply about our number system. It is usually the only system

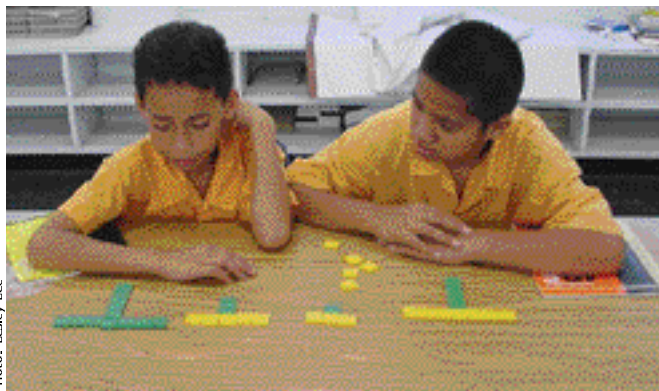


Photo: Lesley Lee

▷ Manipulatives allow children to work with mathematical ideas while learning how to say and write them mathematically.

they have ever seen and they have never really thought about it or questioned it. When I teach them the Greek number system and ask them to perform additions using Roman numerals or to express large quantities using a base 2 number system, they can suddenly see the great advantage of our small number of digits and the power of place value. In order for these students to really see, understand, and appreciate their own system they have to be introduced to another language or culture. Learners who already have another language and culture have a huge advantage because they can see what others take for granted, compare systems, and ask important questions.

Ease in understanding mathematical meanings of English words

One of the well-known problems with doing mathematics in English with unilingual students is the fact that mathematics

uses English words. These words are accompanied by nonmathematical meanings that interfere with the mathematical sense. For example, when we teach subtraction, we talk about “borrowing.” In $43 - 29$, we can’t take 9 from 3 so we “borrow” ten ones from the tens column; now we can take 9 from 13, and we can complete the equation. But borrowing implies that whatever was taken will be given back, and there is no giving back in subtraction. Or, think about the names given

to numbers: what is so negative about “negative numbers” and what is so “odd” about the numbers 1, 3, and 5? When we work with ELL students we are much more careful to pay attention to the distinctions between the mathematical and non-mathematical meanings of words. And ELL children often do not bring the baggage of other meanings that can interfere with understanding the mathematical terms.

Flexibility in thinking. Children who grow up using two or more languages are more flexible in their thinking. They are used to examining situations from different angles and switching perspectives rapidly. This is an advantage in problem solving situations in mathematics, where each bit of information must be examined to see if it is useful in solving the problem.

Despite their advantages in learning mathematics, ELL students can still benefit from methods that are adapted to their needs. Here are some techniques teachers can use to build on the ELL advantage in mathematics:

Use manipulatives. Manipulatives allow children to represent mathematical ideas without words; the materials become concrete objects to think about and think with. They allow all children, not just ELL students, to work with mathematical ideas before and while learning how to say and write them mathematically. Manipulatives can often be created from readily available materials (see the sidebar for an example).

Provide culturally relevant materials. Teachers must be careful to explain, change, or get rid of mathematics problems that do not fit within the culture of their students. Sometimes problems are not understood by ELL children simply because the problem story is completely outside their cultural experience. A “real life” mathematics problem from Michigan may not make any sense to a child in Pohnpei, for example.

In many ways, *all* students are MLLs – mathematics language learners. Teachers and parents cannot assume that because a child’s first language is English, the child understands the particular mathematical usage of words and the strange symbols used to write this new language. Teachers in all classrooms could benefit from the lessons coming out of ELL mathematics classrooms.

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Using Coconut Fronds as Manipulatives

At the 2004 Pacific Educational Conference in Rota, CNMI, the Yapese Teacher of the Year, Mr. Jonathon Youtaman, demonstrated the use of a coconut tree frond as a manipulative. First he demonstrated counting by twos with the leaves, and found there were 12 leaves on each side. He wrote the math problem, $12 + 12 = 24$. He then counted the leaves individually to check his work, and found there were 24. He also demonstrated subtraction. He wrote the problem $24 - 8 = ?$ on the chalkboard. He counted 8 leaves and held them back, then counted the remainder of the leaves and found there were 16 leaves left. Mr. Youtaman demonstrated a number of other ways to use the coconut frond as a manipulative, including splitting the coconut frond into two pieces to show $24 \div 2 = 12$.