

IDENTIFYING LANGUAGE ISSUES FOR ENGLISH LANGUAGE  
LEARNERS IN ALGEBRA CLASSROOMS

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Jesse Elizabeth Herrin

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IDENTIFYING LANGUAGE ISSUES FOR ENGLISH LANGUAGE  
LEARNERS IN ALGEBRA CLASSROOMS

Thesis Supervisor:

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M. Alejandra Sorto, Ph.D.  
Department of Mathematics

Approved:

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Heather C. Galloway, Ph.D.  
Dean, Honors College

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Jesse Elizabeth Herrin

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**ABSTRACT**

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Jesse Elizabeth Herrin

Texas State University-San Marcos

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**SUPERVISING PROFESSOR: M. Alejandra Sorto**

English language learners (ELLs) are likely to be placed into mainstream classrooms with teachers who have not had the opportunity to learn how to teach linguistically diverse students. Teachers that experience this challenge can benefit from knowing the language issues related to the subject matter. This work examines the vocabulary used in mainstream high school algebra classrooms that can be difficult for ELLs to comprehend. This work also offers strategies that teachers may find helpful when teaching algebra. By attending to language issues, it is the hope that all students will one day be given truly equal educational opportunities.

## **Introduction**

The United States of America is a melting pot of cultures, a place where people of all backgrounds and races can come together and live, and a place where education is a universal right open to all. From 1980 to 2012, the number of foreign born immigrants living in the USA has risen from 14.1 million to 40.8 million, almost tripling (Migration Policy Institute n.d.). Around 30% of all immigrants in 2009 were born in Mexico, making them the largest group from a single country. They are followed by the Philippines, 4.5% and India, 4.3%. The influx of students from Mexico and other countries has led to educational reforms which were designed to help the English language learners (ELLs) adapt to American culture and educational norms. For example, in 1973, The Bilingual Education and Training Act was signed into law and required elementary schools that had more than 20 ELLs in any given grade to provide bilingual instruction for those students. However, despite reforms and other educational measures, a large portion of the ELL population continues to underperform in the area of mathematics, and more specifically, algebra (Texas Education Agency 2013). Figure 1 shows that Hispanic ELLs' mathematics achievement scores an average of 34 points lower than those of Non-ELL Hispanics and 53 points lower than White students. While Hispanic ELLs' scores have improved steadily over time, there is still a significant gap between their scores and those of their Non-ELL classmates.

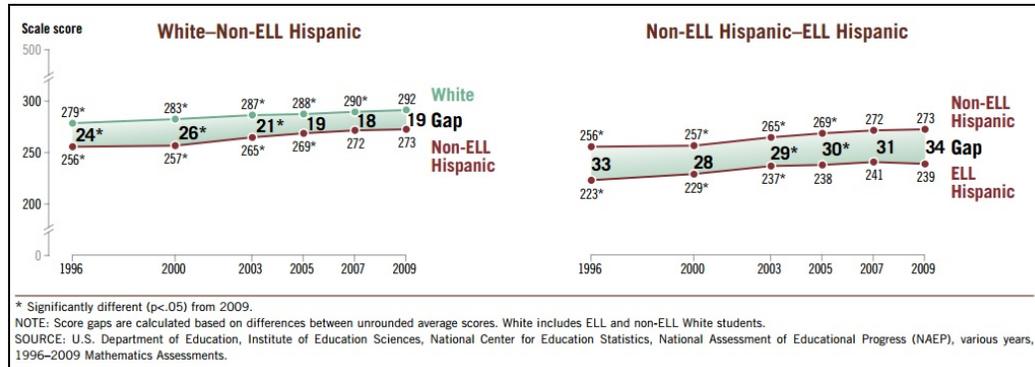


Figure 1: “Mathematics achievement score gaps between Hispanic and White public school students at grade 8, by English language learners status: Various years, 1996-2009” (Hemphill and Vanneman 2011)

In this study, ELL will refer to Hispanic ELLs, those students whose primary language is Spanish. Hispanic students in Texas make up 51% of the K-12 student population (Texas Education Agency 2013), and 90.2% of ELLs in Texas public schools selected Spanish as their home language (Texas Education Agency 2014). These students may not speak English at all, or may be fluent in a social setting, but have not yet achieved academic fluency. In the article she co-authored in 2013, “Mathematics Education and Language Diversity: A Dialogue Across Settings,” Judit Moschkovich discusses her decision to label students as “bilingual” instead of “English learner.” She addresses the fact that “English learner” focuses on the deficiencies of this student population instead of their strengths, and the stigma that “English learner” students are somehow less intelligent than other students. However, since the population discussed will be students who may not speak English well as of yet, and who find learning mathematics a challenge, English language learner (ELL) will be used throughout this study.

### **Purpose of the Study & Research Questions**

The purpose of this study was to understand the challenges that ELLs face in the algebra classroom, specifically as they relate linguistically and anthropologically. While much research has been done on ELLs and mathematics, very little has been published on the specific challenges of teaching ELLs in the algebra classroom. This study attempts to fill this gap in the research.

Another purpose of this study was to identify specific teaching strategies to help in instructing ELLs in the algebra classroom. There are many general strategies that can be easily adapted to fit the algebra classroom, and this study attempts to adapt them in a way that will can easily implemented in the mainstream classroom.

The questions that guided this research are:

1. What language-related issues might arise when teaching algebra to ELLs?
2. What vocabulary words in a high school algebra class might be challenging for students that are acquiring English as a second language?
3. How can an algebra teacher adjust his or her instruction to take into consideration the language issues that might arise when teaching ELLs?

## **Methodology**

The purpose of this study was to understand the challenges that ELLs face in the algebra classroom, specifically as they relate linguistically and anthropologically and identify specific teaching strategies to help in instructing ELLs in the algebra classroom.

The questions that guided this research are:

1. What language-related issues might arise when teaching algebra to ELLs?
2. What vocabulary words in a high school algebra class might be challenging for students that are acquiring English as a second language?
3. How can an algebra teacher adjust his or her instruction to take into consideration the language issues that might arise when teaching ELLs?

The research done for this study is qualitative as the author was not measuring specific variables or implementing the mentioned strategies in a classroom. Rather, the author examined the quality of lessons given in algebra classrooms and how well an ELL would understand the material being taught.

Classroom observation took place at San Marcos High School and were both announced and unannounced. San Marcos High School forms part of the San Marcos Consolidated Independent School District (CISD), located in Hays County. 72.1% of students in the San Marcos CISD are Hispanic and 8.6% of the total student body is are ELLs (Texas Education Agency 2013). While observing three high school algebra teachers, the author focused on the teacher's vocabulary choices and how ELLs responded to those words. There were a total of approximately seven hours of classroom

observation completed. Both academic and pre-AP classes were observed. Academic classes are mainstream classes for the “typical” student, while pre-AP classes strive to prepare students for the more challenging Advanced Placement (AP) classes they may choose to take as juniors or seniors (CollegeBoard n.d.).

The author also examined the algebra textbooks currently being used in algebra classrooms in Texas. Through examination of the lessons and vocabulary choices, the author was able to create an alternate lesson plan that can be used as an example for future teachers on how to increase ELL understanding of the topics presented.

## **History of English Language Learners in the United States**

English language learners have a long history in the United States and, in part due to this population, many educational reforms were passed. In 1964, Title VI of the Civil Rights Act of 1964 granted American students with limited English proficiency access to alternative language programs which allowed them to participate meaningfully in school. After the nation origin system — an immigration system that regulated the number of immigrants who could legally enter the United States from each foreign country, particularly non-European countries— was abolished, the Hispanic population, among others, grew rapidly and schools didn't know how to respond. In 1968, The Bilingual Education Act was passed. Texas Senator Ralph Yarborough proposed the bill which granted additional assistance to schools with large bilingual populations.

Unfortunately, these students weren't always given the help they needed. In 1970, the Department of Health, Education, and Welfare released a memorandum stating that school districts must actively take measures to correct students' English language deficiencies (Bartlett and O'Brien-Merril n.d.). Around this time, the United States Commission on Civil Rights also discovered that students caught speaking Spanish at school were fined, humiliated and punished. School districts supported these tactics because it was thought to be the way to correct language deficiencies. Fortunately, in 1973, things began to turn around. The Bilingual Education and Training Act was signed into law by Texas Governor Dolph Briscoe (Rodríguez 2010). The law was

groundbreaking because it required elementary schools that had more than 20 ELLs in any given grade to provide bilingual instruction for those students.

The Nation quickly caught up, and in 1974 the Equal Education Opportunities Act was passed, providing civil rights protection to all students, regardless of whether or not the school received funding. In 1978, an amendment was passed that expanded the term limited English proficient (LEP) to include students with any difficulty communicating in English. While this amendment required schools to assist an increased number of students, it did not provide any sort of additional funding or support for the faculty and staff members, so implementation was difficult. Over time, state and district education agencies were granted more freedom to choose how bilingual/English and a Second Language (ESL)/ELL programs would be implemented in their area. All of these advancements have made great progress in helping ELLs achieve academic success, however, there is still a long way to go. Nationally, and on the state level, ELLs are still scoring significantly lower, in all areas, than Non-ELLs.

	State	African American	Hispanic	White	Special Education	Econ Disad	ELL	At Risk
Gr 9	64	48	54	80	35	52	26	39
Gr 10	66	50	57	79	35	55	29	40
Gr 11	80	67	73	89	31	70	44	64

Figure 2: “Percent of Texas Students Meeting Standards on 2008 Mathematics TAKS (Texas Assessment of Knowledge and Skills)”-Adapted (Mathematics for English Language Learners n.d.)

According to the National Center of Educational Statistics, in 2010-2011, there were 4,659,349 ELLs at public schools and 718,350 of those students attended school in Texas. That means that Texas provides education for about 15% of the nation’s ELL population. Furthermore, according to the 2012-2013 Texas Academic Performance Report, released by the Texas Education Agency, ELLs in Texas constitute the lowest

scoring student subpopulation in most grade levels and subjects at the state level. Interestingly, ELLs are the second highest in attendance, preceded only by Asian students. This suggests that the low scores are not necessarily a product of students missing school. (Texas Education Agency 2013)

		State	African American	Hispanic	White	Asian	Special Ed	Econ Disadv	ELL
<b>STAAR Percent at Phase-in 1 Level II or Above</b>									
<b>End of Course</b>									
Algebra I	2013	78%	69%	74%	87%	95%	47%	71%	52%
Algebra II	2013	97%	96%	96%	99%	100%	79%	95%	84%
<b>TAKS Met Standard</b>									
<b>TAKS Grade 11</b>									
Mathematics	2013	89%	82%	87%	94%	97%	58%	85%	64%

Figure 3: “Texas Academic Performance Report 2012-13” Excerpt (Texas Education Agency 2013)

As seen in Figure 3 above, only 64% of ELLs met the standards for 11<sup>th</sup> grade TAKS mathematics, whereas 87% of Hispanic students met standards. This not only propagates the belief that ELLs are somehow intelligently under average, but also that they are incapable of learning. While it is evident through the educational reforms that schools are trying to help these students, many do not have the resources to hire bilingual professionals, and most teacher are not prepared for the bi- or multi-lingual classroom.

In this study, through the review of existing literature and studies, as well as classroom observation, the author will attempt to address some of the challenges and difficulties of the bi- and multi-lingual algebra classroom and how teachers can best teach to all students to maximize not only test scores, but most importantly, student understanding, learning and self-worth.

## **Cultural Sensitivity**

The first thing that is important to understand is that the classroom teacher serves as a “cultural accommodator and mediator” (Torres-Velasquez and Lobo 2005). This means that while the teacher is primarily responsible for giving lectures and helping students succeed academically, he or she is also the person who helps an incoming student feel safe, comfortable and accepted in the classroom. In the article, “Differentiating Instruction in English Language Learners,” Deandrea Murrey states that one of the key steps for helping ELLs experience academic success is providing a “low-anxiety environment.” That is to say, teachers should provide “scaffolding” — “the interaction between the expert and the novice in a problem-solving task (Shrum and Glisan 2000)”; a strategy used by teachers to make learning more manageable for students to keep motivation high— using group work to increase student participation, and allowing students to ask questions without fear of ridicule or criticism.

“Scaffolding is used to describe the step-by-step process of building students’ ability to complete tasks on their own (Gibbons 2002) and consists of several linked strategies, which include contextualizing academic language using visuals, gestures, and hands-on learning activities that involve academic language” (Fernandes, Anhalt and Civil 2009).

While using scaffolding effectively can be difficult when the teacher may not speak a student's native language, Fernandes, Anhalt and Civil point out that there are non-language based techniques that can be used. Scaffolding techniques outlined in "Mathematical Interviews to Assess Latino Students" include breaking a question's sentences into parts and ensuring that the student understands all parts. Teachers may also choose to "reframe the problem" or "emphasize key words." Asking the student to draw, point or gesture their understanding of the problem or asking another student to translate can aid the teacher in understanding the student's doubt and allow him or her to clarify meaning. All of these scaffolding techniques can help students feel safe and comfortable in the classroom.

Most Latin American countries have what social anthropologists call "hot" cultures. These "hot" cultures are characterized by a sense of community and togetherness, instead of the individualistic spirit that we tend to praise in the USA. It is recognized that there are two general categories for cultures: "cold-climate/urban" or "hot-climate/rural". (Lanier 2007) "Cold-climate" cultures, which are generally found in the USA, are characterized by having participants who are task and logic oriented, individualistic, private, time oriented, and who communicate directly. "Hot-climate" cultures, found in South America, have participants who are relationship and feeling oriented, group oriented, inclusive, event oriented, and who communicate indirectly. While there are stronger and weaker characteristics in each "climate" culture, when a teacher understands the differences in a student's home culture and the school's culture, it may be possible to help students adapt to the classroom and feel comfortable in the environment.

There are many techniques that can be used to accommodate the cultural differences that arise in the bi- or multi-cultural classroom. One technique is to allow hot-climate culture students to meet their relationship-oriented needs by having class discussions and encouraging these students to participate. Additionally, while in the “cold-culture” of the USA, teachers tend to be more task and logic oriented and as such, try to keep students as focused as possible on the specific lesson being taught, students from a “hot-culture” climate may find value in sharing experiences, however loosely related to the topic being discussed. (Colorado State University n.d.) To navigate these cultural differences, teachers could allow “brief departures from the lesson to build relationships and let students express themselves even if it seems off topic” (Colorado State University n.d.).

Since so much of the classroom environment is dictated by the quality of communication between teacher and student, and between students themselves, it is important to address the differences in communication in these cultures. The biggest difference is in how people respond to yes/no questions. The author learned, while living in Venezuela, that in “hot-climate” cultures, people will often give the answer they think one wants to hear, whereas people from “cold-climate” cultures will respond with what they think whether it’s the “right” answer or not. For example, in Venezuela, if one were to invite a friend to a party, the friend would automatically accept the invitation, even if he or she couldn’t attend, to avoid offending the host. In the United States, when one is invited to an event and he or she knows that attending will be impossible, one will tell the host so that they may better plan the event. So, to avoid putting students in this cultural conundrum of whether to answer what they think is right versus what they think the

teacher wants to hear, it's recommended for the teacher to ask open ended questions that require students to explain which answer they choose and why. For example, an important topic in high school Algebra II is how to solve problems with logs. In an observed high school, academic Algebra II class, the teacher asked students to identify the steps for solving these problems. Students were not asked to determine whether or not the correct step was taken, but rather to determine what the correct step was. In doing this, the teacher was able to check comprehension and make sure that no students were falling behind.

As previously mentioned, "hot-climate" cultures tend to be more group oriented than individualistic, both inside and outside the classroom. They value class discussion, group projects and growing as a class over individual achievement. For this reason, "hot-cultures" view learning as a group endeavor. Interestingly, Gilberto Lobo affirms that "learning mathematics is a community activity. [Students] depend on and support one another and value diversity" (Torres-Velasquez and Lobo 2005). Through the feeling of community in the classroom, students can feel comfortable discussing their strengths and weaknesses in a way that will allow them to learn from each other and grow together.

## **Linguistic Sensitivity**

While being culturally sensitive is important, teachers must also be linguistically sensitive to their students' needs. As mentioned in the introduction, ELLs may not speak any English while others may seem to have no problems communicating when it comes to general conversation (National Council of Teachers of English 2008). However, even though a student may be able to speak with the teacher and other students in an informal setting, he or she may be completely lost when hearing a lesson taught using academic English. The words used in a classroom or a specific lesson can be quite different from their colloquial equals and can often leave the ELL student confused. For example, if a teacher were to ask a student to create a table of the "x" and "y" values of a function,  $f(x)$ , the ELL may have a hard time understanding what to do. In his/her mind, a table is a place that one eats, not a way to organize data.

To minimize student confusion and misunderstanding, it is of utmost importance that the teacher explain new vocabulary words and concepts explicitly. It is helpful for students to both see and hear the new words, so writing them on the board or projecting them in a presentation format is helpful (Khisty 2002). For example, a teacher wanting to introduce the vocabulary word "intercept" could begin by giving the definition. Then, the teacher could draw a graph on the board and visually explain the concept of "intercept." Linking the mathematical definition "intercept" with the visual representation of the vocabulary words will help students connect the two mentally and will be more likely to

remember it in the future. Then the teacher could have students create a graphic organizer which contains the word, the definition, a definition in their own words or primary language, and a visual representation of the word defined (Roberts and Truxaw 2013). Additionally, ELLs may get confused with words that have more than one meaning. For example, “table” is a word that can be used to describe a way of organizing data or a place that one may eat. Both definitions may be used in a mathematics class, one in data collection and the other in word problems, but if the context does not clearly identify which meaning is intended, the ELL may have a hard time solving the problem.

Another way to increase student understanding is through the use of cognates (Gomez 2010). Many words in English and Spanish share Latin roots and are known as “true” cognates. An obvious example is circle and *circulo*. These words are pronounced almost exactly alike and both have the same meaning, a geometrical shape that consists of all set of points in a plane that are equidistant from a given point called the center. However, there are “false” cognates, words that sound similar in Spanish and English, but have very different meanings. For example, face and *fase*. Face is a term used in algebra and Geometry which refers to one of the plane surfaces bounding a three-dimensional figure (a side). *Fase* refers to a stage or a phase. While these words are similar in spelling and pronunciation, their meanings are very different. By using “true” cognates in the classroom, students who may not understand otherwise, will be able to follow along and understand the lesson being taught. To use a previous example, “table” is a true cognate for *tabla* which refers to the way of organized data definition. Without explicit explanation of the alternative definition, a new student may mistakenly believe that is the

only definition and will be confused with faced with a word problem involving a kitchen “table”.

Another common difficulty among ELLs occurs when trying to understand abstract concepts, such as the difference between positive and negative integers. While understanding abstract concepts tends to be difficult for all students, ELLs face the added challenge of understanding the vocabulary used to explain the concepts. Many of the concepts taught in algebra depend on the student’s prior knowledge. To give a very general example, to learn how to use quadratic equation, a student must first understand the concept of the square root. Square root in Spanish is *raiz cuadrada*, not something that necessarily sounds like square root, so an ELL may not be able to automatically connect that concept with his or her previous knowledge, therefore trying to understand the quadratic equation will be even more challenging than it would be for a non-ELL. This makes finding a way to concretely explain these abstract concepts essential for helping students succeed in mathematics. Of course, vocabulary should first be explained explicitly, but after hearing the academic definition, students should be given a more concrete example upon which to base their conceptual understanding of the topic. In *The Intersection of Language & Mathematics*, Swanson describes how she used the image of an iceberg to help ELLs understand signed integers. After discussing with her students about the properties of icebergs, partially above/below the water, they were able to apply the idea of signed integers—positive and negative numbers—and solve word problems involving the seemingly abstract concept.

After having taught a concept, concrete or abstract, it is important to make sure all students, ELL or otherwise, understand what the vocabulary words mean and how to use

them in a mathematical setting. The teacher may choose to start the discussion by asking students questions to check their understanding of the topic (Murrey 2008). At this point, students may begin asking their own questions and clarifying their doubts. This is a great opportunity for the teacher to take the topic away from theoretical mathematics and really involve the class in applying their newly acquired knowledge to a more meaningful context. While there have been many studies done and much research published about ELLs in the mathematics classroom, there are no specific recommendation for teaching algebra to ELLs. The purpose of this study is to begin to fill this gap in the literature

## Results

Through classroom observation in algebra classrooms and examination of the current algebra textbooks used in Texas public high schools, several language-related issues that arise when teaching algebra to ELLs were identified. These issues are the difficult vocabulary words for ELLs, including those which have more than one meaning, like “set” or “irrational”, the complex linguistic structure of the abstract mathematical concepts, such as logarithms, Euler’s number, or imaginary numbers, taught in algebra, the, often inadvertent, use of false cognates, like matrix/matrices, without explicit definition, and ambiguous language, for example, when a teacher says that a graph goes up instead of indicating that the line has a positive slope. These language-related issues are potentially detrimental to student success and could often be remedied through careful planning and intentionality on the teacher’s part.

The vocabulary words in a high school algebra class that are most challenging for students acquiring English as a second language are those which have more than one meaning, often one mathematical meaning and a much different colloquial meaning, such as “irrational,” “imaginary,” or “slope.” Through the careful teaching of vocabulary, it is possible for ELLs to understand these differences and succeed. Other words that are particularly difficult are false cognates, such as matrices, which sounds like *matriz*, the Spanish word for womb, and billion. In Spanish, billion is expressed as *mil millon*, or a thousand million, and the word *billon*, means trillion in English. These subtle differences

in language can change the meaning of a problem and confuse the ELL. Again, through careful explanation of the intended definition of these words, students may be able to differentiate between their perceived false meaning, and the meaning intended by the teacher.

There are many strategies that teachers can use to adjust instruction to take in to account the language-related issues that can arise when teaching ELLs. Some teachers automatically implement these strategies, but many do not because they are not aware of the challenges that face ELLs. After observing a class that would be particularly good for ELLs, the author spoke with the teacher who told the author that she had gone to a training where she learned strategies to help ELLs succeed in school; however, she wasn't given any strategies specific to algebra. The strategies that the teacher mentioned included using academic language in the classroom, creating graphic organizers to reinforce student learning of vocabulary and key topics, having a word wall in the classroom and trying to ask open-ended questions. During that and subsequent class visits, the author noticed that the teacher did a good job of successfully implementing these strategies.

One thing that the previously mentioned teacher, and many others, did that was not helpful for the ELLs in the classroom was the immediate redirection that occurred if they went off topic, even briefly. The author witnessed several cases where a student would begin to tell a story about something that had happened to him- or her-self and the teacher would automatically say something like, "That's nice, but we're talking about

\_\_\_\_\_ now.” A much better way to handle this would be to allow the student to tell his or her story and find a way to relate it to the topic being discussed. In this way, the teacher would be allowing the student from a hot-culture climate to meet his or her need to be relationship oriented. This, in turn, helps students build confidence in the classroom and perhaps that same student will feel comfortable asking for help the next time a lesson is not understood.

## Sample Lesson Plan

One of the difficulties of implementing new strategies into the classroom is trying to adequately adapt existing lesson plans. To provide an example of how this can be done, the author has adapted a lesson from the algebra 2 textbook that Texas public schools have been using (Larson, et al. 2007).

## Original Lesson Plan

Solve Linear Equations

Section 1.3: pages 18-25

This lesson is designed to be taught in one day on the “average” schedule or in .5 day on the block schedule. The lesson is broken into four parts:

1) Plan and Prepare:

a) Warm-Up Exercises:

Simplify the expression

i)  $8b - 3(4-b)$

ii)  $-6(m - 9) + 14m - 20$

iii) You bought a pair of jeans for  $n$  dollars in a city where the sales tax is 5%.

Write an expression for the total cost of the jeans, including sales tax.

2) Focus and Motivate:

a) Essential Question: What are the steps for solving linear equations?

- b) Motivating the Lesson: Many salespeople are paid a combination of an hourly rate and a commission that depends on the total value of the merchandise they sell. As a sales person, you can use linear equations to determine the value of the merchandise you must sell in order to meet your earnings goal.
- 3) Teach:
- a) Key Vocabulary: equation, linear equation, solution, equivalent equations
  - b) Key Concepts: Addition Property of Equality; Subtraction Property of Equality; Multiplication Property of Equality; Division Property of Equality
  - c) Examples:
    - i) Solve an equation with a variable on one side
    - ii) Write and use a linear equation
    - iii) Take Practice: Multiple Choice
    - iv) Solve an equation using the distributive property
    - v) Solve a work problem
- 4) Practice and Apply:
- a) Students should work problems involving the key vocabulary, key concepts and all examples.

The textbook does give helpful tips to the teacher, such as “Avoiding Common Errors” on pg 22, which reminds teachers that “Because the right side of each of these equations does not contain fractions, some students forget that they must multiply both sides of the

equation by the least common denominator. To avoid this error, have students carefully reread the multiplication property of equality” (Larson, et al. 2007). While this is a useful tip, there are many adjustments that can be made to help ELLs better understand this lesson.

## **Adapting this Lesson for ELLs**

The lesson plan provided by the algebra 2 textbook has a good order and structure. There isn't much that needs to be altered to fit this lesson to the needs of ELLs. For a classroom comprised of mostly ELLs, a teacher may want to extend this lesson to cover an entire day, on block schedule, or a day and a half to two days on a non-block schedule. This will give sufficient time for students to learn and understand the vocabulary involved in the lesson and to understand the key concepts. The author chose to focus on this lesson because solving linear equations is a foundational building block for algebra 2.

After completing the routine of answering and discussing the warm-up exercise, the teacher should introduce the vocabulary by both giving the definition and providing a visual representation. Then, the teacher should ask students to form group four groups and work together to create a graphic organizer for one of the vocabulary words. These graphic organizers should be hung around the room when completed so that students may refer to them in the future. This provides ELLs from hot-climate cultures the opportunity to focus on their relationships with their classmates, reinforce the vocabulary being taught, and give the teacher a chance to check student understanding.

To focus and motivate the class, the teacher may ask students either about their future plans for work and explain to them how learning to solve linear equations will be beneficial. Since not all students plan to work in resale, this gives ELLs a chance to share

with the class in a way that is constructive without being disruptive. Teachers may also ask students to tell him or her the steps of solving linear equations to see how much they remember from algebra 1.

The most important strategy to employ while teaching this lesson is to ask students open ended questions after presenting key information. While this may be a challenge when teaching ELLs with very limited English, the aforementioned scaffolding strategies, employing gestures, using a visual representation or asking another student to translate, can be used to help them understand the question and communicate their answer effectively. Continually checking to make sure that students are understanding the information presented will help keep students from feeling overwhelmed later on. Using the vocabulary presented at the beginning of the lesson is a great way to continually reinforce that knowledge as well. By emphasizing the vocabulary words, the connection that students make between the words and their mathematical meaning will be strengthened.

Finally, while students are working on the practice problems, the teacher can walk around the room asking students to explain their steps and reasoning in solving the problem. As previously mentioned, ELLs from hot-climate cultures will often feel fear of ridicule or criticism when asked to answer a question. By doing so one-on-one with the student, most of that fear will be eliminated and the student will feel free to ask questions and the teacher will be able to assess the ELL's understanding and provide scaffolding as needed. Again, this is a time that can be used to enhance the relationships by allowing

students to work in groups, which still being task-oriented and working within a time restriction. In this way, needs of all students are able to be met.

By altering this lesson slightly, both ELLs and non-ELLs will better understand the material being presented. Allowing students to share their experiences and ask questions while attending to language and cultural differences will enhance the learning experience of all students and allow future lessons to be taught without the need for extensive review of this material.

## **Conclusion**

Many teachers have not had the opportunities to learn how to teach the linguistically diverse ELLs that are likely to be placed into their mainstream classrooms, but those who experience this challenge can benefit from knowing and understanding the language-related issues that may arise. Through examination of the linguistic and cultural challenges that ELLs face in learning difficult vocabulary words, which often have more than one meaning, trying to understand the complex linguistic structure of abstract algebraic concepts, and misunderstanding due to lack of explanation when using false cognates and ambiguous language in algebra classrooms, many helpful strategies have been developed. The author's hope is that through the implementation of these strategies and adaptation of lesson plans, teachers will be able to provide all students with truly equal educational opportunities.

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