

Strategies to Teach and Engage English Language Learners in Mathematics Classrooms

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English Language Learners (ELLs) have the burden of learning English at the same time that they are expected to learn subject matter content. In mathematics, the burden is particularly acute because mathematics is also considered a language (Usiskin, 1996). The language of mathematics includes its own vocabulary, syntax (sentence structure), semantic properties (truth conditions), and discourse (oral and written) features. This means that ELLs must coordinate new understandings related to the English language with new understandings related to the language of mathematics, which has nuances that at times conflict with students' understanding of English. Although challenging, teachers can use various strategies to support the full participation and engagement of ELLs in the mathematics classroom. Below I share some strategies taken from Kersaint, Thompson, and Petkova (2009) that can be used to support mathematics concept and language development.

1. Simplify and Elaborate Language to Provide Access and Opportunities to Learn

This strategy requires teachers to be cognizant of both the English and the mathematics words that are used in the classroom. Each of these may cause difficulties for ELLs and provide opportunities to enhance their understandings. Simplifying language involves taking a seemingly complex notion and translating it using terms that are likely familiar to ELLs. Elaborating, expanding, or paraphrasing ideas involves providing additional clarifications to help students make sense of the provided information. Let's consider an example that might appear in a textbook.

Problem: Thomas earns \$30,000 a year. He is promised a \$2,000 raise each year. At this rate, what will his salary be in 5 years?

Several words are used in this problem that might be difficult for ELLs depending on their language development and experiences (e.g., earns, promised, rate, raise, salary). Without

knowledge of these words, it will be difficult to solve this problem. To help ELLs, this problem can be paraphrased as suggested below.

Simplification: Thomas' pay is \$30,000 a year. He will also get \$2,000 more each year. How much will he get paid 5 years later?

Elaboration: Thomas earns \$30,000 a year. This means his pay is \$30,000. He is promised a \$2,000 raise each year. To get a raise means that he will get \$2,000 more each year. At this rate, what will be his salary in 5 years? Salary means the total amount that he will get paid.

Simplifying and elaborating ideas provide ELLs a variety of entry points and access to the mathematics inherent in tasks while allowing the teachers to maintain a the focus on the mathematics. In addition, elaboration provides students an opportunity to make meaning for new vocabulary that is encountered while making connections to their new language.

2. Express Mathematical Information in Multiple Ways

It would be a mistake to limit ELLs' exposure to variety of vocabulary words when they are in a mathematics classroom. Instead, teachers should express information in multiple ways to ensure that ELLs can make connections among the various synonyms that are used in English and in mathematics. As ELLs learn vocabulary, they may be familiar with one form of a word, but not with others. For example, an ELL may be familiar with the phrase "take away", but might not be familiar with the words "subtract," "minus," or "difference." If given a problem in which the phrase "the difference between..." is used, a teacher might mistakenly assume that an ELL is challenged by the mathematics when, in fact, the student is simply not familiar with a particular phrase. To assist ELLs, a teacher might review the various words that have the same meaning thereby allowing the ELLs to make connections to words that are familiar, while at the same time expanding their vocabulary to include new expressions.

3. Use Drawing and Illustrations to Support Communication

Drawings and illustrations can help students visualize and make sense of vocabulary words used in the classroom. Illustrations can also help students focus on the meaning of the intended word, especially in cases in which homonyms exists (e.g., *plane*, as used in geometry vs. *plain*, meaning simple vs. *plane*, the abbreviation for airplane). Illustrations can be used to help students distinguish among various words and help them understand how a particular word is being used in a given context. Visual aids need not be sophisticated. They can be images from the Internet, lines used to make connections between ideas, or simple drawings to convey the intended meaning. Using and allowing ELLs to use illustrations provides a means for communicating understanding, especially when ELLs cannot articulate their understanding verbally in English.

4. Eliminate or Address Linguistic Complexities Inherent in the English Language

The English language includes many features that cause difficulty for ELLs, such as the use of articles (i.e., a, an, the), pronouns, and synonyms. For example, a word problem that uses synonyms might hinder an ELL's ability to solve the problem if he or she does not recognize that the synonymous words refer to the same concept or item. A simple example is provided below to illustrate this possible difficulty.

Example: Five Robins are sitting on a fence. How many birds are left if two of them fly away?

In this problem, an ELL may not recognize that the words "Robins" and "birds" are referring to the same thing and may assume he or she does not have sufficient information to answer the question. Communication that uses pronouns, both aural and verbal, might also be challenging for ELLs. Pronouns are typically used to vary language patterns; however this variation might cause an ELL to question their understanding as they attempt to make sense of information. When pronouns are eliminated or clarified, ELLs are able to focus on the intent of the message being conveyed.

5. Assess ELLs in Ways that are Equitable

In many cases, ELLs are expected to meet the same academic standards as their English-speaking peers. In such cases, it is important to consider approaches to enable ELLs to demonstrate their mathematics knowledge, without underestimating their ability due to difficulties they may have with the English language. To alleviate these difficulties, test accommodations can be made without reducing the robustness of the subject matter to be assessed. An accommodation that is often made is to allow ELLs to use glossaries that translate text into their home language. Although a good first step, caution is encouraged in using this accommodation because ELLs might not be familiar with the specialized mathematics vocabulary in their home language, which would render the glossary useless. A more appropriate approach might be to allow students to use a personal dictionary that they create to help them make meaning of words that have learned. This personal dictionary might include the vocabulary word, an illustration, and their personalized translation of the word in their home language. Another approach involves eliminating potential linguistic complexities, as suggested in strategies 1 and 4 above and finding ways to address such complexities so that they do not cause difficulty for ELLs while taking a test. It is important to recognize that ELLs must engage in various steps when they take a test in English; they must read the text in English, translate it into their home language to make sense of the information, consider what mathematics to use to solve the problem, and then translate it back into English to provide an appropriate response. Clearly, this requires more time than is needed by their English-speaking peers. Teachers who recognize this need will provide ELLs more time to complete exams or reduce the number of questions that an ELL must answer during assessments.

6. Engage ELLs in Classroom Discourse

ELLs should be provided many opportunities to use their new language and mathematics skills as part of the mathematics learning community. To ensure that this occurs, teachers must find ways to incorporate ELLs as contributing members of the class. To do this effectively, teachers must be familiar with the language and mathematical development of individual ELLs and provide opportunities that allow them to showcase their skills. This might involve strategically finding opportunities for students to speak in small- and large-group settings. Teachers can “set ELLs up for success” by providing opportunities for them to rehearse what they will say, to correct the vocabulary they will use, and to gain confidence prior to sharing their ideas with peers. In addition, ELLs can be encouraged to use multiple means (e.g., concrete materials, drawings) to convey their ideas. Planning strategic opportunities for ELL engagement reinforces the idea that they are a valuable and contributing part of the learning community.

The strategies listed above represent a few approaches that can be used to support ELLs in the mathematics classroom. Overall, teachers must use whatever means necessary to engage ELLs and provide them access to and opportunity to learn mathematics.

References

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